THE WHITE HOUSE

WASHINGTON

June 20, 1991

MEMORANDUM FOR THE PRESIDENT

THROUGH: TONY SNOW TS

FROM: MARK LANGE

SUBJECT: STATE HIGHWAY OFFICIALS

I. SUMMARY

On Friday, June 21, at 10:00 a.m. in Room 450, you will address 100 members of the American Association of State Highway and Transportation Officials. This includes most of the state Secretaries of Transportation.

II. DISCUSSION

The remarks (8 minutes, on cards) point out the differences between our transportation bill and the Senate bill.

(Lange/Simon)
June 20, 1991
12:30 P.M.
[AASHTO.TS]

BRIEF REMARKS: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ROOM 450, OEOB
FRIDAY, JUNE 21, 1991
10:00 A.M.

[[Secretary Skinner ... fellow travellers: \\

Welcome to the private screening of Road Warrior II. \\

Sorry if I'm a little late. Not that my commute is all that long... but I do get a little steamed by the gridlock in Congress. \\ ]]

You all understand the importance of mobility in our society. Our economic growth, our international competitiveness, even our cultural vitality -- all depend on the transportation lifelines that span this nation, that let people get to work, home, to entertainment, to family and friends.

We are the most mobile society in history -- economically, and, of course, literally. This century, we've developed the world's most advanced transportation system. We've done it through strong commitment and substantial investment. We have tried to harness the power of market forces, and we'll continue to do so. But we also believe in solid partnerships between the private sector and government at all levels.

No transportation partnership has endured so long or accomplished as much as the one between the Federal Government and AASHTO. Our organizations have worked together for 75 years now. We have helped turn a sprawling land knitted together by

dusty backroads into a nation linked by high-performance roads and highways. Those corridors have reshaped our nation and made it possible for all of us to take mobility for granted.

When President Eisenhower first proposed a major national highway network back in 1956, he laid the groundwork for unprecedented movement, unprecedented access, all across America: to products, to services, to prosperity.

Now, as the world seems to shrink while the competitive pace quickens, we must make certain American business has the mobility to compete and get its goods to market.

That's why our Surface Transportation proposal calls for significant investment in the future. We propose increasing Federal highway spending by 39 percent over the next five years.

We're committed to building stronger partnerships at every level. We favor giving new flexibility to the States. Let them decide how to address local needs. Our bill provides innovative features to encourage private investment in our transportation infrastructure.

We seek legislation for greater investment at the Federal level, for our overall highway system -- to meet an important national need. We asked for a higher state matching share for local roads outside the National Highway System because we believe federal funds should stay focused on national needs.

We believe our nation is best served by providing greater flexibility -- and greater accountability -- at the state and local level. A higher state match on urban and rural roads that

are not critical to national interests will increase total infrastructure investment. It will help us build better, more efficient roads.

I'm very pleased the Senate included a National Highway System in its version of the Surface Transportation Reauthorization. The Senate's bill includes some good features -- such as increased flexibility -- that we advanced originally. We need to loosen the federal apron strings on the states' highway programs.

But at times the stretch of Pennsylvania Avenue between Congress and the White House seems like the longest street in America. And that's certainly the case with the Senate version of this bill. Its defects outweigh its virtues.

The Senate bill doesn't focus Federal funds sufficiently on national needs. It allows for no differential match between the National Highway System and other programs. It shortchanges the National Highway System.

It calls for excessive Federal spending, putting at risk other important federal programs -- including programs you care about: aviation safety and modernization, for example, as well as education and health care.

The Senate version doesn't lower matching ratios or eliminate operating subsidies for local transit systems.

And finally, the Senate bill channels money directly to the Metropolitan Planning Organizations, bypassing the states. I believe that all highway funds should go through the state

transportation authorities. You people have the vision, the experience, and the organizations to ensure that our highway funds are spent wisely to meet local, state, and national needs.

As you all know, I challenged the Congress to pass a comprehensive crime bill and a transportation bill in a hundred days -- by June 14th. While the Senate has acted, the House hasn't even begun.

Now it looks like sound transportation legislation is still on the road to nowhere. Congress continues to take its time, and unfortunately for all of us, the delays are taking their toll.

What the American people heard as a 100-day challenge, the Congress used as an excuse to complain. A challenge of hundred days became an occasion for a hundred delays -- and a hundred and one excuses for inaction.

So I say to the Congress: Don't stop. Don't pass "go." Don't collect any more dollars. Just pass our transportation bill. //

The old approaches to surface transportation just won't do. By any standard, the way in which we -- the Federal Government -- and you -- the states -- do business must change in response to new fiscal and technological challenges. We must take full advantage of our present opportunity to create a surface transportation program that will meet our present and future needs -- not our past problems. We must develop a new generation of transportation systems and solutions.

Our bill recognizes that we can't just preserve the well-

worn paths of the past. We must move ahead. I need your help -- and the nation needs your service and expertise.

Let's review and reinvigorate the partnership between State and Federal interests that's kept America on the move through the 20th century. Let's stop talking. Let's stop stalling. Let's just get the job done.//

With the right tools, the right investment, and the right incentives, we'll move this nation into the next American century. And I look forward to working with you, every step of the way. Thank you all very much. Godspeed to you, and God bless the United States of America.

# # #

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

DRAFT

June 11, 1991
(Senate)

STATEMENT OF ADMINISTRATION POLICY

(THIS STATEMENT HAS BEEN COORDINATED BY OMB WITH THE CONCERNED AGENCIES.)

S. 1204 - Surface Transportation Efficiency Act of 1991
(Burdick (D) North Dakota)

The Administration supports improvements and reforms to the Federal-aid Highway System and the Federal transit program. However, the Administration has serious concerns regarding certain provisions of the Senate highway bill (S. 1204) and the Senate transit bill (S. 1194). (We understand that S. 1194 will be added to S. 1204 on the Senate floor as Title IV). Unless these concerns are addressed, the President's senior advisors would recommend that the President veto the bill.

The Administration's objections are delineated below and improvements will be sought prior to passage. As reported out of Committee S. 1204 and S 1194:

-- Fail to establish and fund a National Highway System that includes the designation of priority highways of national significance, to be improved and rehabilitated with targeted Federal funds.

-- Do not require ~~a higher~~ an adequate increase in State and local matching shares for highway and transit programs. All levels of government -- Federal, State, and local -- must increase investment in the Nation's transportation infrastructure.

-- Provide authorization levels in excess of those proposed by the Administration. S. 1204 currently would authorize $5.2 billion more for highways than the Administration's proposal over a five year period. S. 1194 would authorize $4.7 billion more for mass transit than the Administration's proposal over the same period. These increases in spending, if enacted and made fully available by Congress, would require adjustments in other categories of spending to stay within budgetary limits.

-- Fail to reduce mass transit operating subsidies. Studies show that these subsidies often undesirably inflate the transit wage structure and extend inefficient transit service to low-use suburban areas.

-- Do not derive a sufficiently high level of mass transit funding from the mass transit account of the Highway Trust Fund. As a result, uncommitted balances in this account would remain high, and U.S. taxpayer subsidies of local transit would continue.

-- Fail to bring financial discipline to the mass transit "new starts" program. In particular, the State and local

matching share has not been increased from the existing 80 percent ratio, and funds are authorized above the level enacted by Congress in recent years. Furthermore, language has been added which would allow financing commitments for major projects, such as new rail and bus fixed guideway systems, in excess of the authorization levels of the bill.

-- Force States to allocate 75 percent of their Surface Transportation Program funds based on population in urban and rural areas, thereby severely limiting State flexibility.

-- Provide Federal financing ($750 million) to develop prototypes and full-production systems for magnetic levitation technology. The Administration has proposed a research and development program to spur private sector and/or State interest in magnetic levitation transportation.

-- Unconstitutionally limit the removal authority of the President by appointing a Director of the newly created Bureau of Transportation Statistics who can be dismissed only for cause.

The Administration supports several features of S. 1204 and of S. 1194 which are similar to the Administration's proposal. These include program consolidation, enhanced State and local autonomy over highway and transit projects, greater opportunities for private sector involvement, emphasis on environmental concerns and congestion relief, planning and management systems, and the transit planning and research program to more effectively establish investment priorities.

Pay-As-You-Go-Scoring

S. 1204 would establish a new National Recreational Trails Trust Fund Program in the Interior Department for grants to States to develop and maintain recreational trails. The program would be funded by transfers from the Highway Trust Fund and by repealing fuel tax refunds to commercial recreational off-highway taxpayers. Initially, 0.3 percent of all Highway Trust Fund revenues would be diverted to this program regardless of source. Up to $56 million would be transferred from the Highway Trust Fund in subsequent years. The Administration does not support an arbitrary diversion in the initial year of Highway Trust Fund monies that may include non-recreation tax receipts.

The bill provides for an automatic allocation of funds to States which in the Administration's view is mandatory spending -- hence, an increase in direct spending subject to the pay-as-you-go requirement of the Omnibus Budget Reconciliation Act (OBRA) of 1990. These direct spending increases are not fully offset by the repeal of the fuel tax refunds or by other means. A budget point of order applies in both the House and Senate against any bill that is not fully offset under CBO scoring. If, contrary to the Administration's recommendation, the Senate waives any such point of order that applies against S. 1204, the effects of the enactment of this legislation would be included in a look back

pay-as-you-go sequestar report at the end of the Congressional session.

OMB's preliminary scoring of this program is presented in the table below. Final scoring of this legislation may deviate from these estimates. If S. 1204 were enacted, final OMB scoring estimates would be published within five days of enactment, as required by OBRA. The cumulative effects of all enacted legislation on direct spending will be issued in monthly reports transmitted to Congress.

Estimates for Pay-As-You-Go

In millions of dollars

	1992	1993	1994	1995	Total
Outlays	+30	+50	+54	+56	+190
Receipts	-1	-1	-1	-1	-4

* * * * *

(Not to be Distributed Outside Executive Office of the President)

This draft Statement of Administration Policy was developed by the Legislative Reference Division (Brown), in consultation with the Departments of Defense (Koster), Agriculture (Hogan), Commerce (Van Hanswyck), Education (Heindel), Energy (Lavender), HUD (Kamarck), Interior (Harris), Justice (Dorminey), State (Davis), Transportation (Donelan), and Treasury (Dorsey); as well as EPA (Meni), FEMA (Levi), USTR (Weiss), OPD (Chess), CIRA (Coffey), NR (Tuttle, Long, and Koskinen) and TCJ (Schwartz, Pheto, Bertram, and Sierra-Zorita).

Background

The current bill was originally introduced as S. 965. On June 4, Senator Burdick introduced the bill as reported by the Senate Environment and Public Works Committee as an original bill, S. 1204. Department of Transportation staff anticipate that the bill will be amended on the floor to incorporate the provisions of S. 1194, a bill to reauthorize the federal mass transit program.

Provisions of S. 1204 and S. 1194

The principal provisions of S. 1204 would:

-- Authorize expenditures from the Highway Trust Fund for FYs 1992-1996 totaling $92 billion. By comparison, the Administration's proposal would authorize spending totaling $86.8 billion for these purposes in FYs 1992-1996.

-- Establish a new program of grants to States known as the "Surface Transportation Program," under which States could spend grants on any transportation

project, including highways, mass transit, or rail projects.

-- Establish a Congestion and Air Quality Improvement Program to provide grants to help cities comply with the Clean Air Act.

-- Provide for a Federal-State match of 75/25 percent for the construction of new bridges and other new transportation facilities, and a match of 80/20 percent for other projects funded by the bill.

The principal provisions of S. 1194 would:

-- Authorize Federal mass transit expenditures for FYs 1992-1996 totaling $21 billion derived from both Mass Transit Account and General Fund revenues. By comparison, the Administration's proposal would authorize spending totaling $16.3 billion for these purposes in FYs 1992-1996 derived solely from Mass Transit Account revenues.

-- Not change existing Federal shares for mass transit construction projects (80 percent or 75 percent). By contrast, the Administration's proposal would lower the Federal share to 50 percent for new projects and 60 percent for other projects.

-- Continue Federal subsidies for mass transit operating expenses. The Administration's proposal would eliminate such subsidies.

Administration Position To Date

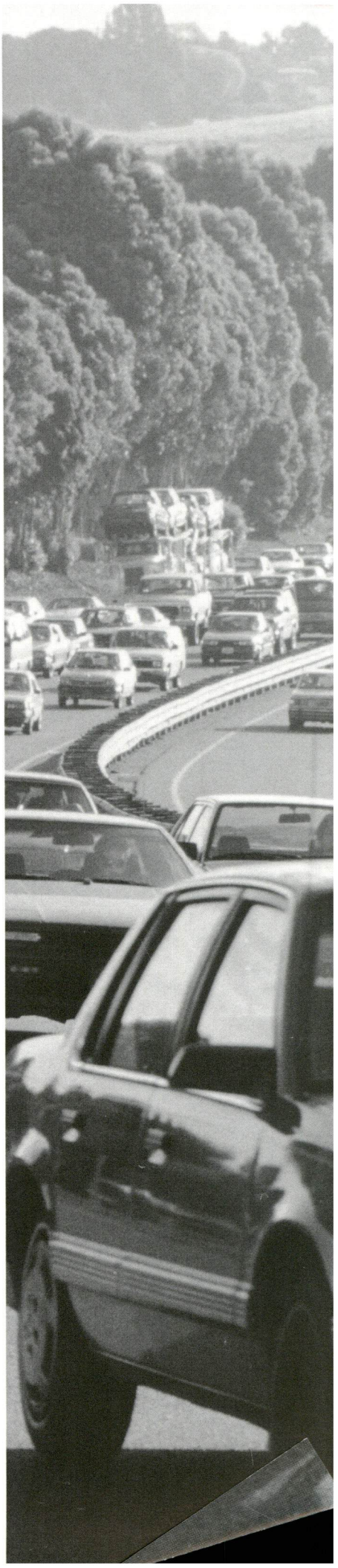
The Department of Transportation stated that it opposed several provisions of the predecessor bill, S. 965, in testimony before the Senate Environment and Public Works Committee on May 14, 1991. In a letter to the Committee dated May 22, 1991, the Secretary of Transportation stated that he would recommend that the President veto a bill which did not include dedicated funding for the National Highway System and an "adequate increase in State and local matching shares." In a letter to the Senate Banking, Housing, and Urban Affairs Committee regarding S. 1194 dated June 6, 1991, the Secretary stated that he would "recommend to the President that he veto a bill unless a significant number of our concerns [regarding S. 1194] are addressed in a manner that is consistent with the Administration's mass transit reauthorization bill proposal."

Legislative Reference Division Draft
6/11/91 -- 1:00 P.M.

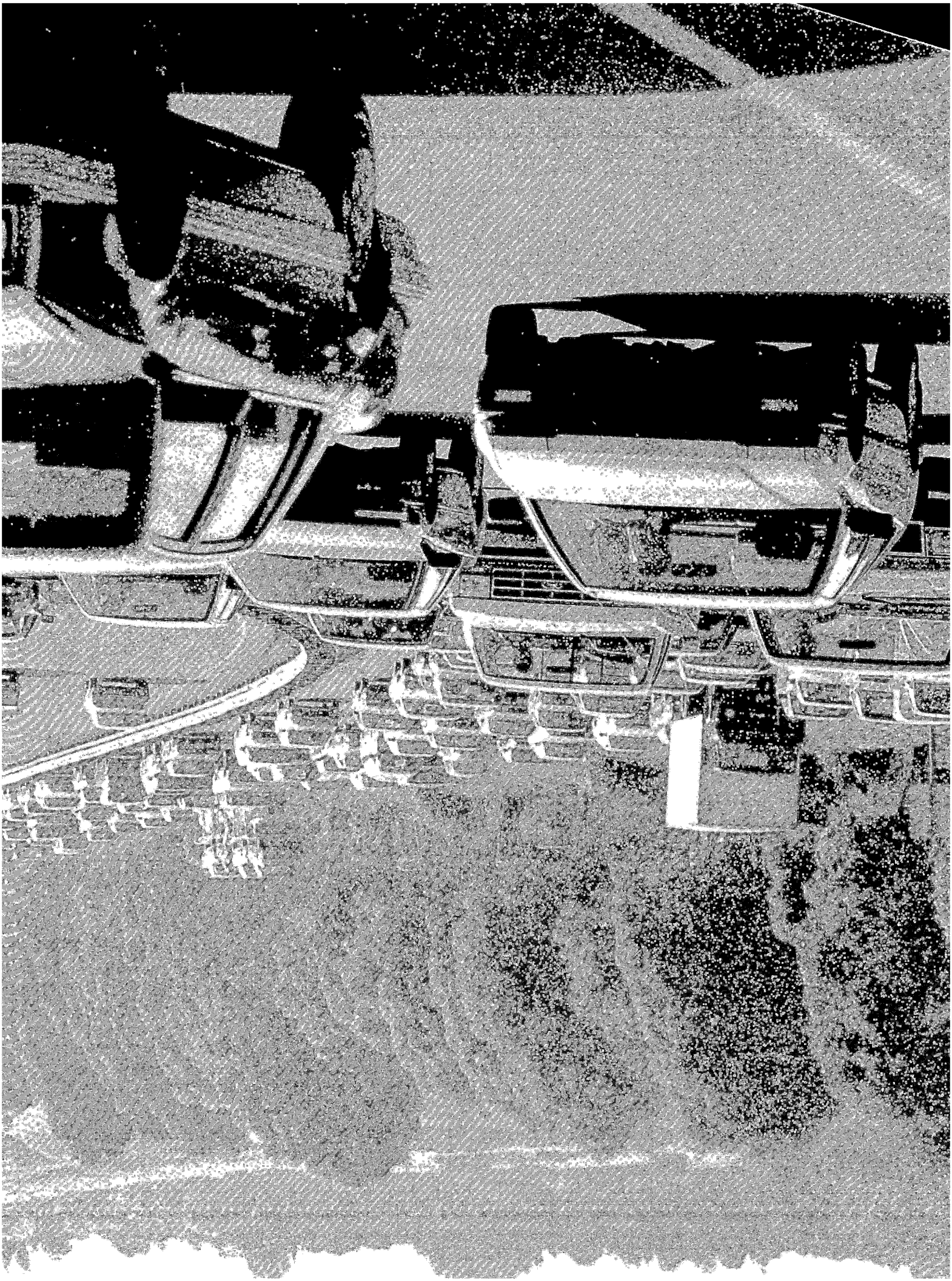
Transportation: Key to a Better Future

The Relationship of Transportation Investments to Economic Growth

A Special Committee Report



American Association of State Highway and Transportation Officials
December, 1990



Transportation: Key to a Better Future

The Relationship of Transportation Investments to Economic Growth

A Special Committee Report

American Association of State Highway and Transportation Officials
December, 1990

Published by
American Association of State Highway and Transportation Officials, Inc.
444 N. Capitol St. N.W., Suite 225, Washington, D.C. 20001
Telephone 202-624-5800

Prepared Under Direction of the
AASHTO Special Committee on Economic Expansion and Development

A. Ray Chamberlain, Colorado, *Chairman*
Ronald Fiedler, Wisconsin, *Vice Chairman*
Dave Clawson, *Secretary*

Region I
Richard Trainor, Maryland
William A. Lazarek, Connecticut
Christine M. Johnson, New Jersey
John Mladinov, New York

Region II
Maurice Smith, Arkansas
Thomas J. Harrelson, North Carolina
Floyd Hardy, Georgia
Patrick McCue, Florida

Region III
Horace B. Edwards, Kansas
Leonard Levine, Minnesota
Roger Schrantz, Wisconsin
Gloria J. Jeff, Michigan

Region IV
Larry W. Larsen, Montana
Arnold Oliver, Texas
Jay Klagge, Arizona
David G. Williams, Oregon

Consultant:
Apogee Research, Inc.

Foreword

This report was prepared by Apogee Research, Inc., under the direction of the AASHTO Special Committee on Economic Expansion and Development, and was approved for publication by a mail ballot of the Committee on November 8, 1990.

The case studies in this report which demonstrate the relationship of transportation investment and economic productivity are drawn from more than a hundred identified by a survey of the AASHTO member departments, and the Federal Highway Administration.

Table of Contents

The U.S. and the New Economy of the 1990s

As we rapidly approach the 21st Century, the U.S. faces new economic challenges at home as well as abroad. Our economy is no longer self sufficient. Rather we now depend on a global economy, where foreign trade in goods and services totals some one-fourth of our economic activity.

Too often we lag in the competitive battles with our largest economic rivals. Our annual trade deficit exceeds $100 billion a year—larger than the economy of many countries. New rivals appear regularly, such as a united Germany and the new economic strength of the European Community when trade barriers fall in 1992.

At home, growth in consumption continues to outpace savings, making it difficult to increase investment in new capacity and technology. Growing concern over quality of life issues, such as the environment, divert attention and resources from traditional economic answers.

At the same time, the United States has become a debtor nation, dependent on a steady flow of cash from other countries to finance government spending as well as much of our domestic investment.

Answers to these challenges are beginning to appear in the form of an economy that emphasizes practical innovation, attention to quality, renewed investment, and recognition of the global marketplace. Indeed, these same watchwords are used by our most direct competitors.

Not surprisingly, many business leaders and economists are calling for more effective use of our labor and capital resources—in other words, improved economic productivity—as the key to future economic growth. Unlike the past when rapid labor growth or access to new raw materials were the economic forces that drove growth, productivity gains now generate some 80 percent of the nation's economic growth.

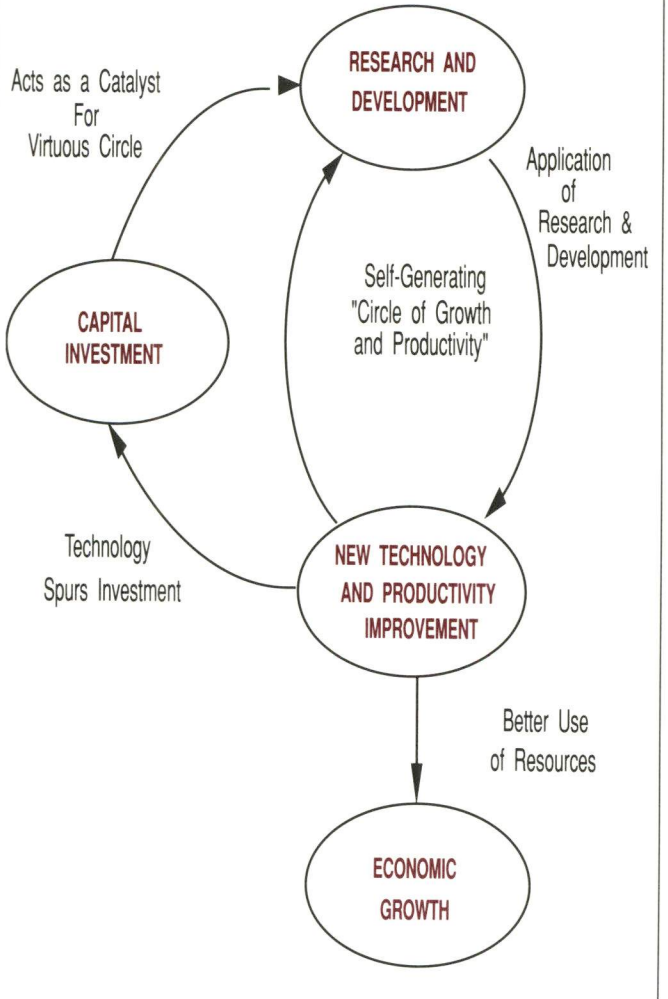
The key role played by improved productivity in a modern economy can be seen through what may be called the "circle of economic growth and productivity". Very simply, new capital investment serves as a catalyst for research and development and a series of improvements in new technology and management techniques (Figure 1). As described on page 3, new evidence shows the vital role

Figure 1

CREATING ECONOMIC GROWTH

Growth in Productivity is Key to Economic Growth

Capital Investment is Key to Productivity Growth



played by investment in transportation in stimulating this "circle of growth".

Given the clear importance of productivity, it is disturbing to note that our rate of growth in economic productivity has fallen to half what it was just 20 years ago— only 1.4 percent a year versus 2.8 percent annually in the 1960s. A drop of 1.4 percent a year sounds minuscule, but even small changes have dramatic effects on a five trillion dollar economy.

Lower productivity affects everyone—workers, managers, and consumers alike. For example, twenty years of productivity gains at 2.8 percent a year, rather than 1.4 percent, means a more than 40 percent increase in output per worker. Such gains translate directly into higher wages, higher profits, and a better standard of living.

Transportation and Economic Growth

"Less than one percent of the nation's economic resources (0.75 percent) are invested in transportation each year, about half that of just 25 years ago . Recent findings show that it is probably not a coincidence that the nation's rate of growth in productivity has been cut in half at about the same time that the level of national resources devoted to investment in infrastructure has dropped sharply."

Just as we search for new answers to this broad array of challenges, there is growing recognition that traditional tools such as investment in transportation and other public works can once again provide a powerful force for stimulating economic growth and productivity.

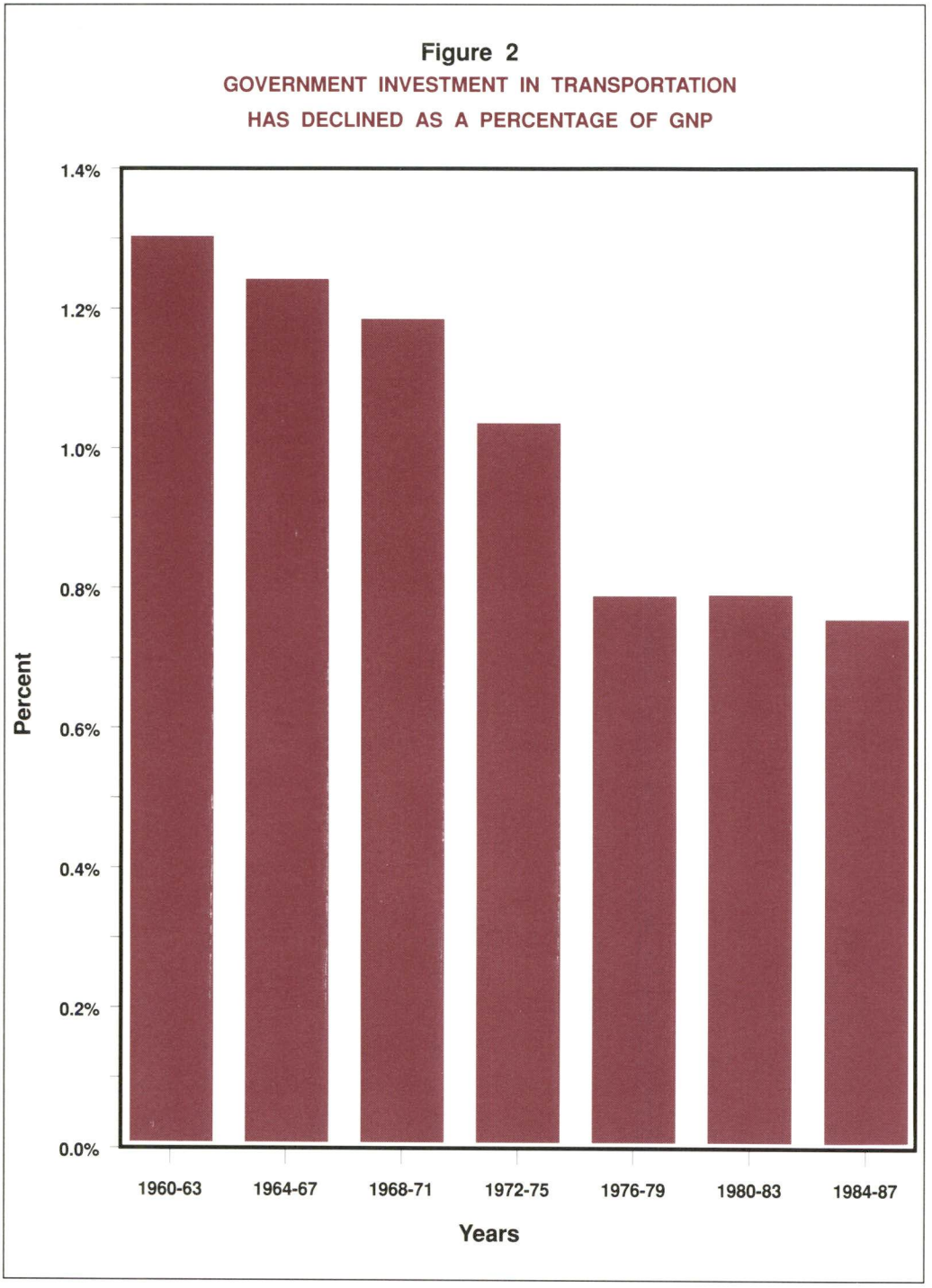
Less than one percent of the nation's economic resources (0.75 percent) are invested in transportation each year, about half that of just 25 years ago (Figure 2). Recent findings show that it is probably not a coincidence that the nation's rate of growth in productivity has been cut in half at about the same time that the level of national resources devoted to investment in infrastructure has dropped sharply. Indeed, reversing the recent national trend toward *dis*investment in public works appears likely to help solve far broader economic problems.

Transportation affects our daily lives more than almost any other public service. It determines how we get to work and where we live; it affects the cost of what we buy and the profitability of our local businesses; it makes it possible to compete in world markets just as it provides access to products from distant points; it is a major force in our quality of life, making it easier to visit friends and to enjoy leisure activities.

Good transportation obviously has more lasting importance as well. This link between transportation and future economic strength was most obvious in earlier times when shipping lanes, post roads, and canals connected the

Figure 2

GOVERNMENT INVESTMENT IN TRANSPORTATION HAS DECLINED AS A PERCENTAGE OF GNP



colonies. Later in the 19th Century, the transcontinental railroads became a conscious national tool used to speed the development of the West.

In the 20th Century, a national and regional network of roads and bridges became the leading force for economic growth. Starting more than 70 years ago, the federal government, in partnership with the states, built a high quality national road system including the Interstate and Defense Highway System. Of course, today's transport system is more than just

"Inadequate government infrastructure can impede improvements in productivity growth."

"Taking advantage of productive opportunities to maintain and improve the infrastructure is an important part of federal, state, and local government policies to raise economic growth."

Michael Boskin, Chairman of the Council of Economic Advisors
Economic Report of the President, 1990

roads and bridges. It includes an inter-connected network of airports and control towers, urban mass transit, inter-city railroads, and ports and harbors.

But transportation is not just a tool for opening up new regions for economic development. Indeed, an effective transport system may play an even more critical economic role in a modern, time-sensitive economy than it did 100 years ago.

Transportation will always play a leading role in helping business to reduce the costs to produce and distribute goods and services. With new production methods such as "just-in-time" (JIT) manufacturing, however, failure to deliver a part on time can shut down an entire factory. Because of their geographic dispersion and high-value shipments, the rapidly expanding service and high-tech industries are surprisingly dependent on transportation as well.

Productivity: The Key to Economic Growth

Economic productivity is more than a watchword for the U.S. Given the limited extent of new natural resources to be discovered and exploited and the predictable growth in our available labor force, productivity remains the one key determinant of economic growth that we can influence. It also provides a yardstick to measure our success relative to that of our major economic competitors.

Not only has the rate of U.S. productivity growth fallen in recent years, it remains low relative to our major competitors. For example, between 1965 and 1985, Japan achieved a labor productivity growth rate in excess of 3 percent per year and West Germany's labor productivity grew at an annual rate of more than 2 percent while the U.S. has lagged at close to one percent.

This low growth in U.S. productivity, coupled with persistently high consumption growth, helped to change our position during the 1980s from the world's largest creditor to the world's largest debtor nation.

Figure 3 compares the recent trends in productivity for each of the seven major industrialized nations with the rate at which they have invested in public capital. The estimates of public capital spending exclude depreciation and are shown as a percent of gross national product. Spending by other countries has been adjusted downward to reflect the fact that some activities that are private in the U.S. (telecommunications and airlines, for example) are public in some countries.

"Very simply, public investment improves the effectiveness of the overall economy."

Even after recognizing the major differences in the economic and social structures of each country, the data imply a striking relationship between the ability and willingness of countries to invest in public capital and the productiveness of their overall economy. Very simply, *public investment improves the effectiveness of the overall economy.*

Just as future economic growth depends on increased economic productivity, so does our domestic standard of living. Declining productivity means that our future consumption opportunities will rise more slowly than

Figure 3

Higher Public Investment Implies Higher Productivity

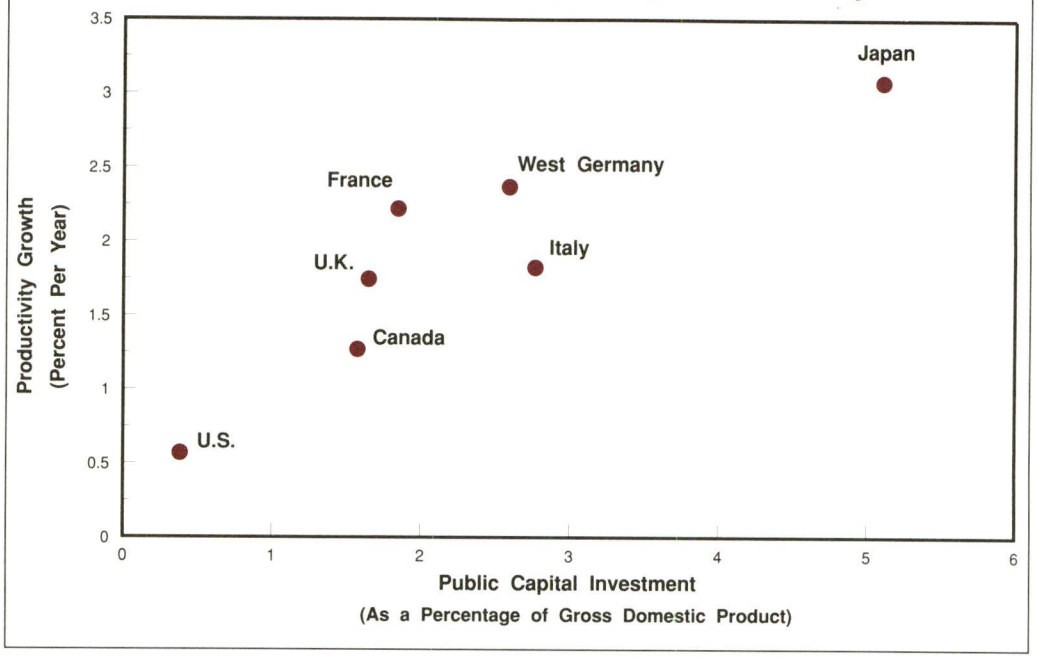
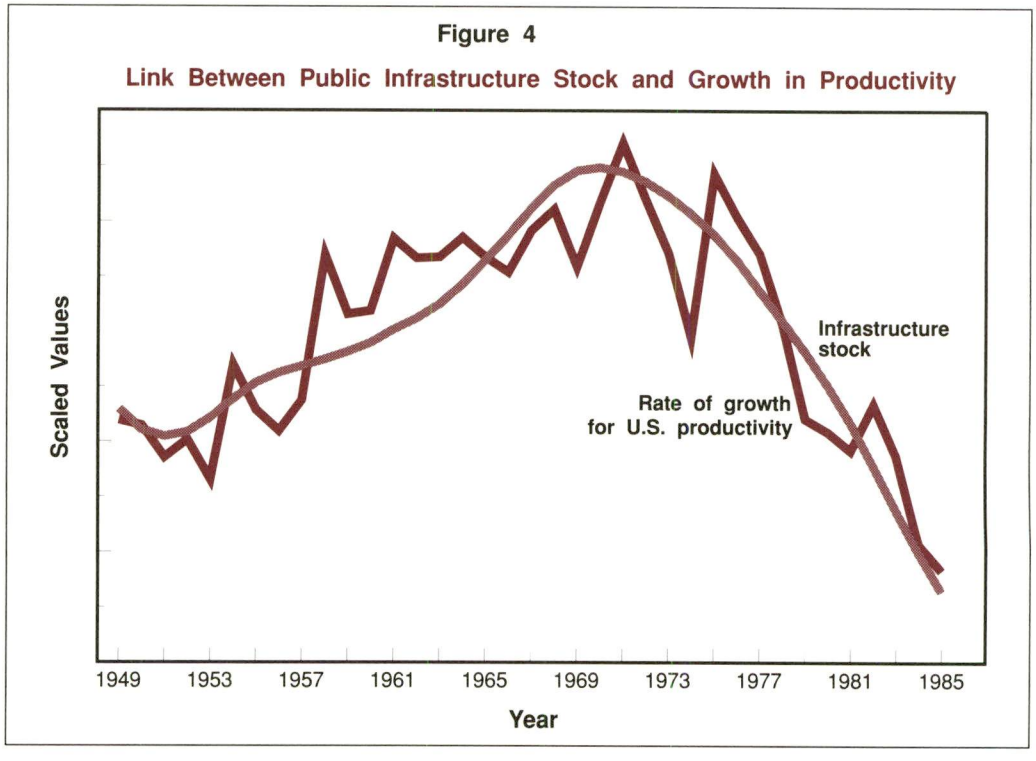
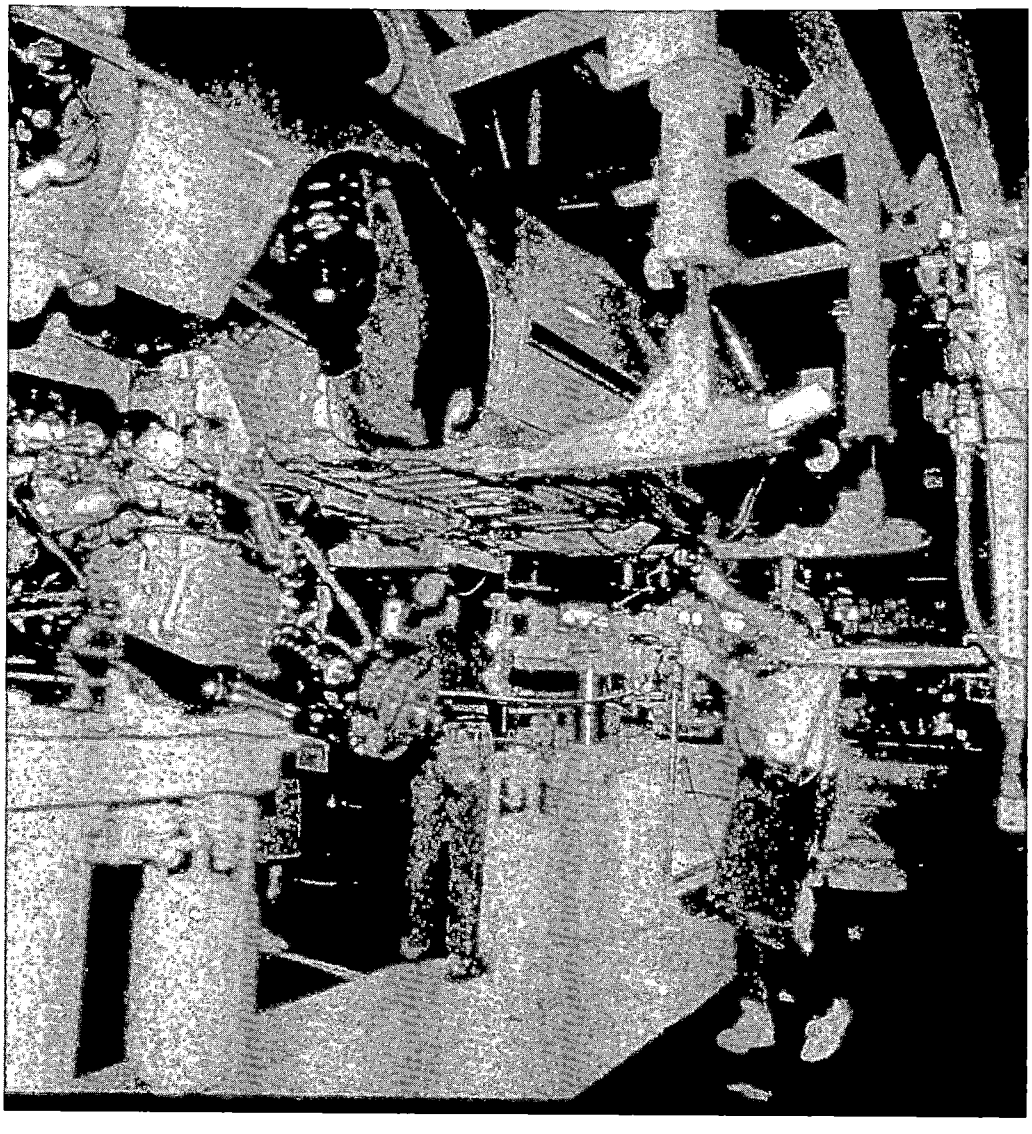


Figure 4

Link Between Public Infrastructure Stock and Growth in Productivity





otherwise. This means that people must work harder and longer to obtain the same basket of goods or must live at a lower standard of living than they could achieve if the economy were more productive. Over time, even small percentage changes in productivity can add up to large sums.

From 1950 to the mid-1980s, there has been a close relationship between the trend in U.S. productivity and the trend in the nonmilitary public capital stock (Figure 4). Increases and decreases in public capital stock have changed along with increases and decreases in productivity.

The Need for Public Investment: The Evidence Is In

New research shows that public capital can be just as important as private capital investment in stimulating a more productive economy. Indeed, after two decades of reduced public investment, it should not be surprising that many public investments may even provide higher rates of return than some private investments.

Dr. David Aschauer, while with the Federal Reserve Bank of Chicago, and Dr. Alicia Munnell, Director of Research for the Federal Reserve Bank of Boston, have quantified the link between public infrastructure investment and long-term economic productivity. Their nation-wide findings provide persuasive statistical evidence that the slowdown in public works investment over the past two decades may well be the most significant single force behind the relative decline in U.S. productivity. A later section provides real-world examples of how firms have taken advantage of transportation to improve their productivity.

This research shows that:

There is a robust, positive linkage between public capital—particularly infrastructure capital—and private sector productivity,

There exists a positive linkage between public capital and private sector profitability, and

There is a long-run positive relationship between public, nonmilitary investment and business investment.

Aschauer estimates that more than half of the total fall-off in productivity growth from the 1950s to the mid-1980s can be attributed to insufficient public infrastructure investment. Just as potholes in the streets would have jarred many fewer motorists had our nation invested more in infrastructure, our

"New research shows that public capital can be just as important as private capital investment in stimulating a more productive economy."

productivity slump would have been much less noticeable for the nation's economy.

While the statistical results vary depending on data used and specific assumptions, the effect is strong, with each 1 percent increase in public capital stock improving overall national productivity by between 0.15 percent and 0.35 percent.

Aschauer finds that each 1 percent increase in the nation's capital stock should raise the rate of return to private capital by about one-tenth of 1 percent. At current rates, a one-tenth of a percent increase in profit rates translates into more than $4 billion a year in profits. This, in turn, means higher private sector investment in plant and equipment—one of the classic ways to improve productivity. Over time, this same increase in public investment will stimulate private investment in plant and equipment, having the net effect of raising the national investment rate by a substantial amount.

Even at the state and local level, where economic gains can be disbursed through neighboring states, Munnell finds that each additional dollar of public capital stimulates private investment by 45 cents. Her research also shows that productivity is not an abstract concept, with an additional $1,000 per capita in infrastructure assets adding roughly 0.2 percent to the average annual rate of employment growth—or about 230,000 new jobs per year.

Such an increase in public investment raises the growth rate of labor productivity directly by allowing the available private capital stock to be utilized more efficiently—and indirectly by promoting private investment, making more private capital available per worker. The effect on productivity is substantial.

The basic idea linking infrastructure and private economic activity is simple. An adequate and well maintained public stock of infrastructure capital is essential to the profitable and efficient production and distribution of private sector goods and services.

Without question, a limited, or inefficient transportation network acts as a drag on overall private economic activity. Private business relies heavily on public infrastructure capital, such as roads, bridges, and airports, to support productive activity. Consider, for example, how the Interstate Highway System provides truck access to virtually every large- and medium-sized market and major port in the United States.

How does this link between transportation investment and economic productivity work in practice? The next section provides a sample of real-world examples taken from more than a hundred identified by state DOTs and the Federal Highway Administration. This report presents these examples for the first time.

"An adequate and well maintained public stock of infrastructure capital is essential to the profitable and efficient production and distribution of private sector goods and services."

Transportation: A Partner in Business Productivity

As with our daily lives, business decisions are continually influenced by the nature and quality of available transportation services. Improved transportation facilities, however, often act as a catalyst in business decisions, allowing and encouraging firms to change their internal operations to take advantage of new production and marketing opportunities. These changes have effects well beyond the loading dock and influence how firms organize their production activities.

Firms today operate in a complex economy, with suppliers and markets disbursed throughout the country and even the world. Corporate decisions regarding location, capital investment, production methods, relationships with suppliers and customers, and overall organization must be based on the constant need to improve profitability.

Underlying these decisions are concerns with costs, production efficiency, labor productivity, and market demand. Transport changes affect each of these factors, not just those associated with the obvious concerns with reduced transport costs. Thus, transportation has leverage throughout the firm, creating a *cascade of benefits* to the firm, its customers, its employees, and its suppliers.

The following table provides a summary of the case studies presented here. A brief review of these examples, reveals three major findings:

- First, there is a clear *interaction between high technology and transportation.* Electronic

communication plays just as important a role in an effective supply chain as does the timely movement of goods. Indeed, the case studies show that private firms have already taken the lead in using technology to maximize the gains from improved transportation;

- Second, the success stories show a *chain-reaction type of effect* that links transport improvements to a series of productivity gains that can even affect the structure of how firms do business. For example, in addition to cost savings, "just-in-time" inventory systems improve quality and make it easier for the firm to react to market forces. These, in turn, generate new sales and make greater cost savings possible.

- Third, the large number of examples identified illustrate that the relationship between transportation and productivity is robust and widespread and covers most major industries, every region of the country, and all modes of transportation.

Summary of Case Studies of the Link Between Transportation and Economic Productivity

Name of Case Study	Industry	Type of Productivity Effect
Koley's Medical Supply, Inc., Omaha, NE	Wholesale Distribution	Productivity improvements achieved by their hospital customers through stockless purchasing depend on good transportation access
Coca-Cola Midwest Eagan, MN	Soft Drink	High quality highways facilitate the use of rolling warehouses, creating productivity gains by reducing product handling costs and allowing the elimination of remote warehouses
James River Corporation Berlin, NH	Paper	Improvements to Route 115 increased transportation reliability and encouraged more carriers to come to the plant, allowing the plant to increase production and operate more efficiently
Campbell Soup Company Camden, NJ	Food	Higher productivity achieved through JIT deliveries by suppliers depends on reliable transportation
Dole Fresh Fruit Wilmington, DE	Food	Improved access roads to the Port of Wilmington improved truck traffic flow to port facilities, leading to more effective operations at their banana importing terminal
Aladdin Mills Dalton, GA	Carpet	An effective highway network helps make the company more competitive and facilitates labor access from adjacent communities
R.D. Werner Company Mercer County, PA	Metal Parts	Relocation of State Route 4017 allowed more efficient organization of production and also will allow expansion of plant
General Motors Corporation	Auto	Production system based on JIT shipping of components substantially increased dependence on effective highway transportation
Xerox Corporation Rochester, NY	Copier	The Interstate highway network facilitates nationwide shipping of its product by long haul trucking from a single manufacturing site
Hewlett Packard Palo Alto, CA	Computer	Because of high housing costs, employees must commute longer distances making good highways essential for labor access
Digital Equipment Corporation, MA and NH	Computer	An effective transportation network between their headquarters in MA and NH, allowed cost-effective expansion into NH
Wal-Mart Stores, Inc. Bentonville, AR	Discount Retail	Productivity gains and improved customer service achieved through its quick response program are facilitated by the Interstate Highway network
Federal Express, Ltd. Memphis, TN	Small Package	Good ground access to airports is essential to efficient operation of its "hub and spoke" system
Bank of Boston Canton, MA	Financial	Construction of Route 128 and access to commuter rail allowed the bank to increase efficiency by locating its back office activities away from the bank headquarters in downtown Boston

Four general types of changes in firm operations, all of which improve productivity, can be induced by improvements in transportation facilities:

Reducing bottlenecks in production and management,

Adding flexibility to what gets produced and how this is accomplished,

Improving access to labor, and

Permitting greater specialization of corporate functions.

Each category of productivity enhancements is discussed in more detail below with selected case studies illustrating the effect that transportation improvements can have on firms' productivity.

Reducing bottlenecks in production and management

Bottlenecks, usually limited production inputs or product flows, are a natural occurrence in every production process. Firms strive to avoid and overcome bottlenecks, with their decisions dependent on whether the limitation is short-term or long-term in nature. Short-term problems require adjustments to the production process, such as increasing inventories or beginning over-time production. Longer term bottlenecks often have to be solved with more dramatic changes, including capital investments, a new location, or a new set of suppliers.

Either type of bottleneck reduces a firm's productivity by decreasing the efficiency or increasing the cost of a production process. Transportation improvements can remove some bottlenecks, creating productivity gains.

A typical short-term bottleneck is a shortage of certain inputs at the right time and place. To overcome such bottlenecks, firms maintain inventories or require suppliers to make more frequent and smaller deliveries (which simply shifts the burden of inventories elsewhere). Maintaining inventories is expensive—there are costs of purchasing inputs before they are needed, costs to plan and manage inventories, and costs of any facilities or production processes resulting directly from having to hold large inventories (such as nearby warehouses). An increase in transportation reliability along with a better structured logistics system may remove input shortages, allowing firms to reduce inventories. Reducing inventories frees up money, manpower, and space, increasing the productivity of a firm's production process.

General Motors—Just-in-Time (JIT) Production

An efficient, effective transportation system is vital to the production and distribution of GM's vehicles and service parts. GM has 141 facilities in the U.S. that ship or receive component parts, raw materials, and/or finished vehicles. Of GM's 141 facilities, 29 are car and truck assembly plants located throughout the U.S. Based on its estimates for a typical assembly plant, described below, GM estimates approximately 7,000 trucks provide daily support to its 29 assembly plants. Also, GM estimates another 7,000 trucks are involved daily for its manufacturing and stamping plants.

According to GM, approximately 240 trucks are required to support the daily activity of a typical assembly plant (materials and supplies inbound and finished vehicles outbound). A typical plant receives and unloads an average of 120 truckloads of component parts and supplies daily. The plant then ships approximately 480 vehicles (one-half of its daily production) directly to dealers using 60 trucks. The other 480 vehicles are shipped from the plant on railcars to rail unloading ramps located in major market areas. Upon arrival, the railcars are unloaded and the 480 vehicles are delivered to dealers using another 60 trucks.

GM's dependence on effective highway transportation has increased substantially in the past decade. According to GM, much of its increased dependence upon highway transportation is the result of efforts to remain competitive. Operational changes to meet this goal revolve around GM's quality network production system that facilitates just-in-time (JIT) shipping of components to meet very precise production schedules. Smaller, more frequent shipments of components using JIT are also a method to control and reduce in-plant inventory. Likewise, in-transit inventory can be minimized by reducing the time that component shipments are in transit. Generally, truck transportation is faster than rail and GM consequently transports more of its component shipments over the highways.

General Motors
Efficient transportation system allows GM to institute a "just-in-time" delivery system: Inventories are reduced and production efficiencies increased.

To stay competitive, firms today are increasingly differentiating their product lines and shortening the life cycle of individual products. In order to achieve this, firms require a wider variety of inputs from a wider variety of suppliers. In addition, firms increasingly market their product to more diverse consumers over a larger area. As a result, both the amount of inputs and products being transported and the importance of speed and reliability of deliveries has increased.

The availability of an effective transportation network provides firms with better and more reliable access to both suppliers and consumers. Productivity gains often arise from more efficient internal operations made possible, in part, by good access through an effective transportation network.

Increasing flexibility in what gets produced and how

To compete in today's rapidly changing business environment, firms increasingly depend on their ability to make rapid transformations among products, suppliers, and markets. This flexibility increases productivity by allowing firms to take advantage in changes in both input and product markets. Transportation can play an important, but perhaps less obvious role in enhancing the flexibility of a firm.

James River Corporation

Road improvements allow year-round shipments: Efficient use of equipment is increased

James River Corporation—Increased Manufacturing Productivity

James River Corporation in Berlin, New Hampshire, manufactures paper rolls, paper towel products, and wood flour. Eighty percent of its products are shipped by truck. Recent improvements to Route 115 encouraged more carriers to come to the plant. Widening the road allowed bigger trucks to use Route 115, which offers more direct access to the plant from the interstate than alternative routes. The road improvements also allowed trucks to use Route 115 year-round, where previously it could not be used for several months in the spring.

With improved transportation access and reliability, the company decided to increase production at the plant by picking up the speed of existing machinery. Consequently, the company began making more efficient use of its equipment leading to increased productivity at the plant. With higher production, the company also increased sales.

In addition to productivity gains achieved at James River's plant, the improvements to Route 115 allow James River's customers to achieve inventory savings. Their customers generally do not want to keep large inventories of paper products. Improved transportation access and reliability allows carriers to make more frequent, smaller deliveries to James River's customers. As a result, their customers can reduce inventories, lowering their inventory carrying costs.

Improving access to labor

Labor is an essential input to virtually every product or service, and so access to cost-effective labor is a major consideration for private businesses. Good ground transportation is essential for access to a workforce. If transportation access is poor, the labor costs may increase or firms may have to relocate.

Many types of businesses, such as research and development firms, require access to highly skilled labor. Attracting these employees may bring "quality of life" considerations into play. In terms of transportation, these considerations include ground transportation quality (comfort, length of commute), as well as proximity or access to high-frequency air services, good schools, and attractive communities. Inadequate or

congested transportation systems may serve to raise the cost of highly skilled workers, thus reducing the productivity of the firms that rely on them.

Hewlett Packard—Labor Access

Labor access is an important concern at some Hewlett Packard (HP) facilities. In the San Francisco Bay area, high housing costs cause many HP employees to commute long distances to work. The long-distance commuters, as well as many short-distance commuters, depend on good highways to get to work. Forty-eight percent of HP employees in the San Francisco Bay area commute over 10 miles one way, with 6 percent travelling over 30 miles one way to get to work.

"Quality of life" considerations are important to HP's employees. HP's highly skilled employees often place great importance on their residential environment. While some employees prefer an urban environment, other employees prefer a rural environment. Some employees are willing to commute long distances to be able to live in their preferred residential environment. To attract and retain highly skilled labor, HP locates its facilities where a highway network allows good access from both urban and rural environments. At HP's facility in Roseville, California, for example, employees can commute on Interstate 80 from Sacramento, California or from smaller, rural communities in the Sierra Nevada Mountains.

Hewlett Packard
Road access is important to firm's siting decisions because employees commute long distances

Transportation improvements, along with improvements in telecommunications, may allow firms to become more specialized in the location of different corporate activities. Firms can locate certain activities, such as corporate headquarters, away from production centers to reduce costs. Specializing the location of different firm functions also allows firms more flexibility to remain competitive in a national or international market.

Specializing functions in different locations may require inputs to be moved over greater distances during the production process, leading to an overall increase in traffic. In many cases, it also causes an increase in individual travel because of management needs to travel more to monitor production and marketing activities. Even when the major transportation mode affected by this increase in travel is aviation, there are significant inputs of highway facilities in order to provide ground access to airports.

Permitting greater specialization of corporate functions

Digital Equipment

Easy transportation access allows firm to expand manufacturing away from headquarters: Production costs are reduced

Digital Equipment Corporation—Corporate Expansion

Digital Equipment Corporation (DEC) has its headquarters in Massachusetts. Further expansion in Massachusetts was not possible because of high real estate costs and traffic congestion. DEC looked for an area with lower property values but easy access to its headquarters, both in terms of employee travel and ease of installing fibre optic cables between that location and its headquarters.

DEC purchased a large parcel of land in southern New Hampshire along the F.E. Everett Turnpike. An interchange was constructed on the turnpike for easy access to the site. DEC installed underground fibre optic cables from the new site to its headquarters. Both good highway access and telecommunications allowed DEC to expand its operations into New Hampshire.

Productivity Case Studies

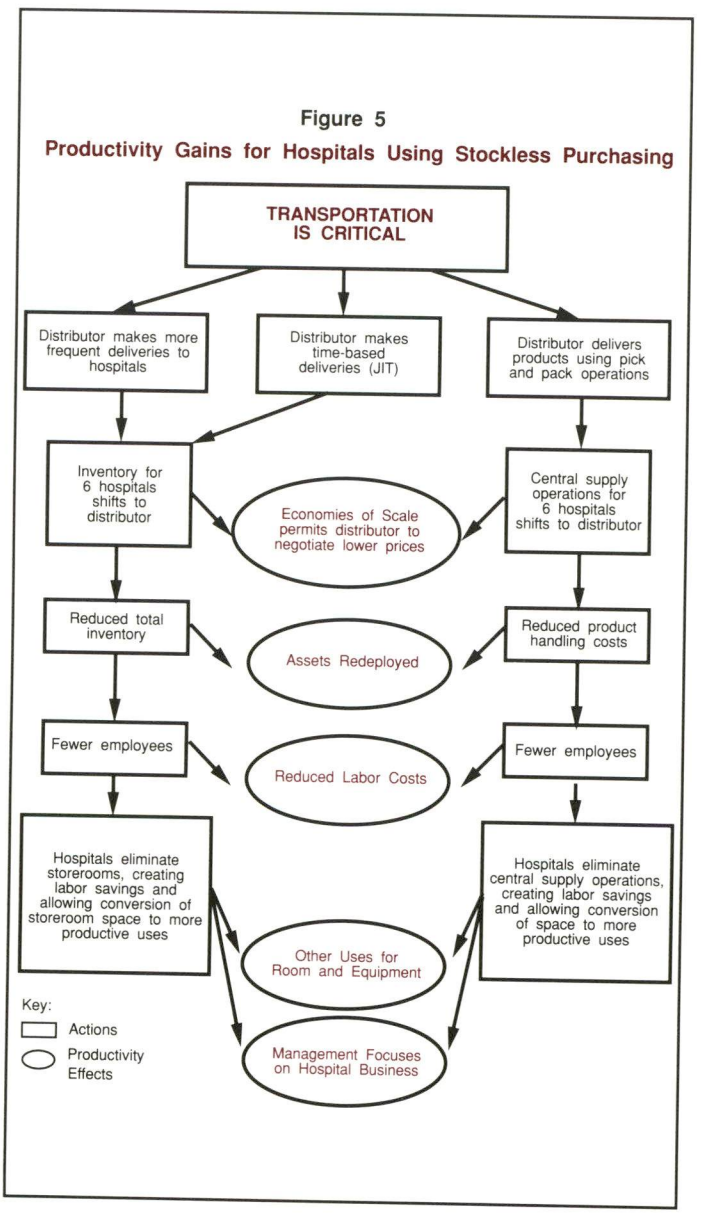
Koley's Medical Supply, Inc. *Stockless Purchasing for Hospital Customers*

Koley's Medical Supply, Inc. is the wholesale distributor for a coalition of six hospitals in Omaha, Nebraska and southwest Iowa that have converted to a stockless purchasing system. In the hospital industry, stockless purchasing goes further than just-in-time by offering pick-and-pack operations in addition to frequent deliveries of medical products to hospitals. The distributor packages medical products for delivery directly to hospital carts or supply closets in hospital departments. In the Omaha area, Koley's packs items in their proper units of issue and delivers them in bins several times a day to user departments in the hospitals. Koley's makes daily deliveries to the smaller hospitals in Iowa.

Transportation access is critical to meeting the

Figure 5

Productivity Gains for Hospitals Using Stockless Purchasing



frequent order cycles of a stockless purchasing system. Generally, the distributor must be no more than three hours by truck from the hospital. Adequate access makes such frequent deliveries efficient and reduces costs over the whole hospital materials supply chain from manufacturer to patient. Completion of the Storz Freeway improved Koley's access to its more distant customers in Iowa.

Through streamlining operations, stockless reduces inventory storage and handling costs for the hospitals (Figure 5). With very frequent deliveries, hospitals can eliminate inventory storerooms and central supply operations. Although these costs shift to the distributor, a distributor often can manage those operations at a lower overall cost through economies of scale not possible in an individual hospital. Stockless also lowers the costs of product flow by reducing the number of times the product is handled.

Labor savings can be significant as fewer employees can achieve faster, more efficient distribution of hospital supplies. Hospitals can eliminate labor involved in warehouse and central supply functions and the distributor can leverage labor for those functions over many hospitals. In addition, hospitals often can convert space previously used for inventory storage to more productive use.

Other savings are achieved through standardization of high-volume items among participating hospitals. Inter-hospital standardization of materials can achieve cost savings beyond the already common standardization of materials among various departments within a hospital. Koley's negotiates for all six hospitals collectively to get lower prices from manufacturers.

At Bishop Clarkson Memorial in Omaha, stockless purchasing allowed the hospital to reduce inventories, reduce its receiving and distribution staff by 12 full-time employees, eliminate trucks and drivers associated with their off-site warehouse, and streamline payment schedules. Bergan Mercy Hospital in Omaha eliminated its storeroom, converting it and other space formerly used for receiving and warehousing to more productive uses. Mercy Hospital in Council Bluffs, Iowa, reduced inventory and purchasing costs through its stockless system.

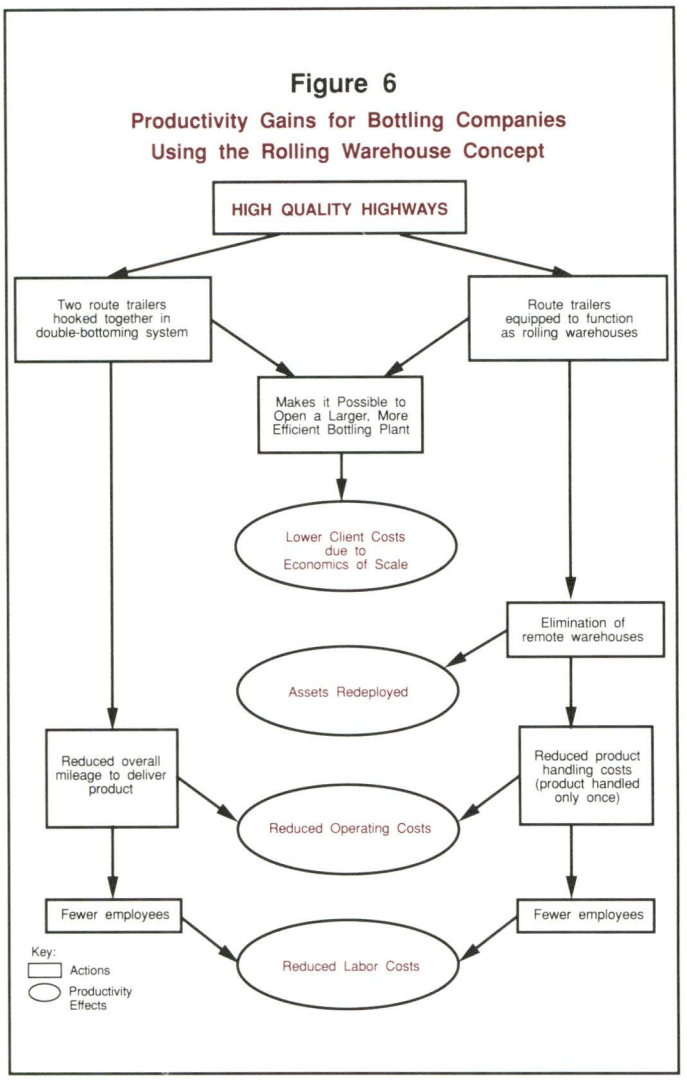
Coca-Cola Midwest *Rolling Warehouse*

The Coca-Cola Midwest bottling plant, part of Johnston Coca-Cola Bottling Group, serves a market area covering Minnesota, Wisconsin, eastern North Dakota, and the upper peninsula of Michigan. Among its strategies to achieve higher efficiencies, Coca-Cola Midwest ships their product using a transportation system the company developed called "double-bottoming." Midwest Coca-Cola also consolidated its production at a larger, more efficient bottling plant in Eagan, Minnesota.

Double-bottoming involves using two route trailers that are hooked together to transport the product from the bottling plant to distribution points within its

Figure 6

Productivity Gains for Bottling Companies Using the Rolling Warehouse Concept



market area. Such tandem trailers require high quality highways to operate efficiently and safely. In fact, current regulations restrict tandem trailers to Interstate highways, specified distances from Interstate highways, and to certain state highways.

Orders for route drivers already are loaded onto route trailers when they leave the production plant. At the distribution point, the route drivers pick up a trailer and drive their routes with their own tractors. Because the trailers are insulated and have a self-contained heating system, they also serve as rolling warehouses. The route trailers are picked up after retail deliveries are completed and brought back to the bottling plant.

The efficiencies from

double-bottoming derive from reduced product handling costs, reduced overall mileage, and increased route driver productivity (Figure 6). The product is handled only once, instead of loading the product onto trucks at the bottling plant, unloading it at a warehouse or distribution center, and reloading it onto route trucks for delivery to retail outlets. Using tandem trailers on deliveries to distribution points creates savings on total mileage the product is transported. Route drivers can immediately begin deliveries and no longer incur the waiting time previously necessary for loading route trucks at warehouses. Other savings arise from the ability to eliminate remote warehouses and their associated costs, including inventory and labor costs as well as property taxes.

Campbell Soup Company *Supply Chain*

Over the last four-five years, Campbell has embarked on a just-in-time (JIT) delivery program for its food production operations. Part of a wider corporate program to improve quality and productivity, the goal of JIT is to receive incoming materials just prior to production in appropriate quantities and meeting quality standards. Accompanying the JIT program is Campbell's Select Supplier program, whereby Campbell works with vendors to achieve quality assurance from its ingredient and packaging suppliers.

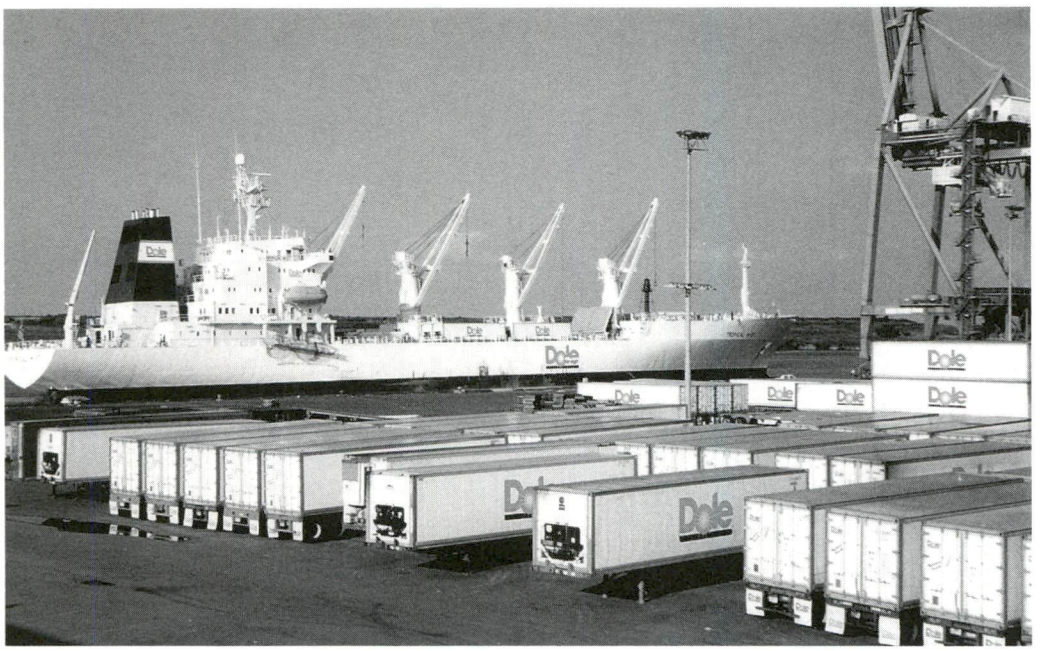
Optimizing productivity gains from JIT deliveries requires reliable transportation. Because rail transportation did not provide the needed reliability, Campbell gradually switched from rail to truck. Much of the incoming supplies to Campbell's production plants are now delivered by truck and some plants actually have eliminated rail deliveries. Because most of Campbell's production plants are not located in urban areas, highway congestion has not been a serious problem for its JIT delivery program.

Together, Campbell's JIT and Select Supplier programs have reduced costly inventories, waste, and handling costs. The greater reliability and reduced travel time achieved with truck transportation allowed Campbell plants to achieve faster turnover of inventory and as a result, carry less inventory. Previously, Campbell's quality control program involved repetitive inspections of supplies after delivery, with rejections that could disrupt production and necessitate large inventories. Now JIT delivery of quality assured supplies contributes to overall productivity gains in the production process. Campbell also believes that using fresher raw materials results in the highest quality product and increases customer satisfaction.

Dole Fresh Fruit
Highway Access to a Port

Because the Port of Wilmington, Delaware, has excellent highway access, the majority of all general cargo moves in and out of the port by truck. Improvements to secondary roads serving the port have complemented the growth of banana importing operations at Wilmington. As a result, Wilmington is now the largest banana port in the world.

There are two access roads to the port. Terminal Avenue connects to Interstate 495 within 1/4 mile of the port and Christina Avenue provides truck access via local roads. These access roads have been widened to accommodate truck traffic, regraded, and resurfaced. Smoother traffic flow because of these improvements leading to more efficient operations for all companies using the port. Dole Fresh Fruit is the major commercial enterprise at the port. Improved truck traffic flow led to more effective operations at their banana importing terminal.



Aladdin Mills
Effective Transportation Network

Aladdin Mills is a carpet manufacturer in Dalton, Georgia. Dalton has excellent access to a major Interstate (I-75), nearby railyards in Chattanooga, Tennessee, air services in Atlanta, Georgia, and ports in Savannah, Georgia, and Charleston, South Carolina. Because of its highly developed transportation infrastructure and high manufacturing base, Dalton also has a very competitive trucking market with unrivaled freight rates.

Aladdin takes full advantage of the dependable transportation system available to the company. Aladdin owns its own warehouses (mini-distribution centers) in New Jersey, Ohio, Illinois, and Florida. Most of the carpet produced by the company is shipped long distance by truck to these warehouses. The Interstate highway network is very important to making Aladdin's carpet competitive in its U.S. market. Aladdin recently increased its exports of

carpet. Excellent highway access to the ports of Savannah and Charleston via the Interstate highway network also helps make the company competitive in its overseas market. Highway access to railyards (Norfolk-Southern and CSX) and air services in Atlanta is also excellent, when needed by the company.

Although not as obvious as these other transportation advantages, the good highway system allows labor access from adjacent communities. This gives the company, which employs roughly 1,700 at the Dalton mill, access to a wide labor pool.

R.D. Werner Company *Reduce Bottlenecks in Production*

R.D. Werner Company is located in Mercer County in northwest Pennsylvania. The company manufactures metal extrusions for ladders, radios, and car alternators, among other products. With the relocation of State Route 4017 (Werner Road), Werner will be able to increase efficiency in production and expand its operations to producing finished products (ladders). Previously, orders for finished products had to be contracted to other companies.

Werner receives raw materials at the north end of the plant and ships products from the southern end. Until one year ago, State Route 4017 ran through the middle of the quarter mile long, two building plant. As Werner's production increased, the limited space restricted options for efficiently organizing production and caused bottlenecks in production.

Bottlenecks in production occurred when an extrusion was completed at one end of the plant and had to be transported the long distance of the plant to the southern end to be shipped. This wasted labor and machinery hours as large extrusions were moved with fork lifts to the other end of the plant to get them out of the way, while other parts scheduled for the same shipment had to be transported later when they were finished. With State Route 4017 now rerouted around the side of the plant, Werner will be able to increase its plant size by 30 percent—a 140,000 square foot increase. This will enable them to organize production in a more efficient manner. Expansion of the plant also will add flexibility to what gets produced by allowing Werner to begin production of finished products.

Xerox Corporation *Long Haul Trucking*

Xerox manufactures photocopiers in Rochester, New York. To serve a nationwide market, Xerox has three distribution centers in Rochester, New York, Dallas, Texas, and Sante Fe, California. Xerox ships copiers from its manufacturing plant to the two outlying distribution centers by long haul trucking. The Interstate highway network makes it possible for Xerox to ship its copiers by truck over long distances on time and in undamaged condition.

Because customer satisfaction is a high priority for Xerox, the efficiency and reliability of long haul trucking over the Interstate highway network contributes to more productive operations for the company.

Wal-Mart Stores, Inc. *Quick Response*

Wal-Mart currently operates its discount retail stores (Wal-Mart stores, and its newer Hypermarts and Supercenters) in 29 states. The company is aggressively expanding its discount store business into new markets, with plans to be in 36 states at the end of 1990. Wal-Mart's legendary success derives from delivering better quality merchandise at lower prices and providing customers better in-stock conditions than competitors.

Wal-Mart's superior merchandise in-stock conditions depend on its distribution system to deliver merchandise to the stores. The Interstate highway network is a strategic part of Wal-Mart's distribution system. Most of Wal-Mart's merchandise moves through its regional distribution centers. Wal-Mart sites its distribution centers based on the availability of good north-south and east-west access in the nation's Interstate highway network. Merchandise is shipped from the distribution centers to the stores by truck, using the company's private fleet.

Wal-Mart's quick response program involves partnerships with suppliers to manage inventory levels in the distribution centers and stores. The goal is to electronically exchange forecasting and sales information to keep a model stock inventory in the store by using automatic merchandise replenishment. Quick response also allows the supplier to better schedule production and reduce its inventory. Although quick response can hold down inventory costs, it increases distribution costs because it requires making more frequent deliveries. Overall, the most important benefit is higher sales from better customer service.

Federal Express, Ltd. *Ground Access to Airports*

Federal Express operates on a "hub and spoke" system, which the company developed. Express mail is carried—usually by truck—from its local stations to a local or regional airport, and flown to a "hub," where the mail is sorted. When sorted mail leaves the hub, it is carried in the same fashion along the "spokes" to its destination. The major hub for Federal Express is Memphis, Tennessee, where the company originated. In addition, there are three "sub-hubs" in Newark, New Jersey; Indianapolis, Indiana; and Los Angeles, California.

Federal Express offers two types of deliveries: the P1 or overnight service, and the P2 service that promises delivery by the day after. Delivery times at hub airports are staggered or "pulsed" to make unloading and sorting at the hub more efficient. Therefore, closing times for drop-off points are also staggered, first regionally and then at stations within a given region. With so many stations throughout the nation, precise planning and arrival times are of utmost importance to the company.

Because timing is crucial, traffic congestion and ground access to airports have a major effect on efficient operation of the "hub and spoke" system. Where traffic congestion is a problem, Federal Express has trucks make fewer stops in order to arrive at stations or hub airports on time. This adds costs in terms of using more trucks and drivers as well as increasing fuel and truck maintenance costs. Where ground access to airports is inadequate, Federal Express must close its stations early to make timely truck deliveries to the airport from those stations. As such, the delivery of a Federal Express package depends on good highway access to airports.

Bank of Boston *Relocation of Back Office Activities*

With construction of Route 128 around Boston, the Bank of Boston was able to increase productivity by relocating its back office activities away from its headquarters in downtown Boston. Because of the size and nature of its financial operations, the Bank of Boston has a large number of back office employees doing paperwork. Before construction of Route 128, the bank's back office operations were scattered throughout the City of Boston because it was not possible to find affordable office space of the size required.

Construction of Route 128 and access to a commuter rail station allowed the bank to relocate its back office activities (and a few hundred employees) to Canton, a suburb of Boston. A new building is able to accommodate the entire back office operations in one location, increasing productivity by making it easier for employees to communicate with each other. In addition, office space at the new location is much less expensive than the previous downtown locations. Lower costs also result from office supplies being delivered to one location, rather than all over the city. Finally, the new location allows employees easy access by auto along Route 128 or by commuter rail.

Selected References

Measuring the effect of transportation on economic productivity is a dynamic field of research with few analytic studies older than two or three years. As a result, there are a limited number of published papers on the subject and the number grows at a rapid pace. Reports used as a source for this report are listed below.

Apogee Research, "Case Studies of the Link Between Transportation and Economic Productivity," draft report prepared for the Federal Highway Administration, (September 1990).

Apogee Research, "Enhancing U.S. Competitiveness Through Highway Investment: A Strategy for Economic Growth," prepared for The American Road and Transportation Builders Association, (June 1990).

David A. Aschauer, "Does Public Capital Crowd Out Private Capital," ***Journal of Monetary Economics,*** (October 1989), pp. 171-188.

David A. Aschauer, "Is Public Expenditure Productive?" ***Journal of Monetary Economics***, (March 1989), pp. 177-200.

Alicia H. Munnell, "How Does Public Infrastructure Affect Regional Economic Performance?" ***New England Economic Review,*** (September/October 1990), pp. 11-32.

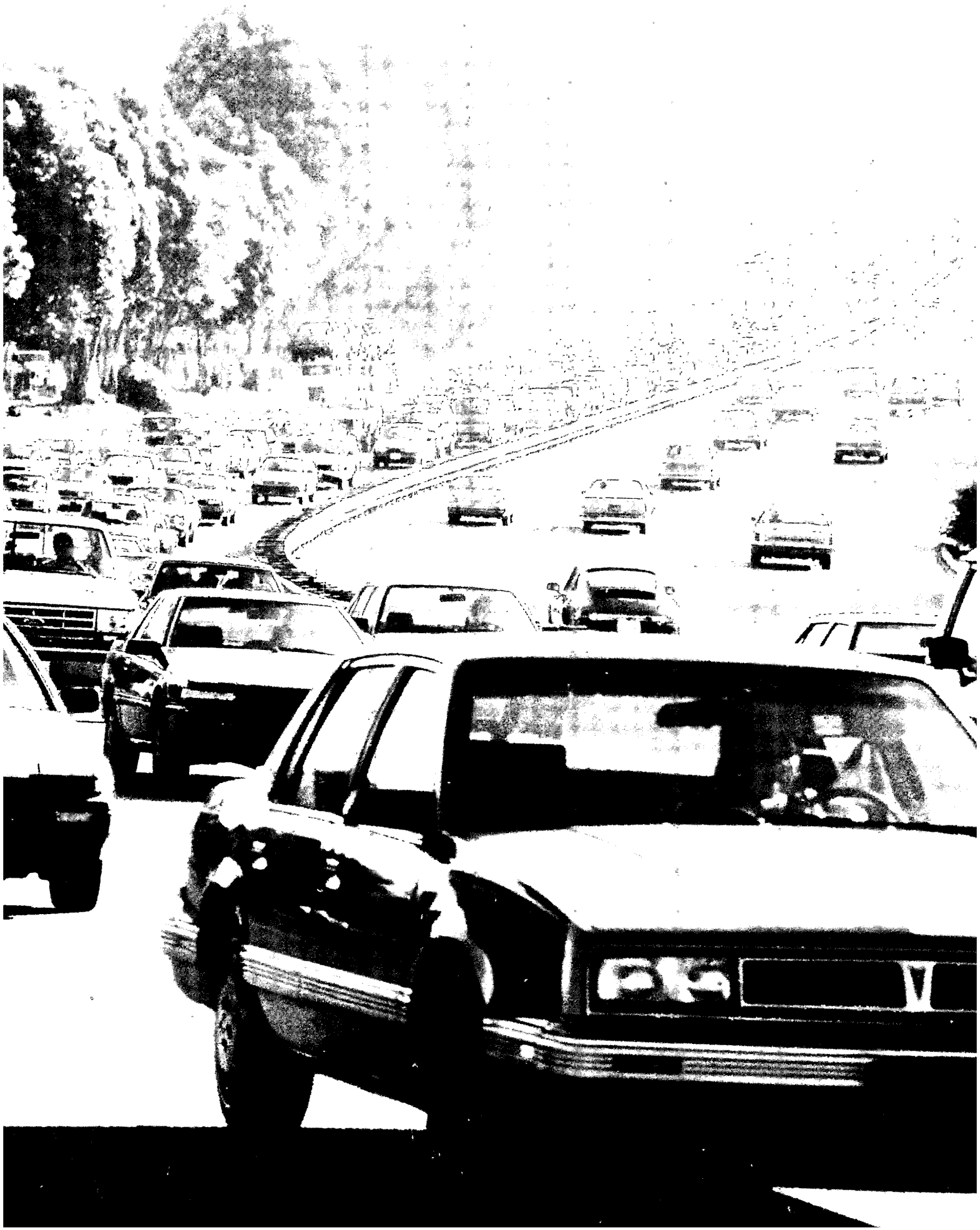
Alicia H. Munnell, "Why Has Productivity Growth Declined? Productivity and Public Investment," ***New England Economic Review,*** (January/February 1990), pp. 3-22.

Policy Implications

The link between transportation and economic productivity examined in this report has two important policy implications. First, it shows the potential gains that can be obtained by redressing the two decades of underinvestment in the nation's highways and bridges. Secondly, it shows that an effective transportation network has economic importance well beyond the immediate benefits of improved transportation services. As a result, significant increases in the overall level of investment (federal, state, local, and private) in the nation's transportation infrastructure is likely to produce high economic returns.

The report shows the importance of focusing America's transportation infrastructure policy on the long-term economic impact of an adequate national transportation infrastructure. The short-term effects of infrastructure investment already are well known. Spending on infrastructure leads to new jobs or new business locations, spreading ripple effects throughout the economy. However, because much of the nation's future economic growth will depend on using its existing resources more efficiently, providing an adequate transportation system to support gains in productivity will become increasingly important. Indeed, the effect on productivity, and in turn, long-term economic growth are the real reasons Americans should be concerned about infrastructure investment.

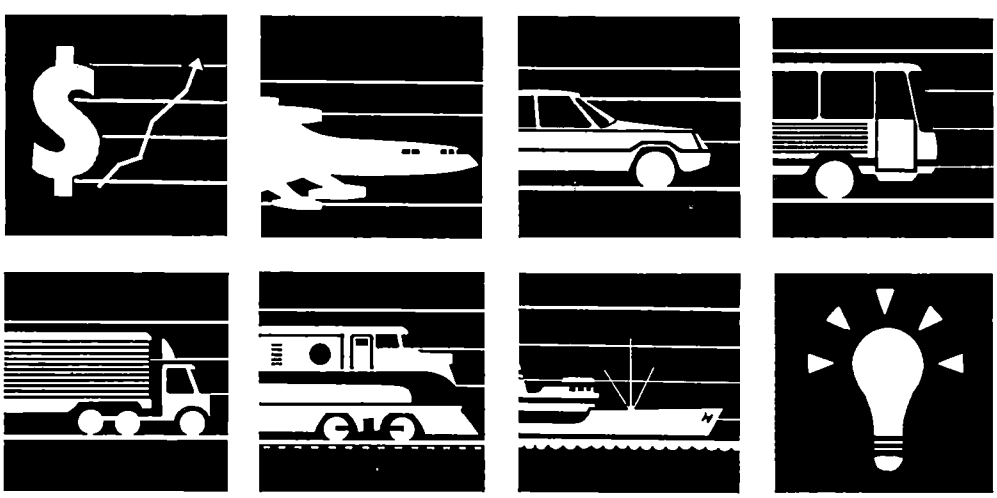
More importantly, the report highlights the need to understand the importance of public capital for the profitability of private firms. Good highways serve multiple functions, allowing for access to labor and other key inputs, just-in-time inventory management, as well as reliable shipment to local, national, and international customers. Without good public infrastructure, private business would be a difficult —in some cases, impossible —task. The case studies presented in this report illustrate how an effective highway network plays and important role in private economic activity.



NEW TRANSPORTATION CONCEPTS FOR A NEW CENTURY

AASHTO Recommendations on the Direction of the Future Federal Surface Transportation Program and for a National Transportation Policy

Prepared by the American Association of State Highway and Transportation Officials



TRANSPORTATION
America's Future Depends on it **2020**

Keeping America Moving

October, 1989 Final Edition

Published by

AMERICAN ASSOCIATION OF STATE HIGHWAY
AND TRANSPORTATION OFFICIALS, INC.
444 N. Capitol St. N.W. - Suite 225, Washington, D.C. 20001
Telephone 202-624-5800

Prepared Under Direction of the

AASHTO Task Force on a Consensus Transportation Program

Charles L. Miller, Arizona, Chairman
Ronald W. Fiedler, Wisconsin, Vice-Chairman

Members

William J. Burns, Connecticut
Kermit H. Justice, Delaware
Ben Watts Florida
John Tabb, Mississippi
Leonard W. Levine, Minnesota
Robert K. Best, California
Duane Berentson, Washington
Hal Rives, Georgia
R. E. Stotzer, Texas
Ray D. Pethtel, Virginia
Horace B. Edwards, Kansas
Franklin E. White, New York
Frederick Salvucci, Massachusetts
James P. Pitz, Michigan

Task Force Subcommittees and Officers

Policy Review Committee:

Harry A. Reed, Arizona, Chairman
Clyde E. Pyers, Maryland, Vice-Chairman

Highway Technical Advisory Committee:

Roger Schrantz, Wisconsin, Chairman
Harry A. Reed, Arizona, Vice-Chairman

Modal Technical Advisory Committee:

Henry Peyrebrune, New York, Chairman
G. Robert Adams, Michigan, Vice-Chairman

Subcommittee on Economic Expansion and Development:

Ronald W. Fiedler, Wisconsin, Chairman

Standing Committee on Planning Task Force on a Consensus Transportation Program:

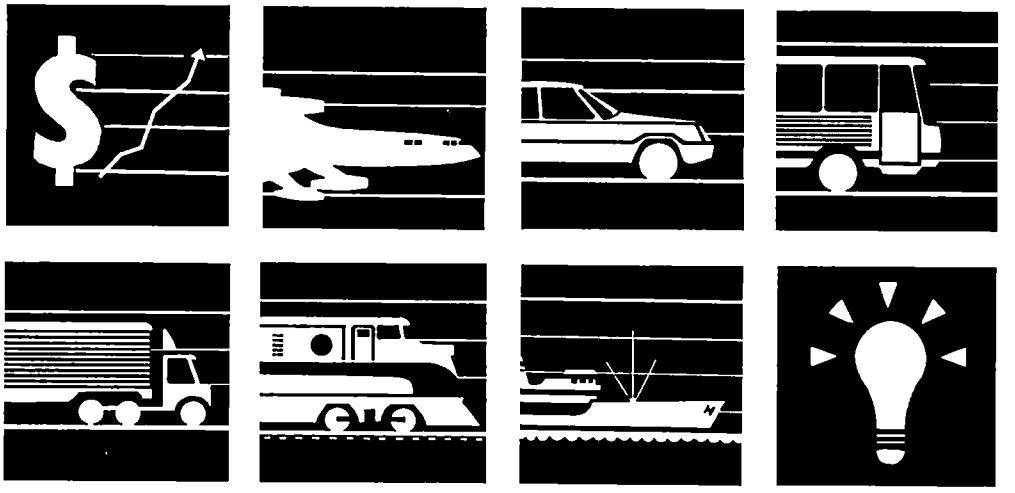
Robert Royer, Oregon, Chairman

New Transportation Concepts for a New Century is available from the AASHTO office at no cost for single copies. Multiple copies are $2.00 each. The Execuitve Summary of *New Transportation Concepts for a New Century* is available at no cost for single copies. Multiple copies are $1.00 each.

NEW TRANSPORTATION CONCEPTS FOR A NEW CENTURY

AASHTO Recommendations on the Direction of the Future Federal Surface Transportation Program and for a National Transportation Policy

Prepared by the American Association of State Highway and Transportation Officials



TRANSPORTATION 2020
America's Future Depends on it

Keeping America Moving

October, 1989 Final Edition

American Association of State Highway and Transportation Officials

EXECUTIVE OFFICE:
444 N. Capitol Street, N.W.
Suite 225
Washington, D.C. 20001
Telephone: (202) 624-5800

Preamble to Final Edition

This AASHTO Report was prepared under the guidance of the AASHTO Task Force on a Consensus Transportation Program. Three earlier editions were published, the first in December, 1988, the second in February, 1989, and the third in July 1989, all of which are replaced by this Final Edition.

As is required under the Association's procedure for publication of an AASHTO Report with recommendations, through actions taken in 1988 and 1989 the content of the Final Edition was considered and approved by more than the necessary two-thirds majority of the Board of Directors/Policy Committee of the Association.

While this AASHTO Report contains recommendations, it is to be understood that such do not constitute official policy for the Association. AASHTO official policy can only be adopted by separate action, which has not yet occurred.

One purpose of this AASHTO Report is to make recommendations on national transportation programs for consideration by other participants in the AASHTO-initiated Transportation 2020 program, including the Transportation Alternatives Group, and for the use of Congress and the states in developing new transportation legislation. In addtion, the goals and recommendations contained herein have been provided to the U.S. Department of Transportation, for consideration in the Department's development of a National Transportation Policy.

Underlying the findings and recommendations made in this AASHTO Report are several background documents published or in final preparation by the Association. A list of those documents will be found in the Appendix, and they can be obtained from the Association's office in Washington. The Appendix also includes a description of the process by which this Final Edition and the supporting background documents were developed and approved.

The Task Force and the Association's member departments want to acknowledge the cooperation of the Federal Highway Administration and other agencies of the U.S. Department of Transportation who provided assistance with preparation of this AASHTO Report, and also the many other organizations and people outside government who provided counsel and information.

Francis B. Francois
Executive Director
October, 1989

Table of Contents

Executive Summary: Part I

"The true history
of the United States
is the history
of transportation. . ."
Philip Guedalla

Today the citizens of America enjoy the convenience and economic benefits of a transportation system second to none. This system was made possible largely through a long standing cooperative federal, state, and local government partnership.

Unfortunately, we are currently disinvesting in our future transportation needs just by maintaining current spending levels. Because of the aging of the system, inflation, and continued national growth, the policy and spending decisions made--or not made--in this century will determine the America of tomorrow.

Metaphorically, American transportation now stands at the crossroads. With some effort and planning, we can establish the needed road signs to guide us successfully into the future. But we must prepare today to meet the new challenge of tomorrow.

The New Challenge

The world today is still shrinking. Telecommunications and transportation are advancing rapidly toward the creation of Marshall McLuhan's "global village."

America is now part of a global economy. What happens overnight on Japan's Nikkei affects Wall Street at the opening bell. Economically, America is adjusting to compete in this rapidly changing world economy.

The new economic world is, in a word, vastly more competitive than it has ever been before. And among the things that are needed for a highly competitive America is a high quality, highly efficient transportation network to give the American people their mobility and on which to ship American materials and products. Good transportation alone is not the only answer; but there can be a competitive America only with good transportation.

Efficiency in All of Transportation

Efficient transportation helps America compete. The intermodal approach to transportation promotes efficiency and will help America meet its transportation challenge. It is AASHTO's belief that each transportation system, each mode, must become more and more efficient for the nation to reach its competitiveness goals.

A Bigger Investment in Transportation

It will cost money to give America the transportation network needed to meet the challenges of the 21st Century. It will cost money, it will require increased research, and it will take planning. Among the myriad ideas about what ought to be the nation's transportation future, there is one constant: the nation invests much less in transportation than it did a decade or two ago; the nation continues to invest less than is needed even to maintain current services, let alone improve the quality of transportation; but the nation must invest more in transportation, much more, if it is to keep pace with a growing America and if it is to help America regain its competitive edge in a dynamic world economy.

Without More Money for Transportation, the Economy Will Suffer

It should be patently clear that, if America is to regain its leadership in the world economy, the nation must commit financially to preserve and improve its transportation infrastructure.

The Need is Now

The nation's transportation system is a complex, dynamic network of physical facilities, operations, and management practices. This system for moving people and goods is essential to domestic productivity, international competitiveness, and quality of life. Transportation accounts for 15 percent of national employment and a substantial portion of the cost of consumer goods. Investments in the transportation system are enormous; it consumes in all its aspects more than $800 billion annually--nearly 20 percent of the gross national product. This system must be maintained.

The individual chapters of this report detail AASHTO's transportation program recommendations for aviation; highways and public transportation; railroads; water; and research, development, and technology transfer. Implementation of these programs is vital if we are to give America the multimodal transportation network needed to match the challenge of the 21st Century. The need is for new transportation concepts for a new century. The need is now.

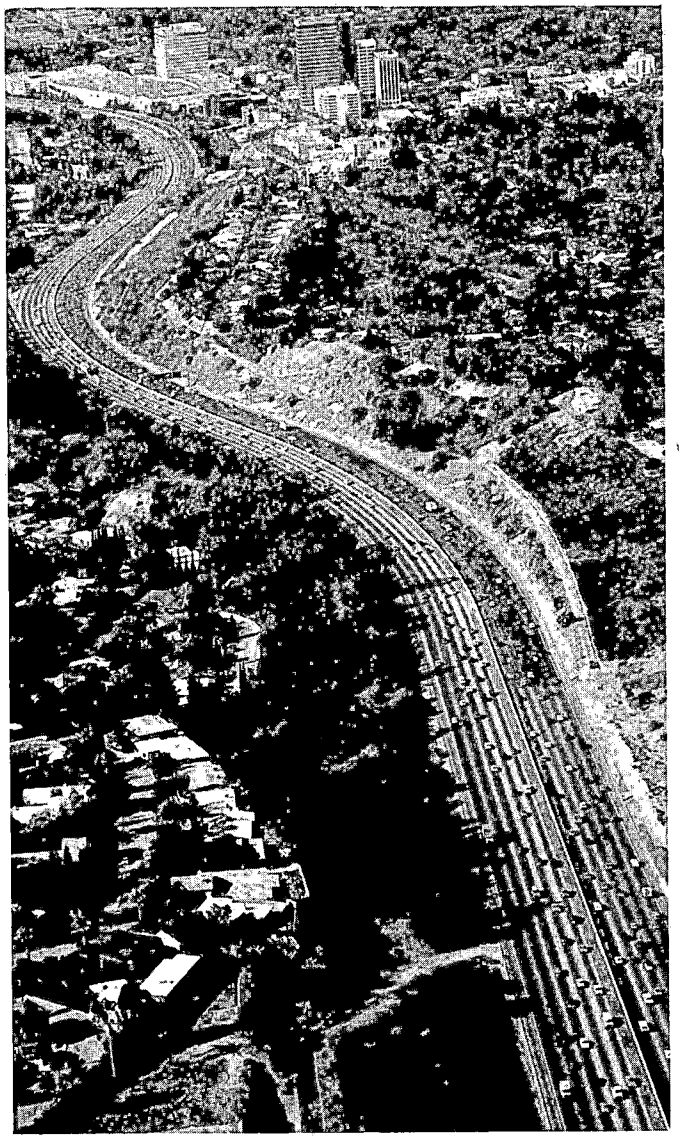


Photo by the California Department of Transportation

AVIATION (Chapter 2)

The long range future of the national air transportation system as we know it today is in doubt. Projected aviation growth is outpaced only by projected aviation shortfalls.

FAA Projections Aircraft and Passengers 1970-2000

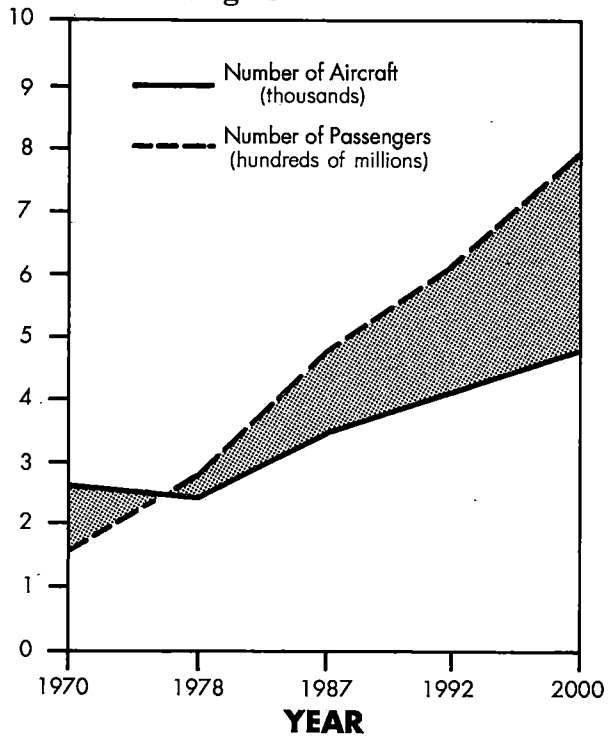


TABLE A-1
Investment Needs By Category
(Uninflated—$ Millions)

Year	Air Traffic Control and Facilities	Airports	Administration	Total
1990	$2750.0	$3834.2	$3100.0	$ 9,684.2
1995	4520.0	5078.0	3100.0	12,698.0
2000	4520.0	6070.1	3100.0	13,690.1
2005	5520.0	6802.1	3100.0	15,422.1
2010	5520.0	7794.2	3100.0	16,414.2
2015	7950.0	8901.2	3100.0	19,951.2
2020	7950.0	9893.2	3100.0	20,943.2

Source: AASHTO Aviation Needs Task Force, from federal agency reports

Growth

In 1987, air carriers enplaned 448,913,726 passengers. This total is almost twice the number of enplaned passengers prior to deregulation.

The FAA forecasts an annual growth rate of 4.5 percent in passengers over the coming decade. From the current (1987) nearly 449 million enplanements, the air transportation system is expected to enplane over 789 million in the year 2000.

If traffic forecast levels are realized and if airport capacity is not increased, it is projected that 58 of the nation's primary airports will become severely congested by the year 2000.

Air cargo has grown from a low of slightly less than three million tons of enplaned cargo in 1982 to slightly over five million tons in 1987, a 70 percent increase in five years. Technology's advances in miniaturization and business's insistence on speedy delivery assure a continued increase in air cargo into the next century.

Dollars

Future needs exceed reasonable revenue expectations by a factor exceeding two.

Projections indicate that the cumulative backlog of spending needs will approach $150 billion by the year 2010.

Providing a stable and reliable funding source for aviation development is vital to the future of the nation's air transportation system and the economic well-being of the country.

Other Concerns

Intermodal Transportation Links: improved highway, rail, mass transit, and water access will become increasingly necessary as the level of air travel increases at the nation's airports.

Aviation Safety: The United States' air transportation system is one of the safest and most efficient in the world. But the federal government's central role in aviation safety must be maintained and an improved system of inspection, regulation, and certification is needed. The air traffic control system must also be equipped, staffed, and trained to perform the added requirements of tomorrow's air transportation system.

Aviation Security: The issue of security is of such compelling magnitude that it has become a national public safety concern. The FAA should assume responsibility for ensuring compliance with federal laws and regulations.

Surface Access: Air travel saves time. That is why it is the nation's first travel mode choice. But with recent studies identifying twenty-three of forty-one major airports as experiencing landside congestion and sixteen airports operating at or near airside capacity, the future invokes visions of intolerable delays unless extensive improvements are made. If aviation's future is critical to this nation's economic growth and international vitality, priority must be given to access improvements.

Environment: Attention to airport and aircraft noise is needed. The need to clean up toxic conditions on or near airport properties and to replace leaking fuel tanks is still another concern for the health and safety of the public.

New Technology: Research, both government sponsored and private industry sustained, must continue to be pursued as an important national aviation goal.

Conclusions

At no time in the past has aviation appeared to face a future with so much success and yet so much challenge.

Government and private sector cooperation must occur if our air transportation system is to receive the investments that will assure that aviation demand through the year 2020 will be met.

This report discusses the federal, state, and local roles as system providers. The past federal/state/local relationship in the air transportation system needs strengthening. A more focused federal role and a greater state role appear necessary, and are recommended.

AASHTO's goals and recommendations for aviation are detailed in Part II of this Executive Summary.

HIGHWAYS AND PUBLIC TRANSPORTATION (Chapter 3)

From a citizen's perspective, the nation's highways and public transportation systems are the most important links in the intermodal chain. They certainly play the largest part in the public's daily existence. Most Americans use highways and public transportation in one form or another every day to work or to play--or just to get away since highways and public transit provide the main access to the other transportation modes.

In 1988, Americans traveled two trillion vehicle miles by auto, truck, bus, and public transit, more than triple the travel mileage of 1956, when the Interstate and Defense Highway System was begun. By the year 2020, total travel in the United States is expected to double again.

America's business is dependent on total mobility. This country's vast size, the broad distribution of people and resources, have always placed a premium on the ability to move people and goods long distances with speed, safety, and low cost. Retail items purchased every day probably traveled to the store by truck over the highways from a factory or a port. Mobility is crucial to the nation's economic strength.

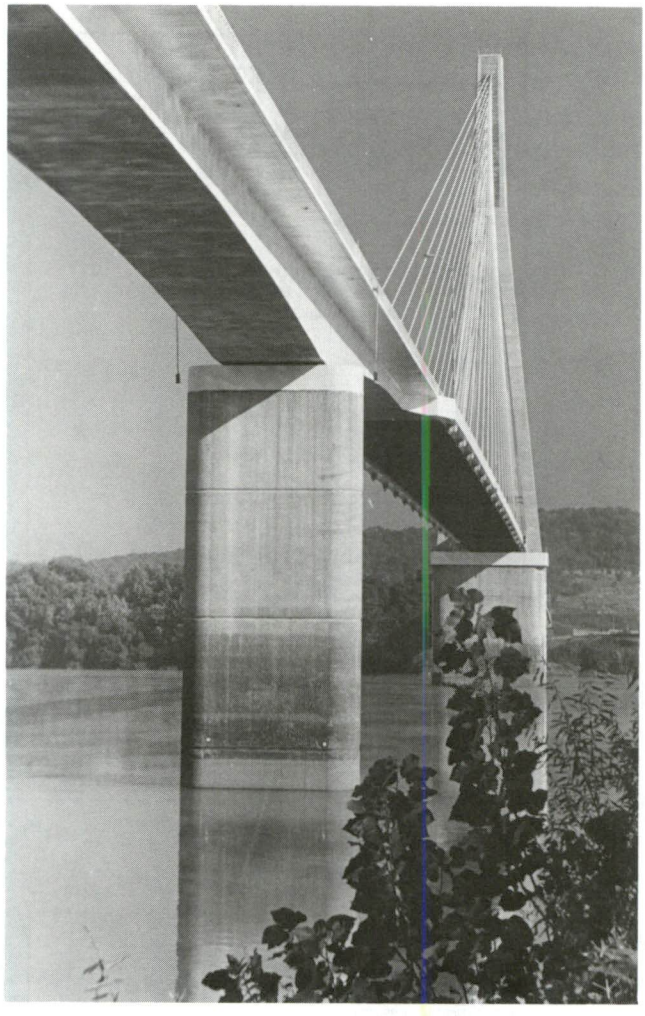


Photo by the West Virginia Department of Transportation

The Problem

Although construction of the Interstate and Defense Highway System is almost complete, tremendous needs still exist to preserve and improve the system. Urban and suburban congestion is increasing, demanding new highway and transit service. Highway fatality rates need to be reduced. The nation's national transportation focus, once strong, has now begun to wander. It is necessary to develop a new focus, a new "National Surface Transportation Policy."

The Solution

State transportation officials have proposed a broad program of recommendations on the direction of the future federal surface transportation program for highways, public transit, and modal interlinks to these modes. These recommendations are to help build a new consensus program. The new consensus surface transportation program for highways and public transportation as envisioned by AASHTO will involve all levels of government.

AASHTO Proposal for Federal Highway Funding

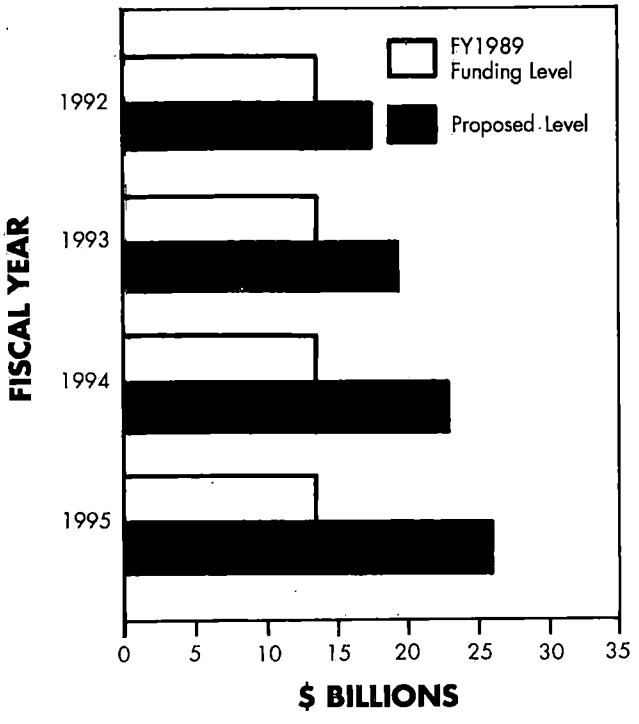


TABLE H-1
AASHTO Proposal for Federal Highway Funding
(Billions of Dollars)

FY1992	17.6
FY1993	19.6
FY1994	22.7
FY1995	25.9

The Consequences

Without a renewed focus on a "National Surface Transportation Policy," the disinvestment in the country's highways and public transportation will continue. The highway and transit systems will further deteriorate, costing users time and money and diminishing safety.

The Facts

America's surface transportation expenditures, at all levels of government, in 1987 equaled about $81 billion. Of this total, about $66 billion was for highways and $14.5 billion for public transportation systems.

AASHTO Proposal for Federal Transit Capital Funding

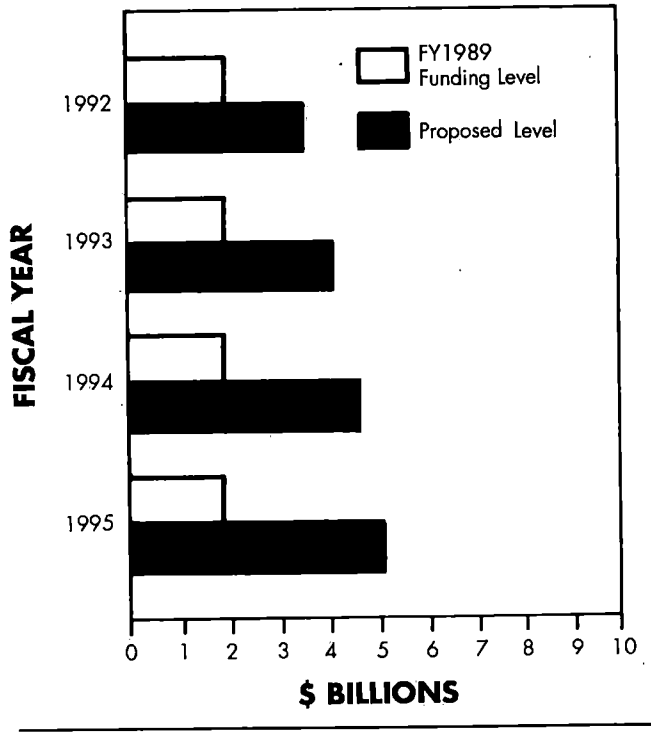


TABLE H-2
AASHTO Proposal for Federal Transit Capital Funding
(Billions of Dollars)

FY1992	3.5
FY1993	4.0
FY1994	4.5
FY1995	5.0

In constant dollars, in order to just maintain the physical characteristics of the nation's public sector surface transportation infrastructure and sustain "most" of the level of service provided today through the year 2020, an annualized investment of nearly $95 billion is required. Of this total, approximately $80 billion is needed for highways and $15 billion for financing public transportation. And further, without increased funds for highway safety, fatality rates cannot be reduced.

Surface travel demand is expected to at least double by 2020. If this nation is to attempt to keep up with this

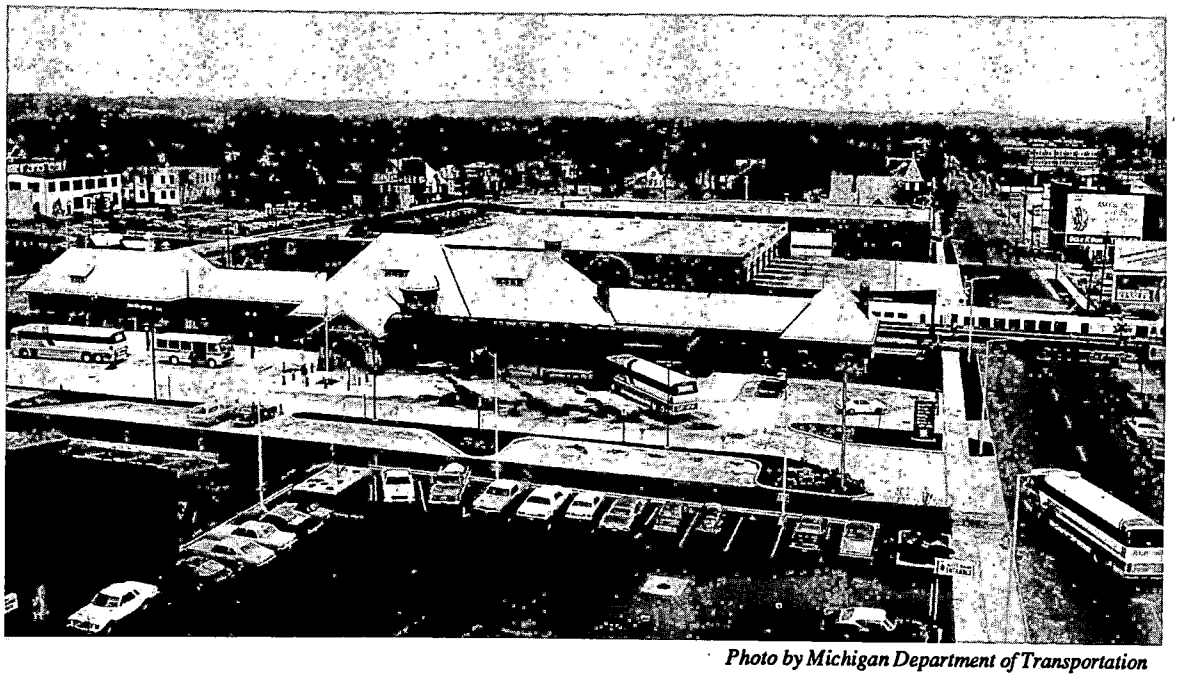


Photo by Michigan Department of Transportation

anticipated growth then an investment of approximately $117 billion per year in constant dollars would be required. Of this total, about $100 billion would be for highways and the remainder for transit.

An additional $1 billion per year in constant dollars in highways and public transportation through 2020 would be required to adequately link surface transportation with airports, ports and waterways, and rail terminals.

TABLE H-3

Surface Transportation Annual Expenditure Requirements 1988-2020

(Billions of Dollars)

Surface Transportation Area	Current	1988-2020 Investment Range Low	High
Highways, Roads and Bridges	66.0*	80.0	100.5
Transit	14.5**	15.1	15.8
Linkage to Other Modes	NA	1.0	1.0
Total	NA	96.1	117.3

* Estimated total expenditure for 1987

** Estimated total expenditure for 1988

AASHTO Report: The Bottom Line

Conclusions

If America is to maintain its economic leadership in the world economy and avoid the negative and costly effects of inaction, the nation must commit the required funds to improve its surface transportation system.

AASHTO recommends a two-pronged approach for both highways and transit: (1) a Categorical Program focused on systems of national importance; and (2) a Flexible Program designed to solve state and local transportation problems within a set of national issues of concern established by Congress.

The Categorical Programs would include a new National Highway System consisting of the Interstate Highway System and a portion of the redefined Principal Arterial System, and major transit systems.

The Flexible State and Local Program addresses such national issues as urban mobility, suburban congestion, rural access, and links between transportation

TABLE H-4

Linkage To Other Modes
Annualized Investment
Requirements 1987-2020

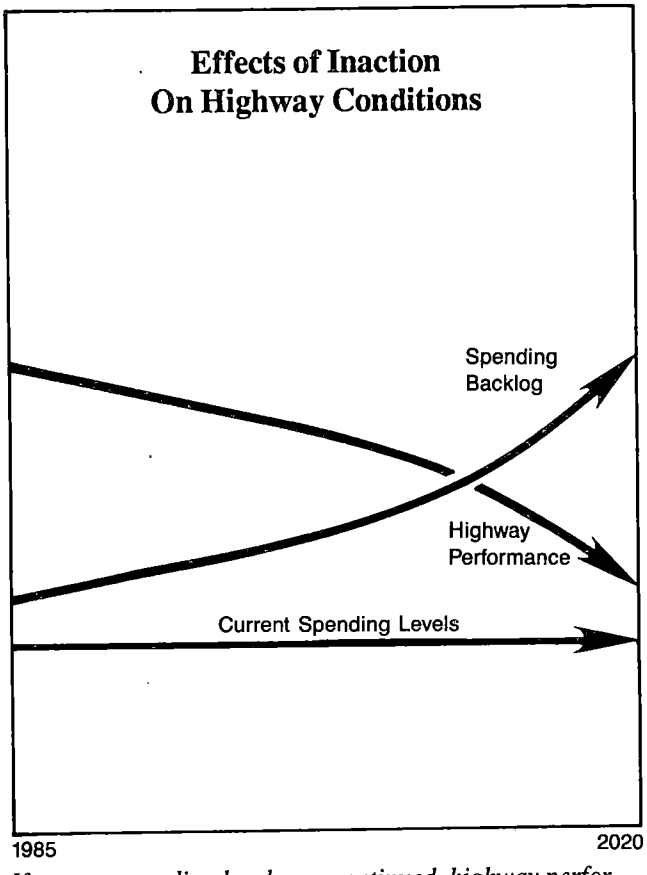
(Billions of Dollars)

Modal Linkage	Annual Costs
Air	.7
Rail	.2
Water	.1
Total	1.0

modes. It is designed to grant funds to the states for rural and urban highway needs beyond the National Highway System and to states and transit agencies to meet public transportation needs.

AASHTO's goals and recommendations for highways and public transportation are detailed in Part II of this Executive Summary.

Photo by the Delaware Department of Transportation



If current spending levels are continued, highway performance will decline while the backlog of needs will escalate.

RAILROADS (Chapter 4)

America's railroads must have a renaissance because they are essential to the nation's economic growth and well-being.

Railroads helped make America what it is today. If the United States is to move strongly into the 21st Century, rail service must be given adequate consideration in transportation planning.

The Problem

Railroads are grossly under utilized in part because they are hampered by federally mandated policies. The railroad industry is also severely burdened by railroad specific federal legislation which places considerable unnecessary costs on the industry, hindering its competitiveness with other modes.

The Solution

Changes in government policies to eliminate inequities and repeal restrictive legislation would allow the railroad industry to utilize more adequately its transportation capacity.

The Consequences

Failure to make these changes and to promote railroad profitability is to court disaster.

The Facts

Unless these changes are made the railroads will undergo severe line reductions. Operations will be limited to a core system designed to carry bulk commodities long distances. Ultimately this will hinder

Photo Courtesy the American Association of Railroads

the Strategic Rail Corridor Network for National Defense, cause additional public exposure risk and added expense for the disposal of spent nuclear fuel, and very likely necessitate the cancellation of a number of Amtrak's principal routes. While Amtrak has increased revenues 59 percent in the last seven years, it will still need an annual operating subsidy of about $580 million for the foreseeable future.

Line reductions will also require additional funding for highways due to increased truck traffic and ensuing maintenance.

America's freight rail service must be preserved. Railroads are the principal mode of transportation for most bulk commodities and the primary mode for many manufactured products. Railroads are essential to the defense, health, and wealth of the country. Government interferences should be eliminated thereby permitting all transportation modes to be controlled equally by economic forces.

America's passenger rail service must be preserved in order to prevent rural isolation and reduce growing highway traffic congestion. Amtrak operations must be improved and the service encouraged to become self sufficient.

Conclusions

If Congress takes the necessary corrective actions to allow railroads to maintain a fair and equitable market share, the railroad industry will be able to provide competitive profitable service for the enhancement of the nation's economy.

To repeat: rail service must be given adequate consideration in transportation planning for the 21st Century. There is no acceptable alternative.

AASHTO's goals and recommendations for railroads are detailed in Part II of this Executive Summary.

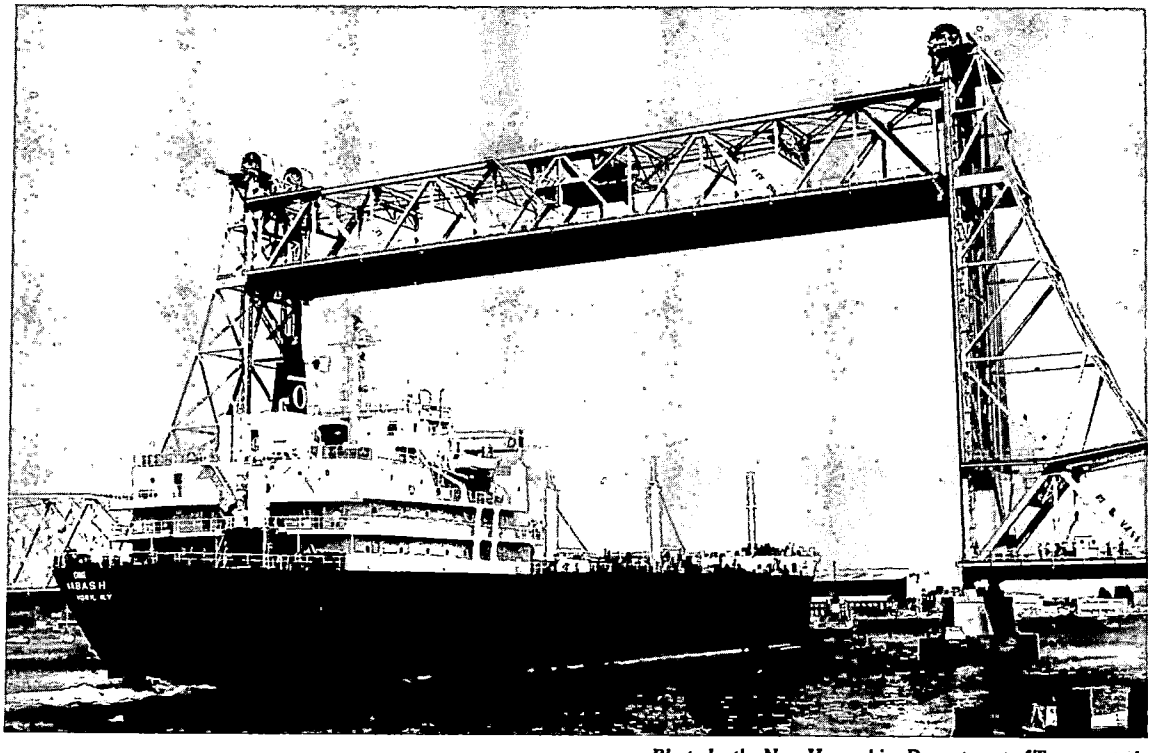


Photo by the New Hampshire Department of Transportation

WATER TRANSPORTATION (Chapter 5)

Water transportation impacts many aspects of the nation's economic well-being. Waterways have served as major transportation facilities since the first settlement of this country. Most of our cities are located on navigable waterways, and industrial expansion has traditionally followed the waterways of the nation. But today, the physical condition of our ports and water transit is deteriorating, truck and rail access to waterways is poor, and funding for improvements is uncertain at best.

The Problem

There are several areas of critical concern for the water transportation industry:

*Productivity and use of the existing water transportation system must be improved.

*The nation's existing water transportation infrastructure must be maintained and new facilities must be built where needed. Public investments must be found and targeted to meet these needs.

*Public safety must be improved.

*The environment must be protected.

*Water transportation must be painted back into the intermodal transportation picture.

The Solution

All levels of government, including the Federal Government and the states, need to reevaluate their roles in the light of enactment of the Water Resources Development Act of 1986. Adequate sources of funding for maintenance and improvement must be found and agreed upon.

The Consequences

If reevaluation and coordination of government roles do not take place, the nation's water transportation system will continue its precipitous decline.

The Facts

About 1.8 billion tons of cargo are handled annually by the nation's port facilities. Two-thirds of the total U.S. waterborne commerce is handled by deep-draft ports. The remaining one-third is handled by the inland waterway system. By moving large volumes of commodities at a low unit cost per ton, the nation's waterway system helps make our exports price competitive. It also contributes to the economies of many individual states and to the nation as a whole by providing jobs, income, and production.

Conclusions

The far reaching effect of the transportation benefits of our nation's waterway system cannot be overemphasized. The nation's waterways are not only vital to trade, economic development, and national defense, but also provide flood control, irrigation, fire protection, fishing, and other recreational activities. The Federal Government must continue its partnership with local and state governments to maintain water as a viable means of transportation.

AASHTO's goals and recommendations for water transportation are detailed in Part II of this Executive Summary.

RESEARCH, DEVELOPMENT, AND TECHNOLOGY TRANSFER (Chapter 6)

It is increasingly clear that many of the challenges presented by our transportation system can only be met by innovation based on research. In the years ahead, it may be technology that exerts the greatest influence on the health of our transportation systems.

The Problem

Technology currently used in many parts of the transportation system does not represent the state of the art. Significant contributions to transportation innovations are often available yet barriers often deter their immediate implementation.

The Solution

Transportation research and development needs to be more adequately funded. This will insure that the necessary organizational framework and coordination exist for each transportation research program to function efficiently. Adequate funding will further insure that the total research, development, and technology transfer effort is fully effective for all modes of transportation.

Highway Indicators
1967-1987

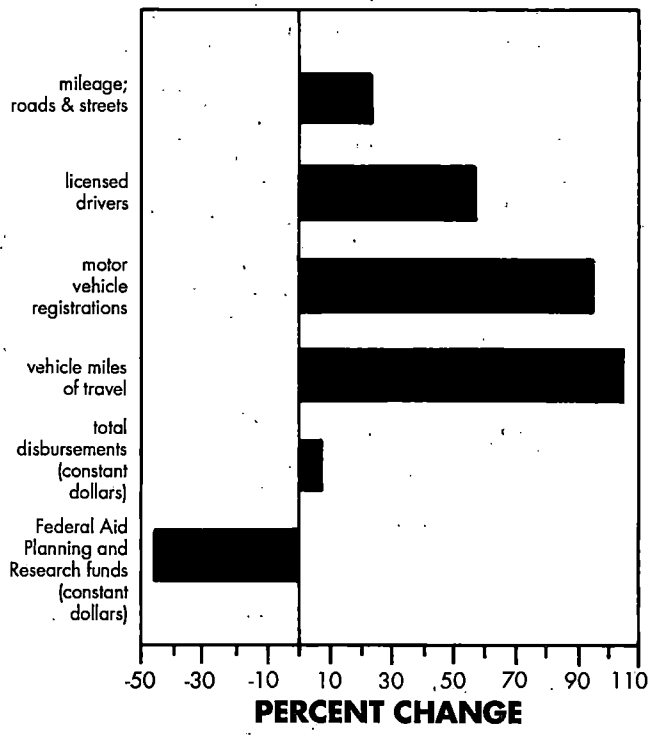
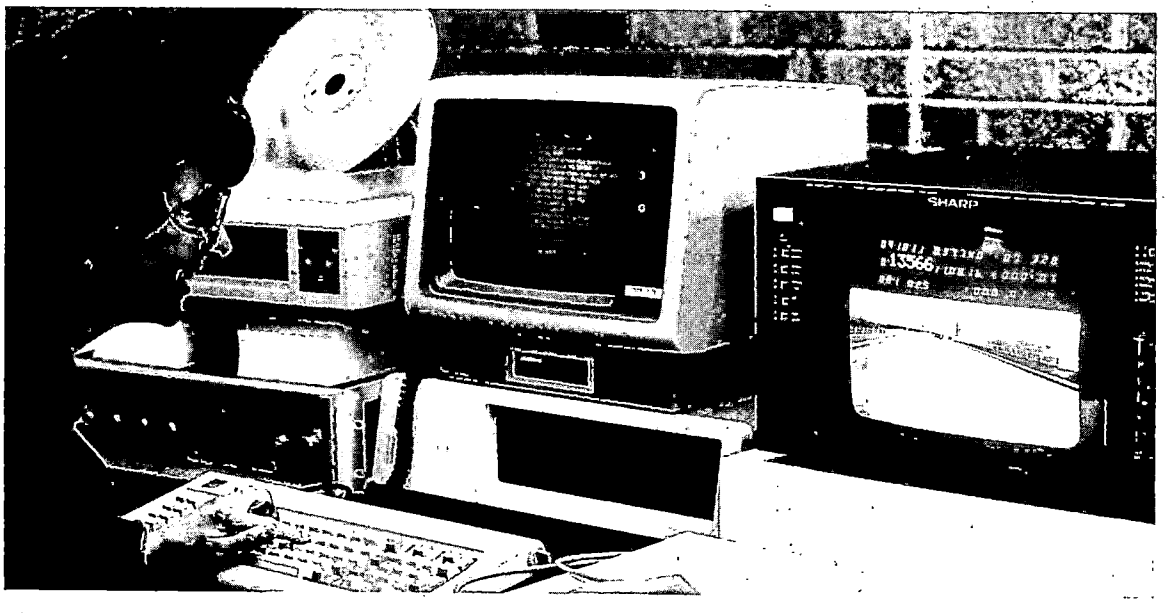


Photo by the Connecticut Department of Transportation



The Consequences

Without adequate funding and coordination, the research, development, and technology transfer needed to rescue the transportation system from its increasing problems will not happen.

The Facts

There is need for a vigorous transportation RD&TT program to lead the nation into the 21st Century. Funding for research has not kept pace with the growing needs and opportunities for technological innovation in the transportation industry. Highway research spending, for example, as a share of total highway program expenditures is currently about 0.20 percent--far less than adequate. Furthermore, in comparison to highways, research spending in the other modes (aviation, railroad, transit, and water) is extremely low.

Conclusions

Given today's crowded, deteriorating facilities, transportation professionals must reverse the decline in the nation's mobility using research, development, and technology transfer to find innovative ways to provide safe and efficient movement of people and goods under more difficult conditions in the years to come.

AASHTO's goals and recommendations for research, development, and technology are detailed in Part II of this Executive Summary.

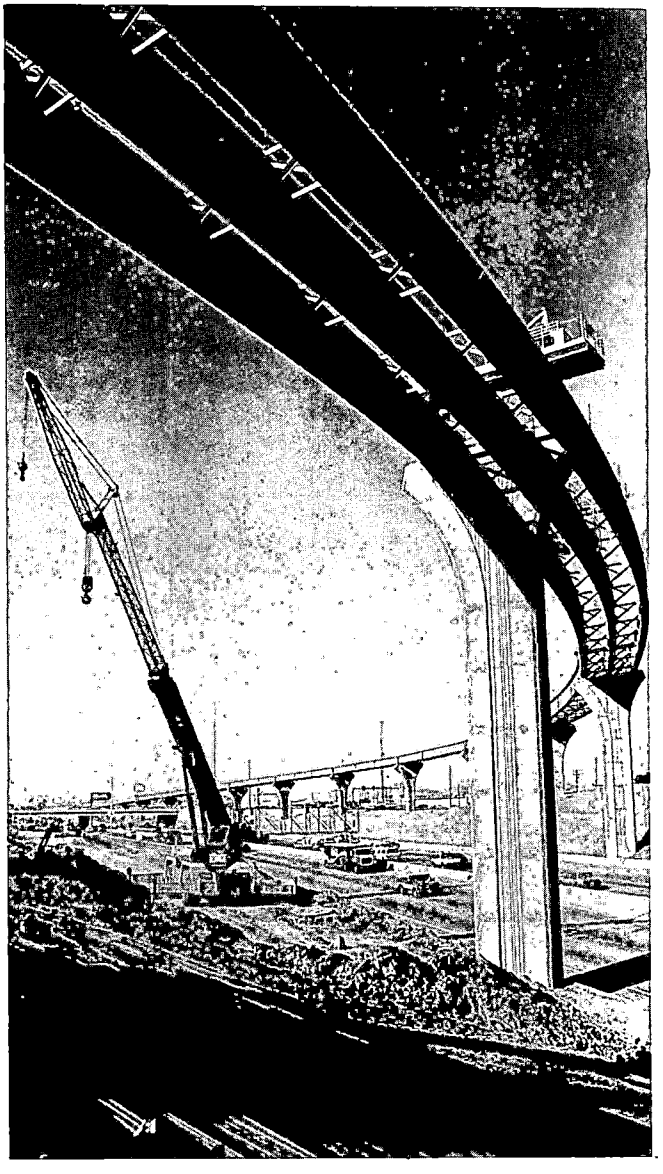


Photo by the Arizona Department of Transportation

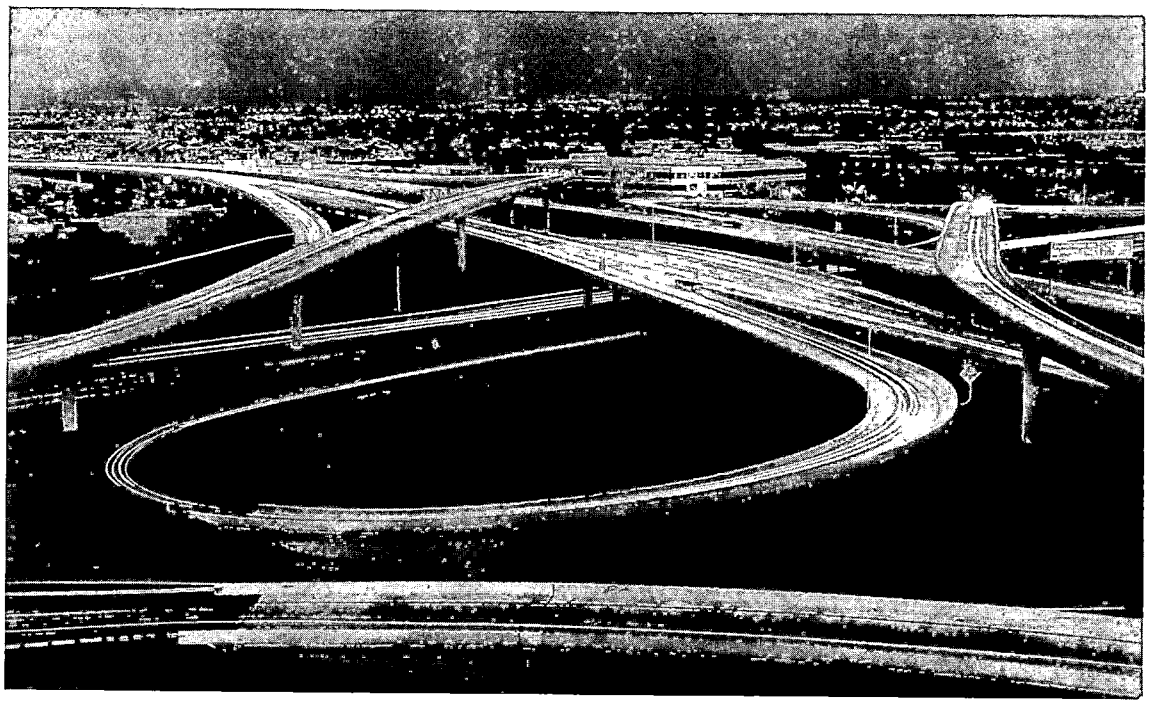


Photo by the California Department of Transportation

A Foundation for the Future

America has one of the finest transportation systems in the world. When it is working smoothly, as it is most of the time, it is taken for granted. But the nation can not afford to take it for granted much longer.

Many national challenges lie ahead. Over the next two years, many people will put forth many ideas as to the direction national transportation policy should take. This report, prepared by state transportation officials, is a foundation on which to build the strong national programs necessary to preserve and improve America's transportation system. New transportation concepts are needed and must be found to keep America moving in a new century.

Executive Summary: Part II

Aviation

Goals and Policy Recommendations

The following goals and policy recommendations reflect the major recommendations of AASHTO for any future transportation program for aviation and related surface access developed under the Transportation 2020 consensus process. They are presented in priority order from AASHTO's perspective, beginning with national goals for aviation.

Aviation Goals

Safety

Through new and improved equipment, procedures, and aircraft maintenance practices, ensure the safety of airline passengers and crews and enhance consumer confidence in the nation's air transportation system.

Security

At the national and international level, establish adequate security procedures and enforce the surveillance and monitoring of airport terminals, appurtenances and baggage areas to ensure passenger safety.

Airport Capacity

Provide adequate capacity to meet current and projected air travel demands through the expansion or conversion of existing airport facilities, where feasible, or the construction of new airport facilities.

Airport/Airway Systems

Define national and state airport/airway systems which will meet forecasted demand and provide continued support for the nation's economic health and international vitality.

Airport Ground Access

Through coordinated, multi-modal planning, determine current and future modal access needs and implement improvements in a timely manner consistent with and in recognition of planned airport capacity improvements.

Environment

Develop and promulgate adequate and uniform standards for environmental quality at airports and airport environs.

Federal/State Roles

Clearly establish the federal role in the definition and funding of a national airport system with appropriate input at the state level as to airport location and compatibility with state goals.

Revenue and Funding

Maximize utilization of existing funding reserves, and develop additional funding at all levels of government, through user and other appropriate fees, to properly ensure the efficient and safe operation of existing airports and the nation's airspace system and the development of an airport system of national and state significance.

Economic Development

Direct and indirect economic benefits from aviation are quite significant, thus, greater flexibility should be given to state and local governments to consider economic development as a factor in the administration of air transportation improvement programs.

New Technology

Give major emphasis to new technology, research and development, and the expedient application of innovations that improve security and safety, increase efficiency, and ameliorate environmental impacts.

Air Cargo

Movement of freight by air is an important and growing part of our national economy, and as such, its needs must be considered in the planning, design and operation of airports with special emphasis on ground access requirements.

Aviation Policy Recommendations

Safety

- AASHTO believes that safety should be the prime consideration of all aviation programs. The following areas of concern should be closely monitored by the federal government and under standards established at the federal level, to ensure the safety of crews, passengers and people on the ground: aging aircraft fleet; aircraft maintenance; increased air operations; constrained airspace; military/civilian airspace conflicts; severe weather information; communications and navigation aids; and pilot training.

Security

- AASHTO believes that aviation security is an issue of compelling national significance, and that it is a proper federal role to ensure that airport and in-flight operations are as secure as possible from terrorist threats. This would entail the following:

  a) Security personnel are qualified and well trained.

  b) Adequate and reasonable security procedures are established and properly monitored for the nation's commercial airport system.

  c) All cargo and baggage are adequately monitored.

  d) New technology is brought to bear on security problems as soon as possible.

  e) Security features are incorporated into airport design.

Airport Capacity

- AASHTO believes that Congress should establish a national aviation policy which would ensure that needed capacity improvements at airports of national significance will be made irrespective of airport ownership. These improvements should be made in a timely manner and at a level which will satisfy forecasted demand.

Airport/Airway Systems

- AASHTO believes that a redefinition of the system of airports of national and state significance should be completed by the federal and state governments. This system should receive funding from a federal aviation trust fund supported by federal users' taxes.

- AASHTO further believes that each state should identify a system of airports of state significance and unless otherwise limited by state law, establish, collect and distribute state aviation fees along with eligible federal aviation funding, to assist in development and maintenance of this system.

Airport Ground Access

- AASHTO believes a major constraint on meeting of future air travel demand will be ground access, both on and off airport.

- AASHTO also believes that land side access should be a component of all airport master plans and all comprehensive transportation plans.

- AASHTO further believes that airport ground access should be eligible for funding as appropriate from the Highway, Mass Transit and Airport and Airway Trust Fund Programs, with assistance from the General Fund as needed. The funding should be flexible and should contain local and state participation features.

Environment

- AASHTO believes that public concerns over airport noise, air quality and potentially toxic or hazardous materials present at airport sites reflect a serious problem that could adversely affect the future development of the nation's air transportation system.

- AASHTO further believes that Congress, and other levels of government if they so desire, should address this most serious problem and provide guidelines for federal, state and local governments for ensuring environmental quality as an integral component of airport development.

Federal/State Roles

- AASHTO believes that states should play a strong role in locating, developing and expanding airports within their jurisdictions; that states should assume a more direct role in administering federal aviation funds allocations unless otherwise limited by state law; and that states should have greater responsibilities for funding and operating airports within their boundaries.

Airspace System

- AASHTO believes that it is a proper federal role to operate and maintain the nation's airspace system. The FAA should develop and implement the National Airspace System Plan as quickly as possible.

Revenue and Funding

- AASHTO believes that a dedicated trust fund supported by equitable user fees should support the national air transportation system, including airports of both national and state significance. Reasonable consideration for public use and benefit also justify continued general fund support of this system.

- AASHTO also believes that user funded trust funds for transportation should not be included in the federal unified budget.

- AASHTO further believes that a federal-state partnership that also provides an appropriate role for local and private participation, if properly coordinated to establish responsibility, will produce adequate funding resources to ensure needed system capacity.

Economic Development

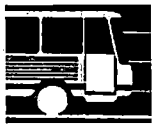
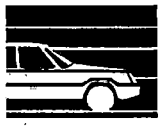
- AASHTO believes that economic development should be an element for consideration in all state and federal comprehensive transportation planning and development for airports.

New Technology

- AASHTO believes that the many positive gains from research and new development will continue to be of enormous benefit to air transportation. National air transportation system providers, both public and private, should ensure that programs and services they provide are managed such that immediate and maximum benefits of new technology will occur.

Air Cargo

- AASHTO believes air cargo is an emerging major component of aviation economics and should be taken into consideration in all planning and operational studies of airports and airspace.

Highways and Public Transportation

Goals and Policy Recommendations

The following are the major goals and policy recommendations of AASHTO for a new surface transportation program for highways and public transportation, to serve America as it moves toward the year 2020. The goals and policy recommendation statements are presented in hierarchical order from AASHTO's perspective, beginning with national surface transportation goals, and progressing through federal role and program policy recommendations to achieve the goals.

National Surface Transportation Goals - Highways and Public Transportation

Preservation

Preservation of America's existing surface transportation system should be the primary goal of any future national transportation program since it is this system which provides the basic network upon which this nation's economic health and international vitality depend.

Congestion

A balanced approach to increasing capacity and reducing congestion on this nation's surface transportation system should be employed, including an appropriate mix of highways and transit, and a thoughtful application of systems management technologies and demand management techniques.

Funding

User and benefitter fees, set at an appropriate level to cover the economic cost of the surface transportation facilities and services provided, should be dedicated solely to the funding of transportation improvements. General fund commitments to public transportation should continue.

Safety

The safety of Americans, using the surface transportation facilities and services, should be preserved and enhanced through the continued national commitment to safety research, safety applications and safety projects.

Access and Balance

The national surface transportation system should be comprised of a balanced, integrated and coordinated network of multimodal facilities and services which provide an adequate level of access to all of the various regions of this nation.

Planning and Research

This nation should continue to commit sufficient funding to transportation planning and research to ensure that established goals are met, that future options do not get precluded, and that new technologies are developed and applied to transportation infrastructure in a timely manner.

Economic Vitality

The national surface transportation program should preserve and enhance the economic vitality of this nation by providing employment, reducing transport costs, improving freight movement productivity, revitalizing rural America, rejuvenating blighted urban areas, supporting existing land uses, attracting economic development, providing transportation for rapidly growing regions, and improving international competitiveness.

Federal Role and Program Policy Recommendations- Highways and Public Transportation

System of National Significance

- The federal role in surface transportation should focus on a system of facilities and services which are significant to the economic health and international vitality of this nation.
- AASHTO believes that such a system would be comprised of all of the existing Interstate Highway System and an appropriate portion of the principal arterial system as redefined and the associated bridges, as well as the public transportation facilities and services which keep this nation's major cities moving.

Issues of National Significance

- Beyond the focus on the Highway System of National Significance and on the major transit projects, the federal role should be to allow the states and local governments flexibility in identifying and implementing specific surface transportation solutions appropriate to the regional/local need. These solutions should also serve to address transportation issues of national significance.
- AASHTO believes the dominant issues of national significance to be urban mobility, suburban congestion, rural access, and modal interlinks. Tradeoffs among issues like transportation safety, air quality, preservation, balance, public transportation, and rural and urban economic vitality should be determined at the state and local levels.

Other Programs of National Interest

- The federal role in surface transportation should include transportation planning, research, safety, emergency relief, and federal lands access.

- AASHTO believes that the basic goal of each federal program should be to assist the nation's surface transportation system to function as safely and efficiently as possible and thereby to preserve and enhance the economic health and international vitality of America.

Federal/State Partnership

- The existing federal/state partnership has worked well over the several decades of its existence in producing one of the best national surface transportation systems in the world.

- Therefore, AASHTO believes that the existing federal/state partnership should be retained for the programs addressing national surface transportation needs and only slightly modified for programs addressing state and local surface transportation needs.

Fewer Categorical Restrictions

- Existing lower-level federal program categories are unduly restrictive and do not permit the states and local governments adequate flexibility to meet their unique transportation needs in the most appropriate and cost-effective manner. Furthermore, existing federal requirements for lower-level programs are unduly restrictive on the states and local governments, which merely serves to increase "red tape" and decrease efficiency without delivering corresponding improvements in levels of safety or service to the users.

- Therefore, AASHTO believes that fewer categories, less rigid requirements and more flexible funding should be employed for the lower-level surface transportation needs in order to facilitate the development of regionally appropriate and economically efficient transportation systems.

Federal Role - Highways and Public Transportation

- AASHTO believes that the new federal role in transportation should include two levels of program specificity and commitment.

- One level would address the concern for "focusing" the federal commitment on a System of National Significance through categorical programs.

- The other level would address the concerns of the states and local governments for program "flexibility" in dealing with Issues of National Significance through flexible programs.

Highway Safety

- The safety of Americans, using the surface transportation facilities and services, should be preserved and enhanced through the continued national commitment to safety research, safety applications and safety projects.

Federal Procedure Recommendations

Overall Recommendation

- Simplicity and straightforwardness should be the hallmark of all federal administrative requirements associated with federal transportation programs.

Allocation of Funds

- Fair, straightforward and simple formulas and equitable discretionary guidelines should be used to allocate revenues collected at the federal level to state and local units of government.

- AASHTO believes that minimum allocations should be developed for any program addressing needs on the national highway system, but that prorata shares based on percentage of total highway user contributions attributable to each state should be used for programs addressing state and local highway needs.

- AASHTO believes that allocations for the major transit projects and for those projects whose costs cannot be accommodated from regular transit formula funds should remain discretionary in nature, and that transit formulas should be used for other transit programs.

Highway Trust Fund

- The Federal Highway Trust Fund should be made permanent, removed from the unified budget process and released from obligation limitations. All interest earned, along with existing balances beyond those providing an adequate cash flow cushion, should be released to the states and local governments to fund needed surface transportation improvements. Increased federal revenues are necessary to carry out the needs of the future Federal Surface Transportation Program.

Certification of Projects

- The states and/or transit funding recipients should continue to be responsible for the certification of all surface transportation projects receiving federal assistance.

Matching Ratios

- For highways, AASHTO believes that an 85 percent federal share is appropriate for the programs that address national needs. AASHTO believes that matching ratios for highway programs addressing state and local highway needs should be determined at the state level.

- For transit, AASHTO believes that the current federal matching shares should remain unchanged. However, for new starts and system extensions, funding priority should be given to projects providing a non-federal share higher than the minimum 25 percent. For the new Mass Transit Account formula funds, the federal share should be 80 percent, the same as it is for other capital formula funds.

Summary Comments

These recommendations, having been approved by at least two-thirds of the member departments, comprise the major policy recommendations of AASHTO for the direction of the future national surface transportation program. Four major themes are represented therein:

- Preservation - Preservation of the existing system should be the primary goal as this is key to the economic health and vitality of this nation.

- Congestion - An appropriate mix of modes and technologies should be used to increase capacity and reduce congestion on this nation's surface transportation system.

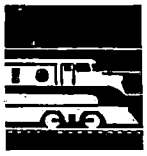
- Funding - User and benefitter fees should be dedicated solely to transportation improvements.
- Safety - Commitment should be continued to improve the safety of this nation's surface transportation system.

These major recommendations are to be read and considered with others made in this document for the highway and public transportation programs. The recommendations made herein do not include all programmatic details, either of the federal program itself or the intergovernmental processes at the state and local government level that would be needed to support the new concepts included in the recommendations. Further effort to develop these details will be necessary.

The following matrices (Figures A and B) show the major surface transportation programs for highways and public transportation recommended by AASHTO. Shown for each program are the corresponding administrative recommendations of AASHTO.

AASHTO'S PROPOSED FEDERAL PROGRAMS AND RECOMMENDED POLICIES FOR HIGHWAYS AND TRANSIT	HIGHWAY PROGRAMS $18 B (FY-92) - $26 B (FY-95)	
	CATEGORICAL HIGHWAY PROGRAM	FLEXIBLE HIGHWAY PROGRAM
ELIGIBLE FACILITIES AND SERVICES	EXISTING INTERSTATE HIGHWAYS AND A PORTION OF A REDEFINED PRINCIPAL ARTERIAL SYSTEM	OTHER PRIMARY, RURAL SECONDARY, URBAN ROUTES, OTHER FUNCTIONALLY CLASSIFIED ROADWAYS AND PUBLIC TRANSIT
ELIGIBLE PROJECT TYPES	0 Reconstruction & Rehabilitation 0 Additional Urban Capacity 0 Pavement Preservation 0 Additional Mileage Needs 0 Bridge Needs	0 Urban Mobility 0 Suburban Congestion 0 Rural Access 0 Modal Interlinks 0 Construction/Reconstruction 0 Rehabilitation/Preservation 0 Bridge Needs
ASSOCIATED PROGRAMS ALLOCATIONS	0 Highway Planning & Research 0 Highway Safety Programs 0 Highway Emergency Relief 0 Highways to and on Federal Lands 0 2% Discretionary Bridge Program	0 2% Discretionary Bridge Program 0 Urban Element Hold Harmless 0 Rural Element Hold Harmless 0 Bridge Element Hold Harmless
FUNDING SOURCE	0 Highway Trust Fund Revenues	0 Highway Trust Fund Revenues
FUNDING ALLOCATION PROCEDURE(S)	0 Factors: Statewide Lane Miles, VMT, Etc. 0 FY 91 Hold Harmless & Equitable Growth 0 Formula Allocation With 85% Minimum 0 Set Donor/Donee Relationship 0 1/2% Minimums 0 Some Transferability	0 Prorata Share Of User Funds 0 No Donor/Donee Relationship 0 Some Transferability
MATCHING RATIO PROVISIONS	0 Around 85 Percent Federal	0 Determined By Individual States
PROJECT CERTIFICATION PROCESS	0 Simplified Process	0 Annual Statewide Project List
BASIC INTERGOVERNMENTAL RELATIONS	O Federal/State	0 State/Local

AASHTO'S PROPOSED FEDERAL PROGRAMS AND RECOMMENDED POLICIES FOR HIGHWAYS AND TRANSIT	TRANSIT PROGRAMS $3.5B (FY 92) - $5.0B (FY 95)	
	CATEGORICAL TRANSIT PROGRAM	FLEXIBLE TRANSIT PROGRAMS
ELIGIBLE FACILITIES AND SERVICES	MAJOR PROJECTS ON EXISTING AND FUTURE TRANSIT SYSTEMS	PROJECTS ON EXISTING AND FUTURE TRANSIT SYSTEMS
ELIGIBLE PROJECT TYPES	O Major Rehabilitation Needs O New Transit Systems O New Transit Services	O On-going Operating Assistance O Rehabilitation Needs O New Bus Service Needs O Small Urban & Rural Transit O Broadened Type of Public Transportation Projects
ASSOCIATED PROGRAM ALLOCATIONS	O Transit Planning & Research O Elderly & Handicapped	No Associated Program Allocations
FUNDING SOURCE (S)	O Current Federal Fuel Tax Proportions Up to Current Funding Levels	O General Funds For Transit O Additional Amounts of The Federal Fuel Tax Over Current Funding Levels
FUNDING ALLOCATION PROCEDURES (S)	O Discretionary Allocations	O Current Transit Formulas For General Funds O New Transit Formula For Additional Amounts of Federal Fuel Taxes For Transit
MATCHING RATIO PROVISIONS	O Same as Current Section 3 O For New Starts and Extensions: Priority to Project with Higher Local Share	O Same as Current Section 9 and Section 18
PROJECT CERTIFICATION PROCESS	O Simplified Process	O Annual Project List
BASIC INTERGOVERNMENTAL RELATIONS	O Federal\State O Federal\Local	O Federal\State O Federal\Local



Railroads

Goals and Policy Recommendations

The following are AASHTO's proposed goals to guide for the development of a healthy rail industry and integrated surface transportation program to the year 2020, and its rail-related policy recommendations for any future comprehensive federal surface transportation program.

The policy recommendations are not presented in any order of significance; rather, each recommendation addresses a unique area of need within the rail industry. All are essential to the health and viability of the railroad industry to the year 2020.

Railroad Goals

Preservation

To preserve rail service where it is in the public interest.

Impact and Benefit Assessment

To develop the ability to anticipate the economic, social and national defense impacts of railroad abandonments on shippers, communities and highways. Also, to assess the relative benefits of rail and highway system improvements.

Cost-Effective Investments

To implement programs that invest in railroad projects which are justified on their own merit and/or as cost-effective alternatives to other improvements.

Rail Policy Recommendations

Provide for Access, Efficient Freight Movement and Congestion Relief

- AASHTO believes that there is an appropriate federal role in funding rail related projects. Any comprehensive national surface transportation program should include federal and state funding for track rehabilitation and acquisition, construction of rail/truck transfer facilities, new rail connections and industry relocation. This proposal meets the objectives of the Transportation 2020 process to preserve rural access, provide modal interlinks and reduce urban and suburban congestion.

Review Federal Railroad Laws

- AASHTO believes that Congress should review the body of law governing the rail industry in the same manner it addressed economic deregulation through the Staggers Act. Laws which should be reviewed include the Railway Labor Act, the Railroad Retirement Act, the Railroad Unemployment Insurance Act,

and the Federal Employers' Liability Act. A redrafting of these laws is essential to allow the rail industry to remain a viable part of the transportation system through the year 2020.

Provide for Traditional and High Speed Rail Passenger Service Needs

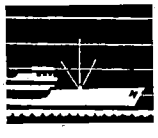
- AASHTO believes that the continuation and further development of Amtrak is an appropriate federal responsibility and in the national interest. In addition, AASHTO believes that the federal government should support and participate in a public-privarte partnership to develop high-speed rail in those selected corridors in which it will demonstrably relieve highway and airport congestion, and improve inner city travel efficiency. Any comprehensive national transportation program must address rail passenger service needs.

Assess the Competitive Environment

- AASHTO believes that Congress should compare the laws, government policies and user fees impacting the various transportation modes. Where a disparity is found, Congress should strive to create an equitable balance.

Provide for Railroad Safety Improvement and Enforcement

- Any future comprehensive national transportation program must continue to provide funds for separating or otherwise protecting railroad - highway crossings. In addition, a federally funded state/federal partnership of railroad safety inspections is required to assure that the rail industry complies with federal safety standards. Also, federal research and development funding is essential in the areas of improved warning systems (such as radar and sonar systems) and hazardous and nuclear materials transportation.



Water Transportation

Goals and Policy Recommendations

States, local government and the private sector generally bear the cost of port landside facilities. The federal government maintains deep and shallow draft shipping channels and aids to navigation. An effective water transportation network depends upon adequate landside connections to rail and highway facilities to deliver or receive goods to or from areas far removed from the water. To ensure that all parties act to maintain a viable water transportation network for the nation, there must be a comprehensive federal surface transportation program which defines a water transportation network of national significance. The following are AASHTO's goals and policy recommendations for the nation's water transportation system.

Water Transportation Goals

Preservation

Preservation of a water transportation system should be a primary goal of a national transportation program since the water mode is part of the intermodal freight movement of goods which supports the nation's economic strength.

Funding

Established cost sharing programs should be continued. Funds generated by water transportation-related activities from user fees, customs duties, etc. should be returned to the water transportation industry. Federal funding for channel maintenance and for construction of water transportation facilities should be secured to maintain an adequate water transportation system.

Safety

Aids to navigation, vessel inspections, environmental protection, drug interdiction, national defense, and other Coast Guard activities are services to the entire nation. The safety of the public and water transportation industry should be preserved.

Access

Intermodal connections between the water mode and other surface transportation modes should be preserved and enhanced where there is a clear public benefit.

Water Transportation Policy Recommendations

Coordinated Water Transportation Plans

- AASHTO encourages the Federal Government to establish clear priorities for federal investments in ports and waterways. A national maritime policy is needed to guide federal, state, regional and local efforts in a manner that will encourage the development of projects that best serve the interest of the nation based on careful examination of the economic and environmental impacts of alternative actions, while preserving the autonomy of non-federal entities.

National Ports and Waterways System

- AASHTO believes that there is an appropriate federal role in the oversight of the operation, maintenance and development of the nation's water transportation related projects. AASHTO urges the Federal Government to develop a National Port and Waterways System which integrates water transportation with its necessary intermodal connections into a surface transportation program.

Intermodal Connections

- AASHTO urges the Federal Government to recognize the need for landside access improvements to our nation's ports. Existing funding sources are inadequate to meet current and projected highway-port and rail-port connector needs. An integrated surface transportation program must consider port landside access improvements as part of federal funding programmed for highway and rail transportation modes.

Water Resource Development Act

- AASHTO urges the Federal Government to fund 100 percent of the costs of feasibility studies for deep-draft and inland harbor improvement projects. Improvements to the nation's deep-draft and inland harbors generate benefits far beyond the local area, including reduced transportation costs, increased competitiveness of U.S. goods in world markets and increased opportunities for national and regional economic development.

User Fees

- AASHTO believes that Congress should amend Section 208 of WRDA of 1986 which permits the recovery of the non-federal share of the cost of an authorized project. The Act should be amended to provide the ports greater flexibility in determining the method of assessing and allocating the non-federal share of a project among port users.

Disposal of Dredged Material

- AASHTO urges the Army Corps of Engineers, in close cooperation with ports and states, to establish regional scientific criteria for disposal of dredged material. The criteria used must include a reasonable margin of safety and should give consideration to the economics of dredged material disposal. Testing procedures for dredged material disposal permit compliance must be standardized throughout the nation.

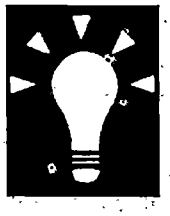
- AASHTO also urges that the Federal Government develop a program to educate the public about the economic necessity of dredging. The public's lack of hard information about dredged material increases the likelihood that all dredged material will be lumped with sludge or toxic materials.

Research and Development

- AASHTO believes that Congress should establish and fund an integrated Research and Development Program for water transportation. The Navy, Coast Guard, Corps of Engineers and the Maritime Administration should coordinate their research efforts within this National R&D Program to ensure the most cost effective use of their individual R&D resources.

Waterfront Development Pressures

- AASHTO encourages the Federal Government to investigate methods to increase the efficiency and capacity of existing port terminals and their inland connections. AASHTO also encourages the development of a national recreational boater education/safety program specifically aimed at operations near ports and commercial vessels.



Research, Development, and Technology Transfer (RD&TT)

Goals and Policy Recommendations

The following goals and major policy recommendations reflect AASHTO's strategy for research, development, and technology transfer.

There is no significance to the order in which these goals and policy recommendations are presented. Each addresses a particular portion of AASHTO's strategy for RD&TT, and all are essential to the overall goal - transportation innovation through RD&TT.

RD&TT Goals

Highway Research and Development Programs

Preserve and enhance the current system of highway research and development programs.

Intelligent Vehicle-Highway Systems

Develop and demonstrate intelligent-vehicle highway technology as an effective means of addressing many of the problems on the highway network.

RD&TT - All Modes

Ensure that AASHTO's member departments are able to use RD&TT to develop innovative solutions to problems in all modes of transportation.

RD&TT - Intermodal Issues

Ensure that intermodal issues that need to be researched are not overlooked because they do not fall clearly under the scope of a single mode.

Application of Technology

Accelerate the application of new technology to solve transportation problems.

Coordination of RD&TT

Ensure that the necessary organizational framework and coordination exist for each research program to carry out its role efficiently and for the total transportation RD&TT system to be fully effective.

Funding for RD&TT

Provide an appropriate level and a stable source of funding for transportation research, development, and technology transfer programs, and ensure that resources are distributed for maximum effectiveness.

RD&TT Policy Recommendations

Highway Research and Development Programs

- AASHTO believes that member-department research activities should be expanded to provide for more effective problem solving at the state level.

- AASHTO also believes that the National Cooperative Highway Research Program should be continued and expanded for applied research on problems shared in common by state highway agencies and on other problems of national significance.

- AASHTO also believes that, to derive full benefit from the member departments' investment in the Strategic Highway Research Program's Long Term Pavement Performance program, this component of the SHRP program should be sustained for 15 years beyond 1991.

- AASHTO further believes that the Federal Highway Administration's program of RD&TT should be expanded to enable this program to more fully execute its role in fundamental research and technology transfer.

Intelligent Vehicle-Highway Systems

- AASHTO believes that Congress and the Administration should establish and support an adequately funded national program to develop and demonstrate intelligent vehicle-highway systems.

RD&TT - All Modes

- AASHTO believes that the Federal Highway Administration's research program should be considered as a model for other transportation modes in conducting research requiring longer term, larger funding, and special expertise.

- AASHTO also believes that appropriate federal modal administrations within the U.S. DOT should consider AASHTO's interests in the development of federally funded research programs.

- AASHTO believes that consideration should be given to creation of a cooperatively funded research program in each transportation mode modeled after the NCHRP. In particular, AASHTO should work with the Urban Mass Transportation Administration, the American Public Transit Association, the Transportation Research Board, and others to advance the prospects for a research program that would have federally mandated set-aside funding and that would address AASHTO's research needs as recommended in TRB's Special Report 213, *Research for Public Transit.*

- AASHTO further believes that the Federal Aviation Administration should consider the initiative currently being discussed within the aviation community to establish a National Cooperative Aviation Research Program.

RD&TT - Intermodal Issues

- AASHTO and other transportation organizations and agencies should identify intermodal problems that might benefit from research. AASHTO believes that if an intermodal problem includes a substantial highway component, it should be considered for submittal as a candidate for NCHRP funding.

- AASHTO believes that when interest in an intermodal research need is shared by several member departments, it should be evaluated as a candidate for pooled funding using a system modeled after the relevant parts of AASHTO's Joint Development process and other pooled fund efforts.

Application of Technology

- AASHTO believes that the FHWA and other modal administrations of the U.S. Department of Transportation should increase their implementation activities for the purpose of moving thoroughly evaluated technology into practice. Technology assistance programs, training, demonstration and experimental projects, and related activities should be continued and expanded.

- AASHTO further believes that obstacles to the private sector's introduction of innovations into the highway market place should be eliminated, and that recent initiatives by Regional Associations of State Highway and Transportation Officials and the FHWA need to be extended to explore more effective mechanisms for testing, evaluating, and reporting on new highway products and materials for the purpose of reducing the time and cost of technology introduction and to encourage industry to invest in R&D for highway markets.

Coordination of RD&TT

- AASHTO should expand its activities aimed at identifying new research opportunities and ensuring that member departments' interests are reflected in research priorities for national-level programs.

- AASHTO believes that the member departments should have a strong voice in setting the nation's transportation research agenda. The states through AASHTO should continue to provide the vision and guidance that will permit transportation research programs to address future needs and opportunities as well as current problems. The states should be responsible for setting research goals and priorities.

- AASHTO believes that improvements in computerized information systems will continue to be needed to minimize the possibility of undesirable duplication of research. AASHTO should take a lead role in working with the Federal Highway Administration, the Transportation Research Board, and other appropriate organizations to develop a database of domestic publicly funded research project information--for proposed, in-progress, and completed studies.

- AASHTO further believes that activities of the newly formed Highway Research Coordinating Council should be continued to ensure that major sponsors of highway research are aware of each other's programs and will work together for a more coordinated system.

Funding for RD&TT

- AASHTO believes that the recent decline in transportation RD&TT spending should be reversed to reflect current needs and opportunities, and to bring the scale into line with research spending in other industries, with transportation RD&TT spending in other developed countries, and with past levels of transportation RD&TT spending in the U.S.

- AASHTO believes that funding of transportation research of national significance is a basic responsibility of the federal government in its leadership role in advancing new technologies to serve the public and in its fiduciary role in utilizing national resources efficiently. Federal funding, through federal user taxes, should continue to be a principal source of funding for research to permit needed technological advancements to occur.

- AASHTO believes that allocation of federal-aid funds for support of transportation RD&TT should be based on specified formulas applied to annual apportionments.

- AASHTO also believes that specific amounts should be allocated annually, and matched equally by private-sector and other participants, for a coordinated public/private program to develop and demonstrate intelligent vehicle-highway systems.

- AASHTO further believes that funding for the Highway Planning and Research program, FHWA's RD&TT activities, and the IVHS program should be derived from federal-aid highway allocations before the split into the categorical and flexible programs recommended by AASHTO.

Chapter 1
Transportation and a More Competitive United States Economy

Over 70 years ago, the United States Congress initiated federal involvement in this nation's surface transportation systems by creating the Federal-aid Highway Program. From its inception, this federal program has provided vital financial assistance for state-administered highway systems. The rationale for this federal involvement in surface transportation was the national economic need for a network of roadways to serve interstate commerce and travel.

In the 1960's, Congress expanded its support for surface transportation to include public transportation, and in 1982 it chose to support both highways and transit from highway user fees.

In the 1970's, Congress temporarily expanded federal support for surface transportation by providing financial assistance to railroads both directly and through the states, for the purpose of helping rehabilitate railroad equipment and trackage.

Today the citizens of this nation enjoy the convenience and economic benefits of a surface transportation system second to none. This system was made possible largely through the federal surface transportation programs established by the U.S. Congress and implemented under the direction of the enduring cooperative federal-state partnership.

There is obvious need to assure an adequate national transportation system for Americans. In making transportation decisions the nation must take into account such factors as the different transportation requirements of the states and their local governments, urban and suburban congestion, rural development needs, changing demographics, and increasingly diverse economies and lifestyles across the country. The need is for new transportation concepts for a new century.

The New Challenge

In recent years, particularly during the past decade or so, the post World War II era of an overwhelming American domination of the world economy has diminished. What inevitably had to happen, did happen. Other nations caught up to us, and some passed us. Workers in the Far East, Central Europe and Latin America now supply a goodly amount of the world's material needs; needs that in earlier times were produced in greater degree by American companies and American workeers. No one expects this revolution in world economics to soon be reversed, if ever. Instead, America must respond to this new economic age with the new skills, new resources and new energies that are imperative for American prosperity and well-being in a new and ever-changing economic age.

The new economic world, in a word, is vastly more competitive than it ever before has been. American business and industry, even the whole of the nation itself, in order to survive and prosper, must constantly replenish its competitive toolbox--with ingenuity, with quality, with reliability, with responsiveness, and with prices that are competitive with those of other nations.

Among the many things that are needed for a highly competitive America is a high quality, highly efficient transportation network on which to ship American materials

and products. Goods transportation alone is not the only answer; but there can be a competitive America only with good transportation.

When transportation works well, and for the most part the American transportation network does work reasonably well today, it is not easy to readily perceive the magnitude of transportation's influence on the American economy. But consider this:

- Inbound and outbound transportation costs constitute as much as 25 percent of product prices for some industries, and many hover in the 8 to 12 percent bracket.
- Over 21 percent of all average household expenses are to pay for personal transportation costs.
- Surveys show that 11 percent of all labor force hours are spent in some form of highway travel.
- Transportation is the parent of nearly one in every five dollars of U.S. gross national product.

Even marginal efficiencies in this massive transportation system can pay big dividends toward a more productive nation.

Efficiency in All of Transportation

When we speak of a more efficient transportation network, certainly a more productive movement of people and goods on the nation's roads and highways is of the upmost importance. But efficient and reliable rail service, and water transport as well, is also critical to national competitiveness. A rapidly growing, very mobile services industries depends upon quality air service, and their competitive position in a world of ideas and ingenuity may be threatened by our increasingly congested airways and airports. Better public transportation to alleviate the longer and longer time required to go to and from work in our urban areas is an urgent need.

In short, each transportation system, each mode must become more and more efficient for the nation to reach its competitiveness goals.

However, even fully efficient single transportation systems, if operated and used in mono-modal fashion, will not be adequate for the international competition that portends for the 1990's and the 21st century. Instead, we need to exploit the vast possibilities that are inherent in intermodalism--a network of pipeline, rail, waterborne, air and motor vehicle transportation services, each doing what it can do best to reduce transportation costs and thereby stimulate economic growth.

In the report *America In Transition, The International Frontier: Report of the Task-Force on Transportation Infrastructure*, the National Governor's Association comments on the need for intermodal coordination this way:

> "Transportation issues increasingly cut across traditional boundaries of transportation modes and governmental agency jurisdictions.....firms have responded with pricing, marketing, technological, and operating changes that have altered domestic and international freight and passenger flows dramatically....Yet government programs have not kept pace with these changes. Transportation policies, laws, and regulations are uncoordinated, inconsistent and often incomplete when it comes to adequately meshing intermodal concerns....In the future, as the global economy requires more interconnections, the ability of people and products to

transfer from one mode of transportation to another in moving across continents or oceans will become even more essential."

A Bigger Investment in Transportation

Among the myriad of ideas and suggestions with respect to every aspect of what ought to be the nation's transportation future, and in part the nation's economic future, there is one constant: the nation invests much less in transportation than it did a decade or two ago; the nation continues to invest less than is needed even to maintain current services, let along improve the quality of transportation; but the nation must invest more in transportation, much more, if it is to keep pace with a growing America and if it is to regain its competitive edge in a dynamic world economy.

The National Council on Public Works Improvement said in *Fragile Foundation*, its recent report to the President and Congress:

> "After two years of study, the National Council on Public Works Improvement has found convincing evidence that the quality of America's infrastructure is barely adequate to fulfill current requirements, and insufficient to meet the demands of future economic growth and development.
>
> A declining infrastructure inevitably will jeopardize the productivity of our economy and our quality of life. Failure to reverse this decline will exact a high price for the nation in the future, both in the cost of deferred investment and in reduced economic competitiveness.
>
> Therefore, the Council recommends a commitment, shared by all levels of government, the private sector, and the public to vastly improve America's infrastructure. Such a commitment could require an increase of up to 100 percent in the amount of capital the nation invests each year in new and exciting public works."

In its report card on the condition of the nation's public works, the Council found serious and impending transportation infrastructure problems. Our nation's highways were given only a C+, with the comments that "spending for system expansion has fallen short of need in high-growth urban and suburban areas," and that, "many roadways and bridges are aging and require major work." Transit fared worse, with only a C-, while aviation did a little better with a B- report card. Overall, the Council found little to cheer in its appraisal of the nation's transportation infrastructure.

These challenging findings were corroborated in detail in the AASHTO report, *Keeping America Moving, The Bottom Line* which summarized national surface transportation requirements for the next three decades:

> "Current levels of spending for the nation's surface transportation system have been inadequate. The publicly supported elements of the surface transportation system have declined in total value since the 1970's, and the nation now is, in effect, disinvesting in surface transportation infrastructure.
>
> Continuing current levels of funding into the future, discounting any effect of inflation, will result in a $1,000 increase in vehicle operating cost per household; public transportation services will deteriorate, and the nation's mobility will suffer."

The Bottom Line goes on to say that current investments must be increased by at least 20 percent (in constant dollars) over the next three decades just to maintain the current service and physical condition of the nation's highway and road system. "However, even at this funding level analyses show service is likely to deteriorate in some areas of the nation and on some highway systems." A total 50 percent increase is needed to maintain current service and physical conditions at today's level, expand capacity enough to accommodate future travel growth, and to improve current service levels to tolerable standards.

Without More Money for Transportation, The Economy Will Suffer

> "Now we face tough competition from other countries for markets--domestic and foreign. We need to produce and deliver goods and services with a high degree of efficiency at a competitive price. Because the cost of doing business is influenced by how well we move goods and people across town, across country, and around the world, our economic performance is tied to the quality of our transportation services and facilities." NGA report, *America In Transition.*

Recently, AASHTO, a community of transportation professionals, has come to more fully appreciate the important role that more efficient, higher quality transportation services may play in making America a more productive and competitive nation. But we still know far too little about the interrelationships of transportation systems with efficient operations of the nation's economy.

In that vein, economists and transportation professionals across the nation were very intrigued by reports in the fall of 1988 of the research of Dr. David A. Aschauer, Chicago Federal Reserve Bank, into the correlations between the several decades long decline in American productivity and the correlary decline in public infrastructure investment. Here is a summary of Dr. Aschauer's findings:

> "...what economists call 'total factor productivity' growth has slumped during the past decade and a half in the United States...the annual growth rate in the private business economy has plummeted from 1.5 percent during the 1950's and 1.8 percent throughout the1960's to .8 percent in the 1970's and a dismal .7 percent in the first half of the present decade.....Not only has productivity growth fallen over time, but it has tumbled relative to the experience of our major international competitors as well."
>
> "...there are deeper implications of the national neglect of our public facilities for the health of the United States economy. Indeed, I have uncovered striking evidence that the recent fall-off in public works spending is at the very core of the productivity slowdown."
>
> "Productivity clipped long at a 2 percent annual rate during 1950 to 1970, while the net public stock expanded by 4.1 percent per year. However, after 1970 the rate of increase in the public capital stock fell to a mere 1.6 percent per year, bringing with it a slump in productivity growth to a miserly .8 percent annual rate."
>
> "This strong, positive correlation between productivity and non-military public sector investment is confirmed by looking across highly developed countries. Indeed, our ability to compete with other nations in the Group of Seven has been eroded by the low level of public investment in the United States. Japan, and to a lesser degree other members of the G-7, have sustained higher levels of public investment and have reaped the harvest of higher productivity growth."

"Thus, a root cause of the decline in the competitiveness of the United States in the international economy may be found in the low rate at which our country has chosen to add to its stock of highways, port facilities, airports and other facilities which aid in the production and distribution of goods and services...we as a country should be vitally concerned with the viability of our economic lifelines that enable us to meet the challenge of an increasingly competitive world marketplace."

It should be patently clear that, if America is to maintain its economic leadership in the world economy and avoid the negative and costly effects of inaction, the nation must commit the required, but affordable, moneys that are needed to preserve and improve its transportation system. Anything less will have dire consequences for our nation's economic vitality, and result in a diminished economic legacy that we pass on to future generations.

The remaining chapters of this report outline the air, rail, highway, mass transit, water transport and research policies and programs that will guide the development of the effective American transportation network that is needed for the kind of an America and its economy that we envision for the 21st century.

Chapter 2
Aviation

Part I

Introduction

The federal role in aviation began with early international conventions that focused on national sovereignty, rights in airspace, and international uses and controls. From aviation's earliest beginnings through today, the need for unquestioned federal supremacy in aviation has marked Congress's legislative efforts. The first federal interests in airports established that state governments would be viewed the same as local governments. It is only recently that narrowly defined references to states or state agencies have appeared in federal aviation legislation.

The national air transportation system in place today is the direct result of a federal/local government partnership. The federal partner regulates aircraft and airmen, ensures safety, equips and operates the air traffic control system, and administers an airport grant program. The local partner provides the surface intermodal link - the airport.

Today our national air transportation system is troubled. The air traffic control system continues to exhibit labor unrest. The federal National Air Space Plan to replace antiquated equipment is seriously behind schedule and over budget. Our locally owned airports suffer critical capacity constraints at key locations. Little or no effort by local airport sponsors address this urgent need. The consolidation of the airlines and their continued move to hub and spoke type operations further aggravate the lack of airport capacity.

Our nation faces an immediate need to restructure the aviation system for current and long- range needs. This effort must clearly define federal, local and state roles within the system. Local authority to constrain airport capacity or to choose to not build to meet demand cannot continue. An increased and well defined state role similar to the surface modes can ensure future airport capacity.

Historical Background

On December 17, 1903 man first flew powered, heavier-than-air aircraft. Since that recent event the aviation mode of travel has developed into the dominant means of national and international commercial passenger travel. The Air Commerce Act enacted in 1926 established the initial federal role in aviation. This act provided for federal regulation of pilots and aircraft and the establishment and operation of the first air traffic control system. The act prohibited any federal role in the establishment of airports.

The initial federal role in airports occurred in the 1928 Act Relating to Public Airports. Congress authorized the leasing of public lands for use as public aviation fields. In the 1940 Washington National Airport Act, Congress granted the Civil Aeronautics Administration, the forerunner of the Federal Aviation Administration, authority to operate Washington National Airport.

In 1946, the Federal Airport Act gave federal assistance to develop a comprehensive system of airports. It was this program that recognized and reinforced the federal/local government partnership present in our national air transportation system today. The passage of the Federal Aid Airport Act created a program that by law could not differentiate state versus local government roles, and it ultimately led to the dominant local government role in airports today.

The Federal Aviation Act of 1958 defines "State agency" only as it relates to air carrier economic regulation as administered by the now sunset Civil Aeronautics Board. The Airline Deregulation Act of 1978 did require that the Federal Government consult with the states in the administration of the Essential Air Service Program.

The Airport and Airway Development Act of 1976 established a pilot project under which four states administered the portion of the airport program for their general aviation airports in a one-year demonstration program. The Airport and Airway Improvement Act of 1987 included a similar state block grant pilot program provision for up to three states for FY90 and FY91. This law included the provision for state sponsorship for projects benefiting two or more airports. This represents the federally defined state role in aviation.

Federal funding of the aviation programs reinforces the federal/local relationship. Formal federal funding of a national airport program began in 1946. The 1970 Airport and Airway Development and Revenue Acts created a trust fund for user fees, no longer providing general funds for airports. In these programs, federal funds matched local contributions with little or no acknowledgement of state participation.

The aviation needs we face today and tomorrow cannot be adequately addressed by old partnerships or paid for from current dedicated funding sources. We must redefine the system, establish specific federal/state/local roles, provide for the means to fund programs that will ensure that the capacity of the system adequately serves the travel needs of the nation and thereby contributes to our economic well-being.

In September, 1988, Leno Menghini, President of AASHTO, requested that the AASHTO Standing Committee on Aviation undertake an effort that would result in an aviation mode component of the Transportation 2020 effort. Major elements of the aviation effort were identified as an evaluation of the requirements of the aviation mode through the year 2020, a review of all existing AASHTO policies relating to the aviation mode, development of recommended AASHTO aviation policies, and preparation of a document summarizing the above.

Future Outlook

The nation's air transportation system in the year 2020 probably will have undergone significant changes from our system today. One possibility is that there will likely continue to be a diversity of users but very possibly fewer and larger airlines providing service to the larger metropolitan areas. Under such a scenario regional airlines could also be operating larger aircraft and serving fewer cities as well. Smaller communities would continue to have problems accessing the national air transportation system. As a result, some form of commercial airline re-regulation could be considered in the future. General aviation would continue to be the primary means of serving business and commercial interests in smaller communities.

Aircraft to meet future aviation needs are expected to be safer, more fuel efficient and more technologically complex, with newer engine types and airframes and more sophisticated navigation

and communications systems. Age diversity could also characterize the aircraft fleet however, as efforts are made to extend the lives of older aircraft. Experience levels of aircrew members could show a gradual decline because of increased costs of training, greater use of simulation and reduced availability of military trained airmen, a traditional source of airline pilots. At the same time, forecasted growth in air travel will likely place increased demands on all the major components of the air transportation system. The airspace system, one of the chief components, is finite and competition for its use will almost certainly increase, and therefore increase the performance requirements of both aircraft and aircrew.

One of the keys to the future of air transportation in this country, will be the ability of airports to keep pace with growth. More passengers, more aircraft and more intensive use of the nation's airspace will require a national aviation policy that ensures development of additional airport capacity, an adequate means of funding airport expansion and a clearer definition of federal, state and local roles in airport development.

Air Transportation Issues

The national air transportation system is the overwhelmingly dominant means of both domestic and foreign commercial passenger travel today. The history of public/private cooperation in developing this system is vital to its future. In order to ensure an air transportation system with a balanced capacity for all users, the future national air transportation system must address these key issues:

1. Adequate airport and airspace system capacity with maximum safety and guaranteed security.

2. A clearer definition of federal/state/local roles in aviation to strengthen the public partnership.

3. A system of reasonable, equitable, and adequate federal user fees to fund a well defined national airspace system.

4. The completion of the National Air Space Plan.

5. New and improved ground access systems for existing and new airports.

6. An adequate program of airport and aircraft inspection and maintenance.

7. Appropriate and uniform standards for environmental quality for airports.

8. The immediate application of new technology to every facet of aviation.

Part II

Aviation Goals and Policy Recommendations

Safety

Goal: Through new and improved equipment, procedures, and aircraft maintenance practices, ensure the safety of airline passengers and crews and enhance consumer confidence in the nation's air transportation system.

Safety is one of the most critical issues in air transportation. It is the performance measure by which the interaction of people, their machines and the other inanimate objects of human creation are judged. Many parts of this complex system are subject to close regulation and oversight. The development and design of all U.S. aircraft, for example, is subject to strict engineering and performance criteria. Strict design criteria are employed in all federally funded airports. Aircraft operation, and use of the nation's airspace is also strictly regulated, as are the operators of aircraft.

In an age of increasing aviation use it is vital that safety be of preeminent concern. Recent concerns over aging aircraft, seemingly careless maintenance procedures, excessive traffic controller workloads and lack of adequate training, apparent conflicts in military and civilian airspace use and inadequate early warnings of severe weather conditions all point to the importance of this issue.

Implementation of the National Air Space Plan, along with the addition of collision avoidance systems and advanced ground to air data links to provide weather information and position to pilots can create more efficient utilization of the airspace. But, along with these innovations must go an adequate system of repair and maintenance for facilities and equipment and a continuing program of training and certification of personnel involved in critical operations.

Major Recommendation

- AASHTO believes that safety should be the prime consideration of all aviation programs. The following areas of concern should be closely monitored by the federal government and under standards established at the federal level, to ensure the safety of crews, passengers, and people on the ground: aging aircraft fleet; aircraft maintenance; increased air operations; constrained airspace; military/civilian airspace conflicts; severe weather information; communications and navigation aids; and pilot training.

Security

Goal: At the national and international level, establish adequate security procedures and enforce the surveillance and monitoring of airport terminals, appurtenances and baggage areas to ensure passenger safety.

Next to airline safety, probably no issue is so important to the air traveller as that of security. Reports of terrorist attacks at major international airports and of weapons and explosives being clandestinely smuggled aboard commercial airliners create public confusion and a pervasive apprehension that our institutions are inadequately prepared to control such violence. Certainly airport users have every

right to expect and even demand that adequate security measures be implemented to minimize such dangers.

The current system is not completely effective, however. Financial constraints have prevented U.S. airlines from keeping abreast with the development of newer technology that could be more effective in screening weapons and plastic explosives. Owing to the lack of adequately trained security staff, it has been difficult to identify and screen out dangerous objects, especially during peak travel periods at major airports. In addition, U.S. airlines and some foreign flag carriers normally do not inspect checked-in baggage.

A number of measures designed to combat terrorism have been implemented. Among them: screening of flight line personnel; placing federal air marshals on flights; establishing in-flight and ground security coordinators at airports; creating means for passenger separation; and providing additional training for airline personnel. The International Federation of Airline Pilots Association (IFALPA) has also approved procedures for immediate imposition of boycotts against unsecured airports and countries that encourage terrorism.

It is apparent that most countries are willing to combat terrorism and are willing to implement laws toward this end. One effective measure would be more uniform laws and legislation regarding terrorist activities. Mandatory sentencing and rapid extradition would be appropriate complementary measures to add. Uniform standards for airport security, adequate funding for state-of-the-art security systems, and adequate training for airport personnel are also needed. Check-in systems should be redesigned to permit more thorough screening of passengers and baggage. Separation of departing, arriving and transit passengers should be considered as a means to decrease the possibility of weapons and drugs being transferred between passengers on different flights. Reliable and efficient baggage inspection systems and electronic inspection of all air cargo are also measures that should be implemented.

The issue of security is of such compelling magnitude that it has become a national public safety concern and the Federal Government should assume primary responsibility in this area. The focus of any security program should be on prevention, with emphasis on airport perimeter control, flight line surveillance, and passenger and baggage screening. The rapidly changing methods and technologies used by terrorists will require that investments continue to be made in the search for moreeffective screening measures. Under federal guidance, the FAA, airports and airlines will need to work closely together in implementing these measures without imposing unreasonable delays on airline passengers.

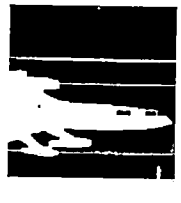
Major Recommendation

- AASHTO believes that aviation security is an issue of compelling national significance, and that it is a proper federal role to ensure that airport and in-flight operations are as secure as possible from terrorist threats. This would entail the following:

  (a) Security personnel are qualified and well trained.

  (b) Adequate and reasonable security procedures are established and properly monitored for the nation's commercial airport system.

  (c) All cargo and baggage are adequately monitored.



(d) New technology is brought to bear on security problems as soon as possible.

(e) Security features are incorporated into airport design.

Airport Capacity

Goal: Provide adequate capacity to meet current and projected air travel demands through the expansion or conversion of existing airport facilities, where feasible, or the construction of new airport facilities.

According to current reports, at least 16 of the nation's primary commercial airports are congested. By the year 2000, under present growth trends, over 40 large airports will have exceeded their practical capacity. Also experiencing growth related problems are general aviation airports in major urban centers. Here, in most cases, the problem is one of accommodating increasing numbers of based aircraft at facilities that have only limited capabilities for expansion.

Several critical and interrelated factors affect the capacity of the nation's air transportation system. Airport runways determine the number of aircraft that can physically take off and land in a given period of time. Terminal facilities and gates control the number of passengers that can be accommodated for passenger loading and unloading. The air traffic control system determines the number of aircraft that can be safely guided in the terminal airspace around an airport. And the surface transportation network serving the airport site affects the number of people that can access the terminal facilities, either by highway or public transportation.

Commercial air service is a highly concentrated activity in the U.S. A relatively small number (72) of the nation's 550 commercial airports account for roughly 90 percent of all passenger traffic. Airline deregulation and evolving business strategies of the airline companies have accelerated the trend toward hub and spoke operations since 1978. Increasing use of these radiating route patterns has significantly contributed to the concentration of traffic at a relatively few airport nodes. Many of these large hub airports are located within dense metropolitan areas, where they are becoming more land locked by urban development that also imposes more stringent environmental standards on airline operations. Noise curfews, aircraft and local flight pattern restrictions and limited aircraft operations are prevalent at a number of the nation's primary airports today.

Despite advances in communications and rapid rail technologies that may lessen certain demands for aviation in short-haul and certain communications dependent markets, the overall demand for aviation is expected to continue its rapid growth, creating the need for major capacity expansions in the system. Many present and already constrained hubs may become even more limited by airspace, land acquisition, environmental, or surface transportation restrictions from expanding further at current sites. New airport facilities will almost certainly be needed, and federal, state and local governments will need to work closely together to identify and develop these new sites.

Completing implementation of the National Air Space System Plan offers great potential for more efficient use of the airspace component of the air transportation system, and this should be a high priority concern. Other recommendations for improving the efficiency of the airspace system such as separation of landing approach traffic and improving procedures for instrument approaches should also be developed. Some redistribution of traffic to alleviate peaking problems may also be possible. Capacity allocation or peak hour pricing approaches could allow traffic flows to be spread more evenly throughout the day, or among other airports serving the same area.

For the long term, eventual automation of the terminal area air traffic control system is foreseen, along with advanced weather detection systems and low altitude airport surveillance radar. Informal surveys have also revealed a favorable potential for adding new capacity in many of the nation's major airport cities, either through expansion of existing airports or development of new sites through conversion of general aviation or military facilities. Another approach more conceptual in nature is the idea of remote transfer airports or wayports. Shifting the transfer portion of intercontinental or transcontinental travel to another location would remove the constraints associated with new construction or expansion in already developed metropolitan areas. Links with nearby cities could rely on short-haul air service or high speed ground transportation.

Major Recommendation

- AASHTO believes that Congress should establish a national aviation policy which would ensure that needed capacity improvements at airports of national significance will be made irrespective of airport ownership. These improvements should be made in a timely manner and at a level which will satisfy forecasted demand.

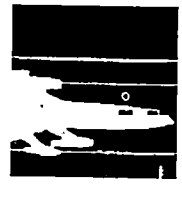
Airport/Airway Systems

Goal: Define national and state airport/airway systems which will meet forecasted demand and provide continued support for the nation's economic health and international vitality.

The National Plan of Integrated Airport Systems (NPIAS) identifies some 3,243 existing airports and 466 new or replacement airports that meet established criteria for inclusion in the national plan for development of public-use airports in the United States. This number represents only about 20 percent of the total landing areas (airports, heliports, seaplane bases) in the U.S., but it includes the large primary commercial service airports as well as a number of general aviation airports serving smaller communities. Among the intended purposes of the NPIAS is to identify airport development projects which may be eligible for federal aid. The federal financing of airports serves the primary purpose of providing a national system of airports for interstate commerce. Definition of the NPIAS system is such that over 97 percent of the U.S. population is within 20 miles of a NPIAS airport.

The ten-year needs (1986-1995) identified in the NPIAS have a budget requirement in excess of $24 billion, including federal, state, local and private costs. Approximately 72 percent of this cost will be needed for development to increase airport capacity and expand the system of U.S. airports to handle greater volumes of passengers and aircraft. The most significant portion of this amount will be needed for development at the 278 primary commercial service airports that serve most of the nation's air travellers. Reconstruction of airports to accept larger aircraft and longer non-stop flights, and construction of new airports will be required as part of this development.

Under the NPIAS plan, major new airport construction will depend primarily on local initiative and financing, as federal grant assistance may contribute no more than 20 percent of the total cost of new airport development. Even with this, however, the NPIAS admits to possible physical or political limitations to constructing new runways at all congested airports and cautions that other measures "may be needed to limit delays at some locations." Measures recommended elsewhere include options that range from traffic redistribution (capacity allocation or peak hour pricing); to airport conversion (general aviation or military airports); to more conceptual approaches such as remote transfer airports or wayports.



Because of the enormous increases projected in air travel in the future and the already mounting pressures to increase airport capacity at many of the nation's primary airports, some important alternatives will be beyond the scope of local governments to address. State involvement may be necessary in building new regional hub airports. Federal involvement will be needed in converting military airports to civil use. And remote transfer airports will definitely require more direct federal and state involvement. All of these concerns point to a need to reexamine the intent, purpose and scope of the national plan for public use airports, with an aim toward focusing more strongly on truly national, state and local interests in airport development and toward establishing more clearly defined systems and funding approaches that reflect those interests.

Major Recommendation

- AASHTO believes that a redefinition of the system of airports of national and state significance should be completed by the federal and state governments. This system should receive funding from a federal aviation trust fund supported by federal user's taxes.

- AASHTO further believes that each state should identify a system of airports of state significance and, unless otherwise limited by state law, establish, collect and distribute state aviation fees along with eligible federal aviation funding, to assist in development and maintenance of this system.

Airport Ground Access

Goal: Through coordinated, multi-modal planning, determine current and future modal access needs and implement improvements in a timely manner consistent with and in recognition of planned airport capacity improvements.

Recent studies have identified 23 of 41 major airports as experiencing landside congestion. Similarly, 16 airports are operating at or near airside capacity, four of which are under FAA operational constraints due to the severe level of congestion. With passenger enplanements forecasted to double current levels by the year 2000, and to double again by the year 2020, both landside and airside congestion will significantly worsen without extensive improvements.

Currently, attention is being focused on the lack of airside capacity with little attention being given to congestion on the landside. Airside demand obviously translates into landside demand and neither can be addressed without the other. FAA considers airside congestion its number one problem, and has been reluctant to fund major landside improvements because it considers them as a local government responsibility. Due to this perception, landside access has not been adequately addressed at the national level, nor in the comprehensive, continuing and cooperative planning processes carried out by the states. The adequacy with which it has been addressed at the local level is also questionable, since aviation planning is generally done independent of other modal planning.

A survey conducted by the AASHTO Modal Technical Advisory Committee provides the only current, long-range, national-level estimate of off-airport access needs and this calculation was intended only as an order-of-magnitude evaluation. The year 2020 needs estimate of $23.45 billion, a very conservative estimate, clearly points to the severity of the landside access problem. Considering that nearly 90 percent of all trips to and from airports are by private car and taxi, new and improved highway facilities are crucial. Carefully planned rapid transit systems could accommodate a portion of the airport access demand, but future needs estimates indicate only about 25 percent of the total capital investment requirement for airport access would be applied to public transportation.

It is clear that improvements to airside capacity must be accomplished by appropriate landside improvements. However, under current practices, there are no assurances that such a coordinated approach will be taken. One of the major issues to be faced for a successful aviation future is the development of appropriate landside access plans and programs. If the future of aviation is critical to this nation's economic growth and international vitality, priority must be given to landside access improvements. In addition to requiring better coordination at all levels of government, increased emphasis must be placed on landside access in the urban transportation planning process. Moreover, landside access may require more funding emphasis from FAA, FHWA, and UMTA programs, and increased funding from state, federal, and local general revenues. Additionally, the states must assume greater responsibility for development of regional or major hub airports within their jurisdictions in order to coordinate landside access needs and assure that a national airport/airway system, sufficient to meet current and future demands, will be developed and maintained.

Major Recommendation

- AASHTO believes a major constraint on meeting future air travel demand will be ground access, both on and off airport.
- AASHTO also believes that landside access should be a component of all airport master plans and all comprehensive transportation plans.
- AASHTO further believes that airport ground access should be eligible for funding as appropriate from the Highway, Mass Transit and Airport and Airway Trust Fund Programs, with assistance from the General Fund as needed. The funding should be flexible and should contain local and state participation features.

Environment

Goal: Develop and promulgate adequate and uniform standards for environmental quality at airports and airport environs.

Noise, air quality, toxic/hazardous wastes and the encroachment by incompatible land uses are all airport-related environmental concerns. Although noise has been one of the most dominant environmental concerns in airport operations, new emphasis is being placed on the airport's contributions to air quality and hazardous wastes problems, as they become increasing sources of public concern.

Attempting to reduce airport-generated noise, vehicle emission, and hazardous materials and at the same time provide a maximum level of service can often be conflicting goals. Actions to reduce environmental concerns at an airport can impact groundside or airside service which could in turn reduce the capacity of an airport.

Noise is one of the most dominant environmental concerns in airport operations. Some states presently restrict land uses near airports and some airport proprietors restrict aircraft operations because of concerns for noise. Most of these operational restrictions occur in the form of capacity limiting regulations that either establish passenger caps or bans on operations during certain hours, or impose curfews on certain noisy aircraft. Aircraft manufacturers are required to meet federal noise standards in the design of new aircraft. However, there are no uniform noise standards at the federal level governing aircraft operations.

Within the vicinities of urban air hubs, high levels of airport noise or the prospect of high levels of noise act as a definite impediment to airport expansion as well as certain desirable forms of economic development. Future airport expansions as well as development of new airport facilities must provide for systematic consideration of the effects of noise. Uniform national standards on airport noise are needed to establish a consistent national policy on airport funding for noise related improvements.

Air quality is becoming an increasing concern to the major urban areas in the United States. Airports in these areas are becoming identified as a source of transportation related emissions. In addition to the other environmental concerns, airport operators will have to deal with efforts to reduce emissions from the aircraft, ground service vehicles and vehicles driving to the airport.

The need to clean up toxic conditions on or near airport properties and to replace leaking fuel tanks is posing still another concern for the health and safety of the public. The responsibility for cleanup of hazardous conditions on airport property lies with the airport owner. In many cases, the presence of toxic substances in the soil and ground water is the result of past airport uses involving agricultural operations or careless handling of fuels and solvents. The astronomical cost to clean up hazardous wastes and the need to meet fuel storage and monitoring requirements could place a further financial burden on many airport operators.

Many local governments are experiencing pressures to increase their tax base through land development and from developers attempting to maximize their investment in properties. The resulting urban growth around airports is bringing with it unsafe obstructions in flight paths, interference with navigational and landing aids and potential for hazardous conditions for persons and property on the ground. To respond to these conditions, local authorities are taking actions which constrain flight activity and indicate movements toward eventual airport closures. At the local level, zoning and land use ordinances that will provide for the orderly growth of each public use airport and the area surrounding the airport must be implemented and strongly supported to be effective.

Major Recommendation

- AASHTO believes that public concerns over airport noise, air quality and potentially toxic or hazardous materials present at airport sites reflect a serious problem that could adversely affect the future development of the nation's air transportation system.

- AASHTO further believes that Congress, and other levels of government if they so desire, should address this most serious problem and provide guidelines for federal, state and local governments for ensuring environmental quality as an integral component of airport development.

Federal/State Roles

Goal: Clearly establish the federal role in the definition and funding of a national airport system with appropriate input at the state level as to airport location and compatibility with state goals.

The separate and combined efforts of federal, state and local governments as well as the private sector are required to achieve a balanced national air transportation system.

Public safety is and always has been the government's first concern in aviation. The current federal role focuses on a system of facilities and services which are significant to the economic health and vitality of the nation. The facilities include the landing areas of airports in the National Plan of

Integrated Airport Systems. The services include standardization, operation, maintenance and regulation of the nation's total airspace, aircraft and airmen.

Because of staggering projections of capacity problems at the nation's major airports during the study period, the Federal Government, working in cooperation with state governments, should identify a system of airports of national significance. This system should be funded from a federal aviation trust fund supported by federal users taxes.

Security at major airports has become such a problem that the Federal Government should take a led in the research and development of new aviation security technologies and measures, and make them available to all airlines.

In summary, the primary role of the Federal Government should be:

1) To establish and maintain adequate standards that promote the safety and security of aviation operations.

2) To operate and maintain the nation's airspace system.

3) To define, with the help of the states, a system of airports of national significance.

4) To collect and distribute federal aviation user taxes to help support an airport system of national and state significance and the nation's airspace system.

The federal-state partnership so prevalent in highway development is absent or, at best, weak in aviation development. State governments should and must play a larger role if the airport capacity needed for the 21st century is to be achieved. Each state should identify and plan for a system of airports of state significance and should establish, collect and distribute aviation taxes to develop and maintain its system. States should also assume a more direct role in the administration of federal aviation funds to better reflect state program priorities. State governments should also play a strong role in locating and developing any new airports within their jurisdictions.

Local governments, including municipalities, counties and authorities currently own 85 percent of the commercial airports and 61 percent of the nation's total public use airports. The primary role of local governments should be to develop and maintain the airport facilities they own to serve the public as part of the national and state airport system. Federal and state governments should provide financial and technical assistance to help accomplish this role.

Major Recommendation

- AASHTO believes that it is a proper federal role to operate and maintain the nation's airspace system. The FAA should develop and implement the National Airspace System Plan as quickly as possible.

Major Recommendation

- AASHTO believes that states should play a strong role in locating, developing and expanding airports within their jurisdictions; that states should assume a more direct role in administering federal aviation funds allocations unless otherwise limited by state

law; and that states should have greater responsibilities for funding and operating airports within their boundaries.

Revenue and Funding

Goal: Maximize utilization of existing funding reserves, and develop additional funding at all levels of government, through user and other appropriate fees, to properly ensure the efficient and safe operation of existing airports and the nation's airspace system and the development of an airport system of national and state significance.

The Airport and Airway Trust Fund was created in the Airport and Airway Development and Revenue Acts of 1970. Funding for the Airport Development Aid Program and the air traffic control system (airways) with dedicated user fees was intended. From the first appropriations process in 1971 the trust fund has generated an operating surplus, and the federal aviation program has received a general fund supplement. That both the aviation trust fund and the general fund are within the unified federal budget has not well-served the user pay philosophy. Accounting procedures that carry forward 18 years of authorized but unobligated balances and prior year deferred obligation authority, estimated at $5,285,000,000, and that report a trust fund end of year unexpended balance for FY 1988 estimated at over $11,000,000,000, have little meaning when the same Congressional Budget Office report includes:

> "The accumulated surplus is only an accounting measure, and as such its meaning must be carefully circumscribed.
>
> "The current accumulated surplus in the aviation trust fund is illusory."
>
> "If users had been required to cover the full, private-sector share of aviation spending since 1971, aviation excise taxes would have had to be raised."

The Airport and Airway Trust Fund must be removed from the unified budget. The revenue side of aviation funding is confusing. The Airline Deregulation Act of 1978 removed all control of airline fares, yet we maintain a budgetary dependence based upon 8 percent of these independent and varying airline ticket prices. Frequent flyer coupons, free up-grades, and airline passes dilute the 8 percent excise tax to a significant but unknown extent. Ticket tax revenue for FY 1988 is projected at $2,815,000,000. This represents 88 percent of trust fund revenues and 97 percent of outlays for the same period.

The outlay side of the program is somewhat clearer. Efforts to limit trust fund outlays to airport and airway funding have, to a significant extent, been successful. However, demands for full funding of the Federal Aviation Administration, the completion of the costly National Air Space Plan, greater airport capital funding and a trigger provision to reduce by half the ticket, air cargo, and fuel taxes in 1990 greatly confuse future federal aviation funding.

The assumption of a trust fund surplus continues to deter needed federal action to reevaluate the user pay concept. There is a need to limit system costs, provide adequate and safe service to the user, and determine an equitable and adequate funding program which must not be included in the federal unified budget.

Major Recommendation

- AASHTO believes that a dedicated trust fund supported by equitable user fees should support the national air transportation system, including airports of both national and state significance. Reasonable consideration for public use and benefit also justify continued general fund support of this system.

- AASHTO also believes that user funded trust funds for transportation should not be included in the federal unified budget.

- AASHTO further believes that a federal-state partnership that also provides an appropriate role for local and private participation, if properly coordinated to establish responsibility, will produce adequate funding resources to ensure needed system capacity.

Economic Development

Goal: Direct and indirect economic benefits from aviation are quite significant, thus, greater flexibility should be given to state and local governments to consider economic development as a factor in the administration of air transportation improvement programs.

Major hub airports are powerful economic generators. They are often among the largest employers in a region, and may contribute many billions of dollars annually to a state's economy. Important industry location decisions are influenced by the presence of an airport hub. Geographic distributions of businesses and industries dependent on air service are often confined to within a one-hour's drive from a major airport. Companies for which transportation is one of the primary requisites of local services provided, are particularly desirous of close-in locations. This would include central and branch administrative offices of major companies, freight oriented distribution companies and certain manufacturing industries that use relatively small or high value to weight components in their manufacturing processes. Convention, trade and tourism industries that contribute significantly to the economies of major cities also depend heavily on the presence of a major hub airport.

In smaller communities, the presence of a general aviation airport capable of accommodating business aircraft often proves to be a deciding factor in locating a branch manufacturing plant. In such cases where rail or truck transportation is available to readily access markets, local land costs and services are favorable and work force quality is high; a relatively modest initial investment of capital to upgrade a runway or install terminal navigation aids could translate into a significant percentage gain in local wealth in the form of increased income and associated industry development.

Economic development is currently not a factor in federal funding for airports. Criteria for grants to smaller airports, that require certain minimum levels of operation to justify expenditures , however, effectively act as constraints to local economic development. States should assume a stronger role in airport development, and should have greater flexibility in programming available federal airport improvement funds to support state economic development priorities.

Major Recommendation

- AASHTO believes that economic development should be an element for consideration in all state and federal comprehensive transportation planning and development for airports.

New Technology

Goal: Give major emphasis to new technology, research and development, and the expedient application of innovations that improve security and safety, increase efficiency, and ameliorate environmental impacts.

The world we live in is changing rapidly. At the beginning of the 20th Century we could only dream of powered flight. Today routine flights by orbiting space shuttles and supersonic aircraft (SST's) are a reality. In fact, the combined advances in transportation and communications have led to the coining of a phrase, "Global Village" that accurately reflects the ease with which even remote parts of the world can be accessed.

Projections for the future are that world air travel, measured in revenue passenger miles, will double by the year 2000. To accommodate this demand the world airline fleet must increase by 40 percent over the same period. Two primary directions for change in aircraft serving this demand are expected to be in the development of hypersonic aircraft and changes in conventional designs in the short to medium range classes. The short to medium haul market is also expected to be impacted by tilt rotor technology currently under development.

Technological advances and improved economic performance could provide a viable second generation SST by the year 2000. The short take off and landing (STOL) aircraft have found application in the regional airline industry, where generally smaller airports are served. In addition, STOL aircraft tend to have significantly less noise impacts on adjacent land uses, particularly in highly developed areas. New tilt rotor technology (VTOL), being jointly developed for the military by Boeing and Bell Textron could find commercial application in the future. Such an aircraft would have the vertical take off and landing capability of a helicopter, and the cruise speed, range and fuel economy of fixed wing aircraft. Their impact could be particularly felt in the city-center to city-center market and in feeding large remote regional jetports from city centers.

Improvements in engine technology will center on fuel efficiency, nose reduction and improved reliability. The high bypass ratio engines now coming on line and under development will be more fuel efficient and less costly to maintain. Noise levels are also expected to be significantly lower than present turbofan engines. Aircraft frames are expected to undergo an evolution as well. Long haul aircraft will likely increase in size to nearly 600 passengers in capacity, to nearly Mach 0.9, in speed, and in non-stop range to approximately 7000 nautical miles. Medium haul markets will likely see the introduction of newer intermediate sized aircraft with improved engine technology and aerodynamics and having seating capacities of 150 to 200 persons. Regional carriers are expected to stay with small turboprop and turbofan aircraft until the mid 1990's when tiltrotor technology may begin to come into service.

Advances in air traffic control technology are expected to significantly affect the use of airspace in the future. By the year 2000 there is expected to be a substantial reduction in the number of enroute and approach control facilities as newer computer systems integrate these functions. Most current air navigation systems will no longer be in use by the year 2020. Newer satellite based systems such as the Global Positioning System (GPS) will provide terminal, enroute and surveillance service to aircraft worldwide. Key advances in weather technology are also expected to improve margins of aircraft safety and provide better preflight and inflight use of weather information. Improved collection and reporting of aviation weather will occur through increased use of computers and satellite communications technology. Along with this will be increased use of cockpit display, on board microcomputer processing systems that provide continuous ground-to-air data links and electronic collision avoid-

ance systems. In addition, low level windshear alert systems (LLWAS) will provide pilots and controllers vital information on hazardous surface weather conditions.

Several new technologies are now available and others are emerging for detection of hazardous substances and drugs. E-scan systems that differentiate between organic and inorganic materials, thermal neutron activation that relies on gamma radiation, and back and forward scattered x-ray systems that allow detection of plastics, drugs and agricultural products offer great potential for screening passengers and baggage more efficiently and accurately.

The combined effects of advances in technology could have a profound effect on air transportation in the future. Hypersonic speeds may become a reality in intercontinental markets. Safer, quieter and more fuel efficient aircraft are possible with new airframe and engine technologies. Improved navigation, weather and communications technologies could contribute significantly to safer and more efficient use of airspace and detection of hazardous weather conditions. Advances in STOL and VTOL technologies could extend service at land locked airports and provide better links to dense urban centers. And better detection and surveillance technology could be employed to ensure airport and airline security. The Federal Government along with state and local governments and the airline industries will have to work closely together to bring these advances into practical use.

Major Recommendation

- AASHTO believes that the many positive gains from research and new development will continue to be of enormous benefit to air transportation. National air transportation system providers, both public and private, should ensure that programs and services they provide are managed such that immediate and maximum benefits of new technology will occur.

Air Cargo

Goal: Movement of freight by air is an important and growing part of our national economy, and as such, its needs must be considered in the planning, design and operation of airports with special emphasis on ground access requirements.

As far as passenger service is concerned, aviation has had little competition from other transportation modes due to the speed with which an aircraft can cover long distances. However, cargo or freight faces a different set of circumstances than the individual passenger. Railroads, shipping, and trucking are vastly superior in their ability to move large quantities of material efficiently. As an alternative to air shipping, they are unsurpassed, except in the amount of time utilized. If the commodity is a high-value item that is particularly sensitive to time, air freight is the only possible choice. As technology produces larger lifting bodies capable of carrying tremendous amounts of air freight, the intermodal choice may begin to swing toward aviation. There are some commodities which will probably always be transported by rail, water, or truck.

Notwithstanding the above, air cargo has been a success story for the 1980's with a growth of nearly 60 percent between 1983 and 1987. The industry should continue to grow because of a combination of factors. Some of these are:

a) Products have become smaller especially in the electronics field, and in many cases more expensive.

b) Because of the time savings involved, companies can often save money on other costs such as interest on debt.

c) There is a trend toward just-in-time inventory management which encourages the use of air cargo.

d) Movement of perishable goods from other countries is now practical because of international air cargo.

e) The availability of large, fuel-efficient jets has enhanced air cargo.

f) Overnight package delivery, necessitating the use of air freight, has become commonplace in today's market.

This increase in air cargo does place further strain on currently overcrowded airports and airspace. This is lessened somewhat, however, because air cargo travels considerably in off-peak periods, particularly at night.

Major Recommendation

- AASHTO believes air cargo is an emerging major component of aviation economics and should be taken into consideration in all planning and operational studies of airports and airspace.

Chapter 3
Highways and Public Transportation

Part I

Introduction

Over 70 years ago the United States Congress initiated federal involvement in this nation's surface transportation systems by creating the Federal-aid Highway Program. From its inception, this federal program has provided vital financial assistance for state-administered highway systems. The rationale for this federal involvement in surface transportation was the national economic need for a network of roadways to serve interstate commerce and travel.

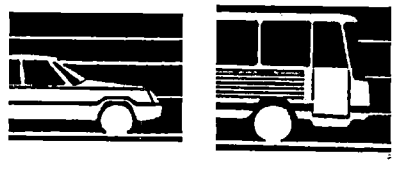
In the 1960s Congress expanded its support for surface transportation to include public transportation, and in 1982 it chose to support both highways and transit from highway user fees.

Historical Background

Since the establishment of the Federal-aid Highway Program in 1916, several significant steps have been taken in arriving at today's level of federal involvement in surface transportation:

- The Federal-aid Highway Act of 1921 initiated the intercity highway network which became the foundation for today's Primary System;
- Originally authorized in 1944, the nation's commitment to the Interstate and Defense Highway System was reinforced in 1956 by the creation of the Federal Highway Trust Fund;
- During the 1960s, the Federal Aid Highway Safety Act by Congress outlined safety standards for vehicular and highway design;
- The Federal Housing Act of 1961 along with the creation of the Urban Mass Transportation Administration (UMTA) in 1964 established federal funding for transit;
- In the federal Surface Transportation Assistance Act (STAA) of 1982, highway and transit needs were both recognized as the first major federal highway user fee increase since 1959 was enacted by Congress.

In framing the federal Surface Transportation and Uniform Relocation Assistance Act (STURAA) of 1987, Congress closely followed the major features they approved in the federal STAA of 1982. The 1987 Act in part continued the consensus that has supported the highway program since the birth of the Interstate and Defense Highway System in 1956, by providing funding for construction of that System through 1991; but at the same time, Congressional intent was clear that this is the last such funding to be provided. The time for a new consensus on the mission of the nation's highway system has come.



That a new consensus on the nation's highway program is needed was highlighted by another action of Congress in the 1987 Act. The major change in the 1987 Act over past highway legislation came as Congress, for the first time in history, committed significant sums of Highway Trust Fund monies to a large number of "demonstration projects." This action was against traditional practice in the federal-aid highway program, which historically has placed programming responsibility in the states.

Turning to public transportation, the 1980s saw a continual decline in the federal share of transit support. At the same time, total state support for public transportation has been increasing, to where combined state support nationally now exceeds federal support. The 1987 Act included support for public transportation. But for both public transit and the federal-aid highway program, the funds authorized and apportioned were less than available in the Highway Trust Fund and its Mass Transit Account.

The nation faces the need to redefine and refocus America's surface transportation programs at the federal, state and local levels, for the decade of the 90s and well into the 21st Century.

AASHTO'S Transportation 2020 Policy Process

In light of the wandering national transportation focus on the eve of the completion of the Interstate and Defense Highway System as initiated in 1956, the American Association of State Highway and Transportation Officials initiated "Transportation 2020."

Transportation 2020 was envisioned by AASHTO as a multi-year, multi-organization, multi-modal effort to achieve consensus and set comprehensive national surface transportation policy into the 21st Century. Through the Transportation 2020 effort, AASHTO undertook to formulate a truly "National Surface Transportation Policy," extending beyond the federal level to encompass federal, state, and local roles and responsibilities.

Since the creation of a new "National Surface Transportation Policy" would require significant consensus building, and since ultimate success would depend upon the effort and support of the many national, federal, state, regional, and local interest groups from both the public and private sectors, AASHTO created a Task Force on a Consensus Transportation Program and developed the following purpose statement and, in general, the basic form of the broader Transportation 2020 process.

> "It is the intended purpose of the AASHTO Task Force on a Consensus Transportation Program, over the next few years, to:
>
> - Develop and implement a strategy for achieving consensus among federal, state, and local governmental levels as to their respective roles and responsibilities under a new "National Transportation Policy" designed to accommodate transportation needs well into the 21st Century,
>
> - Develop and implement a means for establishing wide-spread support for the new policy among elected and appointed government officials and governmental bodies, among public and private sector interest groups, and among the various interests within the general public."

The Transportation 2020 process includes four essential phases: 1) information development, collection and analysis; 2) alternatives development; 3) building a consensus program; and 4) implementation of the consensus program at all levels of government, and in the private sector. As a new, unique

tool to help reach a consensus program, AASHTO urged creation of the Transportation Alternatives Group and took part in its establishment.

The phase 1) information development, collection and analysis effort is described in Part II of this Chapter, and is essentially complete. It provides the basis for the Association's policy development work.

This Chapter presents AASHTO's recommendations on the direction of the future federal surface transportation program for highways, public transit and modal interlinks to these modes. The recommendations herein are intended to be utilized for building a new consensus program. They do not attempt to include all programmatic details, either of the federal program itself or the intergovernmental processes at the state and local government level that would be needed to support the new concepts included in the recommendations. Further effort to develop these details will be necessary, and has been undertaken by the Association; the consensus building effort with other organizations will also need to address these details.

A new consensus surface transportation program for highways and public transportation as envisioned by AASHTO will involve all levels of government. AASHTO has chosen to concentrate first on the federal role, since the federal role is inherently national in scope and tends to set the stage for actions by the states, local governments and agencies, and the private sector.

In developing its recommendations the Association progressed logically to first consider the goals and objectives for a national surface transportation program for highways and public transportation, the results of this effort being presented in Part III of this Chapter. Then, it considered principles for a federal role in meeting those goals and objectives, and finally it developed recommended federal programs and procedures, these being the subject of Part IV of the Chapter.

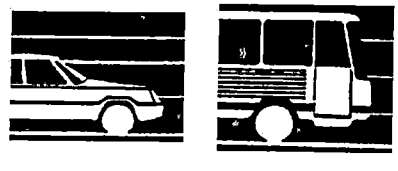
Part II

Findings from the Transportation 2020 Information Development, Collection, and Analysis Effort

Three separate but related activities were undertaken in the overall Transportation 2020 effort to develop, collect and analyze information on the surface transportation needs of this nation through the year 2020. They were as follows:

- Transportation professionals from the AASHTO member departments undertook to develop, collect and analyze information from a variety of sources, including the member departments, the Federal Highway Administration, the Urban Mass Transportation Administration, organizations representing local governments and transit agencies, and other sources. This resulted in publication of the AASHTO Report, *Keeping America Moving: The Bottom Line.*

- To obtain the view of transportation users, AASHTO organized the Advisory Committee on Highway Policy, and in cooperation with the member departments and with the help of the Highway Users Federation, the Committee sponsored 65 forums nationwide that involved some 9,000 people. The results of this effort were summarized in the report *Beyond Gridlock: The Future Of Mobility As The Public Sees It.*



- To gain insights on what America will be facing as it moves into the next century toward 2020, AASHTO, the Federal Highway Administration and the National Association of Regional Councils provided funding to the Transportation Research Board to conduct a futures conference. That conference was conducted in June, 1988 and the conference proceedings were published as TRB Special Report 220, *A Look Ahead: Year 2020*.

The results of the document *Keeping America Moving: The Bottom Line* are presented first. These results are followed by a listing of the major public perceptions about transportation uncovered in the 65 Transportation 2020 Public Forums held around the nation. Summary comments about the future of transportation, as recorded at the TRB Futures Conference, complete the summary of the findings from the Transportation 2020 effort.

Summary of *The Bottom Line* Report

While many conclusions could be drawn from the data and information presented in *Keeping America Moving: The Bottom Line*, the following summary statements have been selected as those which most forcefully direct and determine future federal, state and local roles and responsibilities in providing this nation with the required surface transportation facilities and services to ensure economic vitality between the 1990s and the year 2020. It should be noted that the dollar needs in *The Bottom Line* document do not reflect inflation.

- America's surface transportation expenditures, at all levels of government, in 1987 equaled about $81 billion. Of this total, about $66 billion was for highways and $14.5 billion for public transportation systems.

- In order to just maintain the physical characteristics of the nation's public sector surface transportation infrastructure and sustain "most" of the level of service provided today through the year 2020, an annualized investment of nearly $95 billion is required. Of this total, approximately $80 billion is needed for highways and $15 billion for financing public transportation, with transit capital increasing to $2.7 billion from $2.13 billion in 1987.

  To meet this annualized need, increased federal revenues are necessary. This issue will be addressed by AASHTO in the Transportation 2020 process.

- This 20 percent overall increase in funding over 1987 to merely try to maintain the most critical current levels of service reflects the fact that this nation has been unintentionally "disinvesting" in its surface transportation infrastructure since the 1960s. This disinvestment is the net result of the relative reduction in user fee revenues, due to more fuel efficient vehicles, coupled with the reduced purchasing power of those revenues because of inflation in construction costs.

- Surface travel demand is expected to at least double by 2020. If this nation is to attempt to keep up with this anticipated growth, then an investment of approximately $117 billion per year would be required. Of this 43 percent increase in overall funding for surface transportation over 1987, about $100 billion would be for highways and nearly $16 billion for transit, with transit capital increasing to $3.4 billion, a 60 percent increase over the 1987 level.

- The $16 billion for transit relates to currently operating transit systems. If the nation should decide to significantly increase transit service, a corresponding further increase in transit funding would be required.

- An additional $1 billion per year investment in highways and public transportation through 2020 would be required to adequately link surface transportation with airports, ports and waterways and rail terminals.

- Future transportation investment requirements may be mitigated somewhat through improved materials and techniques, and through the implementation of alternative responses to travel demand, like demand management and operational improvements. Still, the impacts of doubling travel demand and the uncertainties of future levels of inflation, not reflected in the figures presented in *The Bottom Line* report, will undoubtedly quickly erode any efficiencies gained through the implementation of improved construction, design and operational techniques.

- If America is to maintain its economic leadership in the world economy and to avoid the negative and costly effects of inaction, the nation must commit the required funds to improve its transportation system.

In addition to these findings, many other facts are presented in *The Bottom Line* document. The reader is urged to consult the publication *Keeping America Moving - The Bottom Line* which is available from the office of AASHTO in Washington, D.C.

Summary from the Public Forums

The input from the 65 Public Forums co-hosted by AASHTO's Advisory Committee on Highway Policy, state transportation agencies and the local highway users group is extremely valuable to the Transportation 2020 process. The public forum input provides the perspectives of the users and as such represents more of a "supply and demand orientation" than did *The Bottom Line* report, which presented the costs of providing for the estimated future requirement for surface transportation facilities and services.

Some of the major and recurrent themes raised in the public forums and presented in *Beyond Gridlock: The Future Of Mobility As The Public Sees It* are categorized and summarized below:

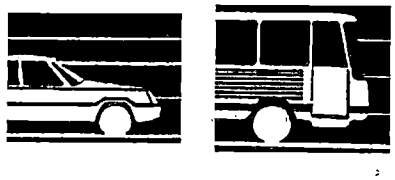
- Congestion is increasing in both our urban and suburban areas.

  This increase in traffic volume and congestion has resulted in: 1) Physical deterioration of our transportation facilities, 2) Deterioration of the level of service (more delays, higher delivery costs, increased accidents, etc.), and 3) Deterioration of air quality in our major metropolitan areas.

- Interstate Highways, rather than being "complete," are in need of additional work. The needed work on the Interstate includes: 1) Major rehabilitation of older sections, 2) New capacity in urban areas, and 3) Some new links in rural areas where traffic patterns have changed since the system was laid out in the early 1950s.

- Public transportation facilities and levels of service must not be allowed to undergo further deterioration.

  To address this concern: 1) Urban facilities should be refurbished, 2) Dilapidated rolling stock should be replaced, and 3) New services should be provided for the special needs of rural areas and for elderly and handicapped persons.



- Funding, at all levels of government, must be increased to preserve and enhance our nation's transportation systems.

  To enact this increase: 1) Changes should be enacted in the handling of the Highway Trust Fund (i.e. - it should be removed from the Unified Federal Budget, interest should be retained for transportation purposes, the balance should be drawn down, it should be made permanent and used for transportation purposes only), 2) User fees should be increased to fund the needed maintenance, preservation and improvements, 3) User fee exemptions, especially on gasohol, should be eliminated, and 4) Non-traditional funding sources should also be explored and employed at the state and local levels (i.e. - developer impact fees, toll roads, private contributions, "benefitter fees," and general revenue sources.)

In addition to these major themes, several other worthy suggestions were presented at the public forums. For a more complete listing, the reader is urged to consult the publication *Beyond Gridlock: The Future Of Mobility As The Public Sees It* is available from the Highway User Federation and from AASHTO Headquarters in Washington, D.C.

Summary of the Futures Conference

The official summary and conference proceedings from the TRB Futures Conference were published in TRB Special Report 220, *A Look Ahead: Year 2020*. The substance of the conclusions of the proceedings are as follows, it being understood that these conclusions do not necessarily represent the views of AASHTO or its member departments:

The mission of the nation's transportation system must respond to broad changes in context and needs over time. As the nation looks ahead to the 21st Century, the transportation system must meet new challenges introduced by an increasingly complex context for mobility. The Transportation 2020 Futures Conference suggested that the key challenges will include:

- The increased relevance of productivity gains from infrastructure investment to the maintenance of living standards and global competitiveness as the labor force grows more slowly than in the past.

- The new and more complex patterns of interaction associated with a post-industrial global economy, dispersed service-based economic activity, extended urbanization and emerging centers of growth and redevelopment.

- Future travel demand increases beyond mere population growth caused by a proliferation of households and lifestyles that generate a diversity of mobility needs and desires.

- A blurring of traditional boundaries among transportation providers, modes, and institutions fostered by deregulation and service innovation and enhanced by recent applications of computer and communications technology.

- Heightened awareness of the interdependence among increasing vehicle travel, community quality, natural resources, and the environment.

- Changing views of appropriate public and private sector responsibilities and of intergovernmental roles as affected by evolving institutional traditions, relative technical and financial capabilities, and competing priorities for available resources.

The conference featured commissioned papers on the following 10 topical areas:

- Economic growth and vitality
- Demographics
- Lifestyles
- Energy
- Environment
- Development patterns
- Commercial freight movements
- Personal mobility
- New technology
- Resource and institutional arrangements

The reader is urged to consult *A Look Ahead: Year 2020* which is available from the Transportation Research Board (TRB).

Conclusions

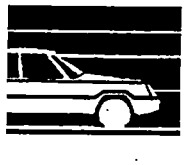
The "facts and figures" presented in the preceding documents were taken into account by AASHTO in reaching its policy recommendations for the future federal surface transportation program.

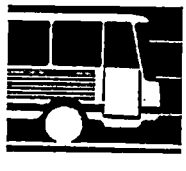
These three documents describe many issues facing the nation, as it moves beyond completion of the Interstate and Defense Highway System and into the 21st Century. The nation of today has more complex transportation needs than were present in 1956, when the current surface transportation consensus was brought together, and those needs will become even more complex over the next few decades. Different states have changed in different ways, and will change again.

Part III

National Surface Transportation Goals and Objectives - Highways and Public Transportation

The process used by AASHTO in making the policy recommendations of this Chapter involved the identification of potential alternatives and a survey of the individual state highway and transportation agencies to rank order these potential alternatives. Workshops of the Policy Committee members were held to further define and delineate the preferred policy alternatives.





The AASHTO process began at the level of national surface transportation goals and worked its way down through national modal objectives, before going on to develop principles for the federal role. This summary presentation of AASHTO's recommendations will follow the same order.

National Surface Transportation Goals - Highways and Public Transportation

AASHTO makes the following major recommendation of seven national surface transportation goals, to guide development of a consensus program under the Transportation 2020 process.

Major Recommendations

Preservation

- Preservation of America's existing surface transportation system should be the primary goal of any future national transportation program since it is this system which provides the basic network upon which this nation's economic health and international vitality depend.

Congestion

- A balanced approach to increasing capacity and reducing congestion on this nation's surface transportation system should be employed, including an appropriate mix of highways and transit, and a thoughtful application of systems management technologies and demand management techniques.

Funding

- User and benefitter fees, set at an appropriate level to cover the economic cost of the surface transportation facilities and services provided, should be dedicated solely to the funding of transportation improvements. General fund commitments to public transportation should continue.

Safety

- The safety of Americans, using the surface transportation facilities and services, should be preserved and enhanced through the continued national commitment to safety research, safety applications and safety projects.

Access and Balance

- The national surface transportation system should be comprised of a balanced, integrated and coordinated multi-modal network of facilities and services which provide an adequate level of access to all of the various regions of this nation.

Planning and Research

- This nation should continue to commit sufficient funding to transportation planning and research to ensure that established goals are met, that future options do not get precluded, and that new technologies are developed and applied to transportation infrastructure in a timely manner.

Economic Vitality

- The national surface transportation program should preserve and enhance the economic vitality of this nation by providing employment, reducing transport costs, improving freight movement productivity, revitalizing rural America, rejuvenating blighted urban areas, supporting existing land uses, attracting economic development, providing transportation for rapidly growing regions, and improving international competitiveness.

"Who pays," "how much," and "for what" are critical considerations to AASHTO member departments in developing a transportation program for the future.

Preservation of existing systems, facilities and services is the number one national concern of AASHTO. Closely following the preservation goal, however, is the recognized need to aggressively address the issues of urban mobility, suburban congestion and rural access for economic vitality. The provision of additional surface transportation facilities and services is in view, as well as the implementation of system management approaches where such measures will significantly reduce congestion and improve the operating level of service.

When it comes to who pays for these, and the other recommended improvements, AASHTO strongly believes in "user" and "benefitter" fees. In the case of transit, AASHTO believes that general funds should continue as an important source of revenues for transit facilities and services.

National Modal Objectives - Highways and Public Transportation

Three major categories of national modal objectives are presented. They are: highway objectives, public transportation objectives and modal interlink objectives, including aviation, ports and waterways, and rail.

National Highway Objectives

1. SYSTEM MAINTENANCE, including pavement preservation, should be provided.

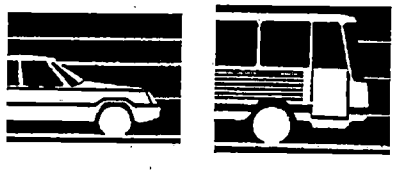
2. BRIDGE NEEDS, including maintenance, repair and replacement, should be provided.

3. INTERSTATE RECONSTRUCTION, including pavement rehabilitation and preservation on the existing system, should be provided.

4. URBAN CONGESTION should be addressed with improved freeway/expressway capacity where appropriate.

5. PRINCIPAL ARTERIALS serving interstate and intrastate needs should be provided.

6. INTERSTATE CAPACITY should be increased by the addition of lanes in congested sections.



National Public Transportation Objectives

1. URBAN CONGESTION should be addressed with improved public transportation services where appropriate.

2. RECONSTRUCTION AND MAINTENANCE of facilities and vehicles should be provided to preserve existing service.

3. MOBILITY should be provided for the non-driving public by public transportation services.

National Modal Interlink Objectives

The following priority objectives are the same for each of the aviation, ports and waterways, and rail modes:

1. ACCESS by highway and public transportation modes should be improved to ports, terminals and other modal facilities.

2. PLANNING should ensure that decisions to locate ports, terminals and othermodal facilities include adequate consideration of existing and future surface transportation requirements.

AASHTO supports similar priorities under national modal objectives to the national transportation goals set forth above. Preservation of existing surface transportation systems, facilities and services is again ranked first, followed closely by the desire to address this nation's growing level of congestion.

It should be remembered that these national goals and objectives include roles to be performed at the federal, state and local levels.

Part IV

Federal Role and Program Recommendations - Highways and Public Transportation

The Association makes the following recommendations with regard to the federal role in a Transportation 2020 consensus surface transportation program, and the federal programs for highways and public transportation to be established thereunder.

Recommended Federal Role Principles - Highways and Public Transportation

The Policy Committee of AASHTO has set the following policy statements to guide the direction of the future federal role in surface transportation:

1. ISSUES OF NATIONAL SIGNIFICANCE should be included in the federal focus on transportation.

2. SYSTEMS OF NATIONAL SIGNIFICANCE should be included in the federal focus on transportation.

3. PRESERVATION NEEDS on the existing surface transportation systems should be included in the federal focus.

4. NATIONAL ECONOMIC WELL-BEING and economic growth should be included as part of the federal focus and role in transportation.

5. PLANNING should be emphasized in the federal role.

6. SAFETY should be emphasized in the federal role.

7. MAJOR CAPITAL NEEDS requiring massive expenditures for new construction or reconstruction should be part of the federal role.

8. RESEARCH should be emphasized in the federal role.

9. INTERSTATE OR INTERREGIONAL ISSUES should receive at least a minimum response at the federal level.

10. EMERGENCY RELIEF should be provided for at the federal level.

11. DEFENSE should be included in the federal role in providing surface transportation.

The Policy Committee, comprised of the Chief Administrative Officers of AASHTO member departments, arrived at a remarkably high degree of consensus concerning its recommendations for the future federal role in transportation. The top three of the 11 priorities just listed are more strongly supported than the other eight. Priorities one and two indicate that AASHTO members desire the federal role to focus on "ISSUES" and "SYSTEMS" of "NATIONAL SIGNIFICANCE," while priority three suggests that the preservation of existing systems may well be of national significance.

Major Recommendations

System of National Significance

- The federal role in surface transportation should focus on a system of facilities and services which are significant to the economic health and international vitality of this nation.

- AASHTO believes that such a system would be comprised of all of the existing Interstate Highway System and an appropriate portion of the principal arterial system as redefined and the associated bridges, as well as the public transportation facilities and services which keep this nation's major cities moving.

Issues of National Significance

- Beyond the focus on the Highway System of National Significance and on the major transit projects, the federal role should be to allow the states and local governments flexibility in identifying and implementing specific surface transportation solutions appropriate to the regional/local need. These solutions should also serve to address transportation issues of national significance.

- AASHTO believes the dominant issues of national significance to be urban mobility, suburban congestion, rural access, and modal interlinks. Tradeoffs among issues like transportation safety, air quality, preservation, balance, public transportation, and rural and urban economic vitality should be determined at the state and local levels.

Other Programs of National Interest

- The federal role in surface transportation should include transportation planning, research, safety, emergency relief, and federal lands access.

- AASHTO believes that the basic goal of each federal program should be to assist the nation's surface transportation system to function as safely and efficiently as possible and thereby to preserve and enhance the economic health and international vitality of America.

Recommended Federal Role - Highways and Public Transportation

AASHTO supports the following direction for federal involvement in the future surface transportation program.

The Focused Aspect

Federal transportation programs would be focused on SYSTEMS OF NATIONAL SIGNIFICANCE - that is, transportation which provides for the major movements of goods, services and/or passengers, including the Interstate and the major Public Transportation Systems of this nation.

The Flexible Aspect

The Federal Government would provide funding for and procedural guidance on ISSUES OF NATIONAL SIGNIFICANCE like mobility, economic development, urban congestion, etc. which are considered to be of "national significance" in that they are common problems encountered around the nation. Funds would be made available for use at state and local discretion for funding transportation projects which addressed these national issues.

Basic to AASHTO's selection of a new federal role were the following beliefs:

1. The federal/state/local partnership has worked in facilitating the development of this nation's existing surface transportation system.

2. Existing federal program categories for lower-level projects are unduly restrictive and do not permit state and local governments an adequate degree of flexibility to meet their own region's unique and specific transportation requirements in the most appropriate and cost-effective manner.

The Highway Funding Aspect

The federal funding level for the combined categorical and flexible highway programs should be increased over the life of the next highway authorization bill. AASHTO recommends that a gradual increase be enacted which would begin in the first year (FY 1992) at approximately $18 billion and rise to about $26 billion by the last year of the authorization (FY 1995).

AASHTO supports a 50 percent-50 percent split between the categorical and flexible highway programs. AASHTO additionally recommends that up to 20 percent of a state's total highway apportionment be eligible for transfer either way between that state's categorical highway program and that state's flexible program without FHWA approval.

AASHTO recommends that total statewide urban and rural lane miles, total statewide urban and rural vehicle miles of travel and other appropriate factors be used for the state-by-state formula distribution of federal categorical highway funds, rather than using factors directly related to the highway system of national significance. (See Commentary.)

The Transit Programs Funding Aspect

The federal funding level for the transit program should be increased over the life of the next surface transportation authorization bill. AASHTO recommends that a gradual increase be enacted for public transportation capital projects which would begin in the first year (FY 1992) at approximately $3.5 billion (including the current capital portion of the general fund commitment) and rise to about $5 billion by the last year of the authorization (FY 1995).

AAASHTO further recommends that Mass Transit Account funding in excess of current funding levels for capital projects (approximately $1.1 billion per year) would be distributed on a 50 percent-50 percent basis using the existing Section 9 formula and percent of total population, after any reductions in general fund appropriations have been held harmless.

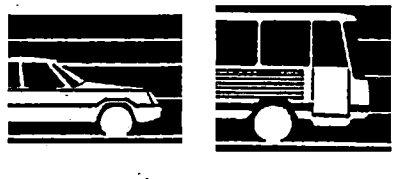
AASHTO supports the direct allocation of federal transit funds to transit funding recipients in areas over 200,000 population, and direct allocations to the states for fair and equitable distribution ot urban areas under 200,000 population and to rural areas.

AASHTO believes that any additional Mass Transit Account formula funding for public transportation should be available for the broadened uses delineated under the Flexible Transit program description. (See page 3-17 of this document.) (See Commentary.)

Major Recommendations

Federal/State Partnership

- The existing federal/state partnership has worked well over the several decades of its existence in producing one of the best national surface transportation systems in the world.
- Therefore, AASHTO believes that the existing federal-state partnership should be retained for the programs addressing national surface transportation needs and only slightly modified for programs addressing state and local surface transportation needs.



Reduced Categorical Restrictions

- Existing lower-level federal program categories are unduly restrictive and do not permit the states and local governments adequate flexibility to meet their unique transportation needs in the most appropriate and cost-effective manner. Furthermore, existing federal requirements for lower-level programs are unduly restrictive on the states and local governments, which merely serves to increase "red tape" and decrease efficiency without delivering corresponding improvements in levels of safety or service to the users.

- Therefore, AASHTO believes that fewer categories, less rigid requirements and more flexible funding should be employed for the lower-level surface transportation needs in order to facilitate the development of regionally appropriate and economically efficient transportation systems.

The approach espoused by AASHTO reflects modifications to the existing federal role in transportation, while evidencing the strongest preference for change in the categorical administration of existing federal-aid programs.

Recommended Federal Programs - Highways and Public Transportation

- AASHTO believes that the new federal role in transportation should include two levels of program specificity and commitment.

- One level would address the concern for "focusing" the federal commitment on Systems of National Significance through categorical programs.

- The other level would address the concerns of the states and local governments for program "flexibility" in dealing with Issues of National Significance through flexible programs.

The AASHTO recommendations for the modified federal programs under the Modified Federal Role are as follows.

Categorical Programs

At this level, the federal role would focus on systems and programs of national significance, to include the following systems and programs:

- CATEGORICAL HIGHWAY PROGRAM - Funding under this program would be spent on addressing this nation's interstate commerce and defense needs through projects which:
  - Reconstruct and/or Rehabilitate
  - Provide Additional Urban Capacity
- Provide for Pavement Preservation
- Provide Additional Mileage Needs
- Provide for Bridge Needs

- Highway System of National Significance - The highway system of national significance should include the existing Interstate system and an appropriate portion of the principal arterial system as redefined. The redefinition necessary would be a cooperative and rigorous effort between AASHTO and FHWA to develop consistent criteria to be used by states in designating principal arterial routes.

  The states would submit their potential routes through AASHTO to FHWA. In response, FHWA would be given an appropriate amount of route mileage to assign in order to ensure system rationalization and route connectivity. The new highway system of national significance should result in a nationally consistent, state designated, federally approved system plan.

  In further defining the highway system of national significance, at least the following criteria should be considered:

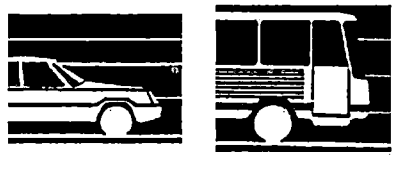
  - Serve interstate and international commerce and travel
  - Provide for national defense needs
  - Enhance economic vitality and international competitiveness
  - Provide service to all portions of the nation
  - Respond to changing population and travel patterns over time through an objective review process.

  The newly redefined highway system of national significance should be established as a nationally consistent, state designated plan. AASHTO has used the preceding process and criteria to develop illustrative highway system of national significance (HSNS) alternatives. The formal establishment of the highway system of national significance should be completed as a cooperative effort between the states and the Federal Highway Administration after adoption of federal authorization legislation. Consultatioon should occur with local governments and private sector users as the formal HSNS is defined. (See Commentary.)

  A percentage of funds from the federal Categorical Highway Program would be set aside for meeting needs like:

  - Transportation Planning & Research
  - Transportation Safety
  - Transportation Emergency Relief
  - Transportation to Federal Lands

  An appropriate amount of Highway Trust Fund monies would be appropriated and apportioned to each state under the Categorical Highway Program.



- Completion of the Interstate - The costs associated with completing the Interstate highway system as reported in the 1989 ICE and funding the remaining Interstate substitution commitments which are already approved may exceed the funding currently committed through 1991.

  AASHTO strongly supports the prompt funding and completion of the remaining Interstate highway and Interstate substitution commitments. (See Commentary.)

- Discretionary Bridge Program - To address this nation's bridge needs, AASHTO supports a separate amount of funding, not to exceed 2 percent of the total highway program, which should be dedicated to finance a continued discretionary highway bridge replacement and rehabilitation program.

  Structural and/or capacity deficient bridges on any public highway would be eligible for funding under this program if the cost of rehabilitating, replacing or supplementing the capacity of the bridge exceeded $10 million or 10 percent of the state's total annual federal-aid highway apportionments under the new highway program.

  The selection of projects would be in accordance with priorities established by FHWA, with due consideration given to balance among the states. (See Commentary.)

At the conclusion of fiscal year 1991, states will carry approximately $11 billion of unobligated apportionment balances that they have been unable to use because of annual obligation lists imposed on the federal highway program. These apportionments represent an unpaid commitment of the Federal Government to highway users in the states.

Obligation authority equal to the apportionment balances should be released to the states at the earliest possible opportunity. These unobligated apportionments should be provided to each state in addition to and not as replacement for regular apportionments in the current or future program. (See Commentary.)

- CATEGORICAL TRANSIT PROGRAM - Funding under this program would be spent on addressing this nation's major public transportation needs through projects and programs which:

  - Address Major Rehabilitation Needs
  - Address New Systems and Services

  A percentage of funds from the federal Categorical Transit Program would be set aside for meeting special needs like:

  - Transit Planning & Research
  - Elderly and Handicapped Transit

- Mass Transit Account Equity - The one-ninth of the current federal gasoline tax, the one-fifteenth of the current federal diesel fuel tax, and the one-third of the current alternative fuels tax would continue to be committed to transit programs.

The fiscal year 1989 funding allocation levels for rail modernization, new starts and capital bus expenditures from the federal fuel tax would be maintained and continued as discretionary grants under the categorical transit program. (See Commentary.)

Flexible Programs

At this level, the federal role would be to provide a highly flexible source of funding to be used at the discretion of state and local governments, as long as identified transportation issues of national significance were being addressed. This level would replace all other existing federal-aid transportation categories and programs now existing at the federal level, and would include the following issues:

- FLEXIBLE HIGHWAY PROGRAM - Funding under this program could be spent by states or local governments on projects which address issues of national significance like:
  - Urban Mobility
  - Suburban Congestion
  - Rural Access
  - Modal Interlinks

  An appropriate amount of Highway Trust Fund monies would be appropriated and apportioned to each state under the Flexible Highway Program to fund projects like:
  - Construction and Reconstruction
  - Rehabilitation and Preservation
- Urban and Rural Highway Elements - AASHTO strongly supports the flexibility of decision-making, prioritizing and programming at the state level through processes that include city and county governments and ensure consideration of their surface transportation needs. Roadways and bridges which are not on the highway system of national significance (HSNS), but are functionally classified as arterials or collectors, and any other highways or bridges which are currently eligible for use of federal aid are eligible for improvement under the flexible program. To ensure an equitable distribution of flexible apportionment by each state, Congress should specify that each state shall allocate in aggregate to non-state systems an amount of flexible apportionment equal to not less than their FY 1991 apportionment of urban funds, secondary funds, and bridge funds that was made available to non-state systems of the respective state.

  AASHTO is willing to consider the merits of any proposed urban and rural elements which include sufficient flexibility regarding the state and local transfer of funding and priorities among urban and rural needs at state and local discretion. (See Commentary.)
- FLEXIBLE TRANSIT PROGRAM - Funding under this program would be spent in addressing state and local transit needs including:
  - On-going Operating Assistance

- Rehabilitation Needs
- New Bus Services
- Small Urban and Rural Transit

The General Funds currently committed to transit would be appropriated and apportioned in accord with current law to designated transit recipients and to the states under the Flexible Transit Program.

All annual Mass Transit Account resources in excess of fiscal year 1989 transit funding allocation levels would be distributed by a broad-based public transportation formula. These revenues should be in addition to, rather than a substitute for, amounts currently appropriated out of the general fund.

For these Mass Transit Account formula funds, eligible projects would be broadened to permit funding for public transportation capital projects that serve to increase vehicle occupancy rates and enhance basic mobility as follows:

- traffic signal improvements which provide priority treatment for transit and ridesharing vehicles;
- exclusive high occupancy vehicle lanes;
- transportation system management measures which provide priority treatment or improve operations for high occupancy and shared ride vehicles; and
- commuter rail service capital improvements which include service between multiple urbanized areas within a single state.

Mass Transit Account formula funds may be used for a share of the total project cost when the projects listed above are a component of a highway project.

Highway Safety

The U.S. Department of Transportation estimates fatalities per hundred million vehicle mile in 1987 at 2.4, the lowest in history. The United States has by far the lowest fatality rate per vehicle mile of travel in the world. The private and public sector safety communities at all levels deserve a large share of the credit for this achievement.

All system failures produce a drain on our society and its economy. The degree to which vehicular accidents contribute to this drain can best be appreciated by examining the current annual toll, which are losses of more than 46,000 lives, over 3.5 million disabling injuries, and societal costs estimated at $75 billion. Traffic accidents also require redirection of monies and human energies that could expand our social and economic well-being.

However, current trends in population and travel growth present further challenges to the highway safety community. Projecting the current rate of growth in vehicle miles of travel to the year 2020 results in an estimated 3.5 trillion miles of travel on the nation's highways annually. This growth in travel coupled with the current death rate would result in 84,000 deaths per year on our nation's

highways in the year 2020. In addition to this intolerable loss of life, these accidents would also interrupt the free flow of goods and services on our roadways, adding an incalculable cost to transportation operations.

These projected scenarios indicate that to maintain the current highway fatalities at 46,000 we must lower the death rate. To accomplish this goal, a major highway safety initiative is required.

Managing tomorrow's traffic will require increasing attention to safety. The measure of value for the surface transportation system will continue to be mobility and safety. Improving the quality of transportation requires the recognition of the interconnections of safety issues on each transportation component; the facility, the operator, and the vehicle. The safety issues in particular cannot be dealt with effectively in an isolated fashion.

Major Recommendation

Highway Safety

- The safety of Americans, using the surface transportation facilities and services, should be preserved and enhanced through the continued national commitment to safety research, safety applications and safety projects.

Recommended Federal Procedures - Highways and Public Transportation

AASHTO makes the following recommendations for modifying the federal administrative procedures. These recommendations for the future administration of federal transportation programs revolve around and relate to the adopted definition and delineation of the "modified federal role" as previously presented.

Major Recommendation

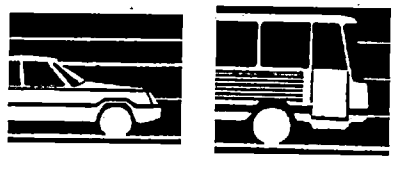
Overall Recommendation

- Simplicity and straightforwardness should be the hallmark of all federal administrative requirements associated with federal transportation programs.

Administrative recommendations made in this chapter are organized around the topics of intergovernmental coordination and relationships, allocating procedures for funding, certification of federally assisted projects and the federal use of matching ratios as an incentive for the furtherance of systems and issues of national significance.

The Intergovernmental Delivery System

The Federal Government should continue its primary relationship with the states in the delivery of transportation facilities and services.



Categorical Programs

Under the focused federal role the Categorical Programs (Highways and Transit) should continue to be administered in a manner similar to that employed presently. Coordination will be required in this level of the modified federal role among the state transportation agencies, regional planning bodies and local governments, particularly in the case of urban transit systems, transportation planning and modal interlink projects.

Flexible Programs

For the Flexible Highway Program, funds should be administered and coordinated on a statewide basis under the direction of state officials. Annual reports should be required from each state to assure that the federally adopted "Issues of National Significance" are being addressed through expenditures of these federal highway funds. For the Flexible Transit Program, funds should be administered in the same manner as they are today under UMTA's corresponding transit formula programs.

The Allocation of Funds

Fair, straightforward and simple formulas and equitable discretionary guidelines should be used to allocate revenues collected at the federal level to state and local units of government.

Categorical Highway Program

Under the Categorical Highway Program, some donor/donee relationship will need to continue. The donor/donee relationship will provide large, sparsely populated states with the ability to fund projects on the System of National Significance (Interstate and part of the existing Primary), emerging growth regions with the ability to fund needed transportation improvements, while still providing densely populated areas with the ability to fund urban highway projects.

Through a hold harmless provision, no state should receive less than the current highway program would provide in 1991 as if all states had completed their Interstate Highway Systems. To ensure some degree of equity of formula allocations, an 85 percent minimum allocation provision should be established and the existing 1/2 percent minimum apportionment retained for the Categorical Highway Program. In the event federal highway funding is increased above the 1991 levels, AASHTO recommends that every state, including hold harmless states, should then receive an increase in its allocation; the percentage growth in highway allocation amounts for hold harmless states should be at an equitable percentage growth rate. In addition, the basic formula for distributing categorical highway funds should be driven by factors, such as lane miles, travel (VMT), and other appropriate factors. (See Commentary.)

Planning, research and safety should be allocated as a percentage of each state's apportionment for the Categorical Highway Program. Emergency relief and federal lands allocations should continue to be discretionary.

Categorical Transit Program

Transit funds should continue to be distributed using the discretionary grant approach.

Flexible Highway Program

Funding for the Flexible Highway Program, which will replace all other highway categories and programs now existing at the federal level, should be allocated strictly on a pro rata share of federal Highway Trust Fund collections attributable to each state as a proportion of federal Highway Trust Fund revenues collected throughout the nation.

For the Flexible Highway Program, no donor/donee relationship should exist. Funds under the Flexible Highway Program would be allocated to each state in proportion to the highway user contributions attributable to the state.

Flexible Transit Program

The General Funds currently committed to transit should be appropriated and apportioned to the states and local governments under the Flexible Transit Program in the same manner as funds are currently distributed under UMTA's formula programs.

All annual Mass Transit Account revenues in excess of fiscal year 1989 transit funding allocation levels should be distributed by the following formula: 50 percent by the Section 9 formula and 50 percent by total population. The formula should include a hold harmless provision so that if future general fund appropriations for Section 9 are reduced below the 1989 level, Mass Transit Account formula funds equal to the size of the Section 9 appropriation reduction would first be distributed 100 percent by the Section 9 formula. The actual recipients of the Mass Transit Account formula funds would be the same as the recipients of the Section 9 and Section 18 funds.

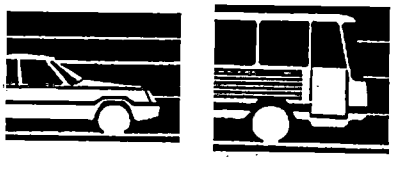
Major Recommendations

Allocation of Funds

- Fair, straightforward and simple formulas and equitable discretionary guidelines should be used to allocate revenues collected at the federal level to state and local units of government.
- AASHTO believes that minimum allocations should be developed for any program addressing needs on the national highway system, but that prorata shares based on percentage of total highway user contributions attributable to each state should be used for programs addressing state and local highway needs.
- AASHTO believes that allocations for the major transit projects and for those projects whose costs cannot be accommodated from regular transit formula funds should remain discretionary in nature, and that transit formulas should be used for other transit programs.

Highway Trust Fund

- The Federal Highway Trust Fund should be made permanent, removed from the unified budget process and released from obligation limitations. All interest earned, along with existing balances beyond those providing an adequate cash flow cushion, should be released to the states and local governments to fund needed surface transportation improvements. Increased federal revenues are necessary to carry out the needs of the future Federal Surface Transportation Program.



The Certification of Projects

The states and/or transit funding recipients would be responsible for the certification of all transportation projects receiving federal assistance.

Categorical Programs

Streamlined certification processes would be used for projects developed under the Categorical Highway and Transit Programs. Differences which exist between the certification of highway and transit projects would be retained at the federal level.

Flexible Programs

Certification for projects developed under the Flexible Highway and Transit Programs would not occur at the individual project level but at the statewide program level for highways and, in the case of transit, at the statewide or local transit agency level, depending on who was the recipient of the funding.

Each state or transit funding recipient would prepare an annual list of projects, using existing documents like the state construction program, the regional Transportation Improvement Programs and the local government project lists for prior approval at the federal level.

Annual progress reports covering the preceding year's achievements would be submitted at the same time and as part of the same document. In this manner, the Administration, the Congress and the Federal Government would be kept abreast of progress toward the national goals surrounding issues of national significance.

Major Recommendation

Certification of Projects

- The states and/or transit funding recipients should continue to be responsible for the certification of all surface transportation projects receiving federal assistance.

The Federal Use of Matching Ratios

Matching ratios could be different for the various needs represented in the Categorical and Flexible Programs.

The use of federal matching ratios to focus state and local program emphases, however, should be carefully examined. And, under no circumstance should a federal matching ratio be set in order to "force" state and local governments to enact revenue increases.

Categorical Programs

The matching ratio for roadway and bridge improvements under the Categorical Highway Transit Program should range between 100 percent and 85 percent. For extremely important projects like roadway preservation and bridge needs the federal portion could initially be 100 percent. For other needs, like capacity increases or additions to the system, the initial federal matching ratio could come

closer to an 85 percent level. In this manner the incentive would be to preserve the existing system before dealing with other system requirements.

Emergency Relief and Public Lands highway projects, due to their very nature, should be eligible for 100 percent federal funding.

Over the first five years of any new program, however, AASHTO believes that the federal matching ratio for the Categorical Highway Program should be around 85 percent.

For the Categorical Transit Program, the federal share should remain at the current level. For new starts, or system extensions, funding priority should be given to projects providing a non-federal share higher than the minimum 25 percent.

Flexible Programs

The matching ratio for projects under the Flexible Highway Program should be set by the states. The states, by varying the matching ratios, could provide strong incentives to meet state and local needs while addressing national transportation goals and issues of national significance. Care should be taken in this regard to ensure that rural needs are not overlooked or overshadowed by procedures or matching ratios which preference urban transportation-related goals.

The matching ratio for capital projects under the Flexible Transit Program should remain at 80 percent.

Major Recommendation

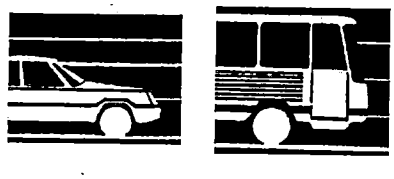
Matching Ratios

- For highways, AASHTO believes that an 85 percent federal share is appropriate for the programs that address national needs. AASHTO believes that matching ratios for highway programs addressing state and local highway needs should be determined at the state level.
- For transit, AASHTO believes that current federal matching shares should remain unchanged. However, for new starts and system extensions, funding priority should be given to projects providing a non-federal share higher than the minimum 25 percent. For the new Mass Transit Account formula funds, the federal share should be 80 percent, the same as it is for other capital formula funds.

Summary Comments on AASHTO'S Administrative Recommendations

Simplicity and straightforwardness should be the hallmark of all federal administrative requirements associated with federal transportation programs.

The changes from current practices recommended by AASHTO, reflected in the preceding sections of this chapter, serve to underscore the state concerns for a Modified Federal Role which would focus substantial federal resources on the Categorical Programs for addressing surface transportation systems of national significance.



These recommended administrative changes also highlight the desire to see increased state and local flexibility in solving specific surface transportation problems under the proposed Flexible Programs which are aimed at addressing general surface transportation issues of national significance.

Chapter 4
Railroads

Part I

Introduction

A balanced multi-modal transportation network is essential for strong economic growth. Railroads are an indispensable element of this network. Key issues for the rail industry and all modes of transportation which must be addressed by any future comprehensive surface transportation program are:

1. Efficient use of financial resources;
2. Providing access and mobility;
3. Relieving congestion; and
4. Protecting the environment.

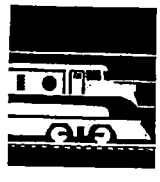
Only through coordination among all modes, achieved with the help and support of the states and Federal Government, can these issues be resolved.

Historical Background

During the Interstate highway construction era, motor carriers used the improving highway system to greatly expand their services. During the same period, for a variety of reasons including excessive regulation, railroads were unable to invest in equivalent improvements in productivity. Consequently, railroads have become increasingly reliant on long distance and heavy haul markets, where their ability to efficiently transport bulk commodities gives them an inherent competitive advantage. With the railroads' loss of most service-sensitive markets, motor carriers became the primary providers of light density, short and medium haul transportation services.

In response to these major market shifts, inadequate financial performance and changes in the regulatory environment, the railroad industry is undergoing a significant restructuring. The industry's goals are to improve its competitiveness and profitability. To accomplish these goals, railroads have focused on:

1. Abandoning unproductive lines;
2. Selling marginally productive lines to more efficient operators such as other railroads, shippers and/or public agencies;
3. Improving the utilization of capital assets;



4. Increasing labor productivity;

5. Adopting new technologies; and

6. Marketing innovative services.

The future shape and role of the U.S. rail system depends on the results of these efforts. Success in reducing costs will provide opportunities to preserve rail lines and increase rail traffic.

Future Outlook

When the restructuring process is completed, many observers of the railroad industry expect a scenario consisting of large carriers operating high density main lines. These line haul carriers will continue their current emphasis on long haul and multiple car service, and keep the system in private ownership. Branch lines and secondary main lines will be retained only if they produce sufficient volumes of traffic to be cost-effective.

Smaller rail carriers are expected to specialize in operating the remaining system of branch lines and secondary main lines. They will gather traffic and interchange it with the line haul railroads. Many of these carriers, known as short lines or regional railroads, already exist. It is anticipated that many more will be formed in the future. Typically, short lines and regional railroads are able to operate light density lines more efficiently. In addition, they can provide the more flexible, individualized service required to satisfy many shippers' needs.

Another major initiative in the rail industry is an effort to regain a portion of the intercity freight traffic presently served by the truck industry. Intermodal rail service uses highway trailers and containers, gathered by trucks and unloaded from ocean vessels, to be transported to distribution terminals for final delivery by truck. New developments in the technologies of intermodal services promise to increase the railroad industries' ability to compete for time sensitive and high value freight.

Public Role

As the industry undergoes the current restructuring process, communities face the prospects of rail abandonments or short line sales. Abandonments can bring forth loss of jobs, industry relocations, loss of tax revenues, shipper dislocations and increased highway construction and maintenance expenditures (needed to accommodate the increase in truck traffic).

Short line sales may not occur in some cases due to the difficulty of obtaining financing for acquiring the line. Many of the lines operated by short line railroads are in need of rehabilitation. Financially, these railroads are frequently operating with only marginal profits and the owners are unable to rehabilitate lines without outside assistance.

The public role, in insuring the availability of essential rail freight transportation, may need to be expressed through funding for track rehabilitation and/or acquisition. This financial assistance must be provided as an alternative to highway investment for projects that serve the public interest and promote economic development.

The public role for rail passenger service is presently expressed by Congress through financial support for Amtrak. In addition, individual states have undertaken major efforts toward establishing high

speed rail services in areas of dense population and congestion. Intercity passenger rail service is a viable alternative to clogged highways and air traffic lanes.

Part II - Findings of the National Conference of State Railway Officials Information Development, Collection, and Analysis Effort

Introduction

As stated earlier, *Beyond Gridlock- The Future of Mobility as the Public Sees It* was published by the AASHTO Advisory Committee on Highway Policy. The information for the report was gathered through 65 public forums held nationwide. The report summarizes major areas of concern for present and future transportation needs. One area of concern pertained to railroads. The report states:

> "A recurring theme in testimony throughout the forums was that rail service must be given adequate consideration in transportation planning for the 21st century."

It was concluded:

> "The Transportation 2020 forums showed that railroad abandonment in many parts of the country has placed heavy demands on road systems not originally designated to carry loads once shipped by rail. Particularly hard hit are roads serving the timber and agricultural industries."

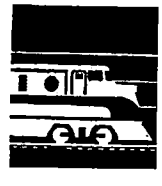
Summary and Conclusions of the NCSRO Rail Report

A balanced multi-modal transportation network is essential for strong economic growth. Railroads are an indispensable element of this network. Railroads compete with other modes of transportation, most notably trucks and barges. This competition assures shippers an efficient, reliable and economical transport system.

Concerning the essentiality of railroads, the U.S. Department of Transportation (DOT) informed Congress, in a report, *Prospectus For Change in Freight Railroad Industry* (October, 1978): "Without rail service ... industries would suffer major dislocations and would be faced with the need for vast new investments in transport and warehouse facilities, as well as with high operating costs. These extra costs to the economy would exceed many times the investment needed to keep railroads functioning efficiently."

The DOT report stated the following as the most important factors contributing to the relative decline and poor financial health of the rail industry:

- "Basic changes have occurred in traditional rail markets, as heavy industry gave way to a service-oriented, high technology economy and as shifts have occurred in the location of industry.
- Regulatory constraints have impinged upon management's ability to ... abandon facilities and services, and improve productivity.



- Government provision of highways, waterways, airways, and other facilities, which - in areas where user charges are inadequate - has subsidized the rail industry's principal competitors.

- The railroad industry has been slow in adapting to new technology; rival modes have been more successful in making use of new developments.

- Labor unions and management have not been able to agree on methods for full implementation of changes that would increase productivity, despite substantial increases in wages and benefits."

Corrective actions have been taken in some areas since the DOT report was issued. Most notable are implementation of the Staggers Rail Act and various new technologies. Another portion of the DOT report which is still applicable states:

> "Since government actions have been very much a part of the environment of railroading, there is an equally urgent demand for constructive changes in Government policy to be part of the solution."

One Class I railroad, Delaware and Hudson Railway Company, is currently in bankruptcy. According to the American Association of Railroads, all other railroads reported net incomes for the year ended March 31, 1988. None, however, earned a rate of return greater than its cost of capital. One reported a zero return on investment. This is an improvement over the previous year when two railroads reported a net loss on operations and three reported a zero return on investment. It also stops, at least temporarily, a rail industry trend of steadily declining profitability.

Railroads have little prospect of growth in their traditional traffic base. Traffic has eroded, due in part to developments in technology and the transition from an industrial to a service economy. Changing market demands, resulting in large increases in imports of manufactured products and decreases in exports of coal and grain, have also adversely impacted railroads. In addition, railroad traffic has been reduced by product substitution and down-sizing. The automobile industry is a good example of where these changes have taken place.

Railroads are making strides in their attempt to overcome these traffic reductions. This is evidenced by a 10.3 percent increase in freight revenue ton-miles last year. This increase was accompanied by many cost reductions, as well as improved efficiency in operating procedures. These improvements, however, have been relatively modest and their retention is not assured. In addition, the revenue associated with them could quickly be eliminated through increased truck productivity. This is particularly true if truck size and weight limits are expanded, without increased taxes to offset the additional cost of damage these trucks would cause to the highways.

The new federal tax bill is not favorable to railroads due to changes in depreciation and minimum tax calculations. The most devastating affect on railroad industry profitability, however, would be the reimposition of regulatory restrictions. Amendments to the Staggers Rail Act, which would do just that, have recently been considered by Congress.

In all likelihood, to break the trend of marginal profitability, Class I railroads will reduce their operations to core systems. About one-third of the current trackage (45,000 miles), will be abandoned or sold. Without either legislative relief, or a favorable legal environment on the labor-protection issue, it can be assumed these lines will be abandoned rather than sold. If this happens, many communities and shippers will experience severe negative impacts. In addition, as lines are aban-

doned, an increase in highway funding will be required to cover the additional costs generated by the diverted traffic.

At its peak, rail passenger service was provided by many railroads operating several thousand trains each day. Demand for this service and the profitability of providing it declined significantly as highway and air transportation systems improved. To salvage at least a minimal level of rail passenger service, Congress created the National Railroad Passenger Corporation known as Amtrak. Amtrak operates approximately 220 daily intercity passenger trains which serve 480 communities in 43 states.

Severe traffic congestion in many parts of the United States is helping re-establish rail passenger service as a viable transportation alternative to airlines and automobiles. The revival of rail travel is already evident in corridors, such as between Boston and Washington, D.C. In this and several other areas, efforts are underway to relieve pressure on overburdened highway and air transportation systems by establishing high speed rail passenger service. In some urban areas, a primary motivation for using Amtrak and developing high speed rail corridors is that few opportunities remain to provide additional capacity for highway and air travel.

If Congress takes the necessary actions to balance government involvement in the competitive environment, the railroad can continue to provide freight and passenger services for the enhancement of the nation's economy. Again, as concluded in *Beyond Gridlock:*

> "... rail service must be given adequate consideration in transportation planning for the 21st century."

Part III - Total Systems Approach to SurfaceTransportation Investment

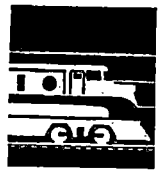
Goals

Addressing the transportation funding and service crisis within budget constraints requires the recognition that all elements of our transportation infrastructure (rail, highways, water and air) are part of an integrated and interdependent system. Preserving rail service must be viewed as a transportation and economic alternative for communities experiencing job losses, industries being forced to relocate, and highways requiring additional improvements.

Not all rail lines can (or should) be saved. States have an important role, however, in insuring that opportunities are available for maintaining rail service where it is the most cost-effective method for meeting transportation needs. Any future comprehensive national surface transportation program should be structured to meet the following goals:

1. To preserve rail service where it is in the public interest.

2. To develop the ability to anticipate the economic, social and national defense impacts of railroad abandonments on shippers, communities, and highways. Also, to assess the relative benefits of rail and highway system improvements.



3. To implement programs that invest in railroad projects which are justified on their own merit and/or as cost-effective alternatives to other improvements.

Goal Achievement Strategy

These goals can be achieved through a comprehensive national surface transportation program. Railroads can and should play an important role in the U.S. transportation system. In addition, transportation resources must be coordinated if they are to be used efficiently. The best response to a proposed rail abandonment may be to build a rail/truck transfer facility, acquire and/or rehabilitate the line, or proceed with the abandonment and improve the highway. Funds are not available to do everything. Resources must be allocated to where they best serve the public.

When confronting a transportation issue involving railroads and highways, economic analysis will indicate the most prudent, financial investment strategy. It will determine, for example, whether a rail line should be rehabilitated or a highway should be improved. States should have discretion to independently make the choice, and to accomplish transportation projects through direct investment, loans to railroads or acquisition of the rail facilities. Federal funds should never be used, however, for freight railroad operating subsidies.

Part IV

Policy Recommendations - Rail

Listed below are several policy recommendations which address the foregoing discussion as well as other important rail issues.

Provide for Access, Efficient Freight Movement and Congestion Relief

The U.S. Class I railroad system will continue to shrink as the industry strives for economic revitalization. This will be achieved through abandonment of uneconomic lines and the sale of marginal lines to those who can operate them more profitably. This process will require public policy choices on the preservation of lines. These lines may be important transportation corridors. As such, they may be preserved as alternatives to highway improvements or as links providing access for communities to the nation's core rail system. Preserving these lines will often require rehabilitation and perhaps acquisition.

When rail lines are abandoned, highways must accommodate trucks as they provide replacement collection and distribution services. To accomplish this, rail/truck transfer facilities supported by a system of local feeder highways may need to be established. Rail/highway transfer facilities, such as container and piggyback terminals, can also be used as a means of transferring to rail that traffic which would otherwise travel on the highway system. In order to maintain access to markets, coordination between the highway system and transfer facilities will be very important. It is imperative to locate transfer facilities in a way which directs truck traffic away from congested urban/suburban areas. Whenever possible, private investments should be used to help finance these facilities.

Major Recommendation

Provide for Access, Efficient Freight Movement and Congestion Relief

- AASHTO believes that there is an appropriate federal role in funding rail related projects. Any comprehensive national surface transportation program should include federal and state funding for track rehabilitation and acquisition, construction of rail/truck transfer facilities, new rail connections and industry relocation. This proposal meets the objectives of the Transportation 2020 process to preserve rural access, provide modal interlinks and reduce urban and suburban congestion.

Review Federal Railroad Laws

The rail industry has changed significantly since much of the body of railroad law was enacted. The rail industry is no longer an all-purpose transportation provider.

It now specializes in long distance, heavy haul markets. Motor carriers have become the provider of choice for most low density and short haul freight transportation.

The rail industry was the predominant employer in the early 1900s and most of the railroads were extremely powerful. Many were abusing this power to the detriment of their employees and the general public. Consequently, railroads became the legislative laboratory for dealing with many economic, safety and labor issues. In recognition of changes in the industry and the nation, however, public policy must now be modernized to bring railroad laws, regulations and programs into line with the rest of the transportation industry and the industry in general.

In 1980, the Staggers Act modernized the economic regulation of the rail industry. However, several laws remain to be updated. These include the Railway Labor Act, the Railroad Retirement Act, the Railroad Unemployment Insurance Act, and the Federal Employers' Liability Act.

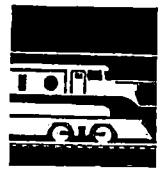
Major Recommendation

Review Federal Railroad Laws

- AASHTO believes that Congress should review the body of law governing the rail industry in the same manner it addressed economic deregulation through the Staggers Act. Laws which should be reviewed include the Railway Labor Act, the Railroad Retirement Act, the Railroad Unemployment Insurance Act, and the Federal Employers' Liability Act. A redrafting of these laws is essential to allow the rail industry to remain a viable part of the transportation system through the year 2020.

Provide for Traditional and High Speed Rail Passenger Service Needs

Rail passenger service is provided nationally by Amtrak. Amtrak was formed in 1971 to fulfill the need for intercity rail passenger service that the rail industry could no longer afford to provide. Since that time, Amtrak has been funded from operating revenues and federal appropriations. In the last four years, it has been the desire of the Administration and Congress to reduce Amtrak's dependence on federal support. Enhanced service has increased ridership and revenues, but not enough to cover lost federal funding.



In addition to the shortage of operating funds, Amtrak is experiencing a capital budget crisis as its equipment wears out. Without replacement and repair of its equipment, Amtrak will become unable to operate. Amtrak is an important passenger transportation service and its needs must be considered in any comprehensive national surface transportation program.

While Amtrak is the provider of traditional rail passenger service, several regions are developing high speed intercity passenger projects to connect high density traffic corridors. These projects will provide essential passenger service in rapidly growing corridors and will significantly reduce highway and air travel congestion.

Major Recommendation

Provide for Traditional and High Speed Rail Passenger Service Needs

- AASHTO believes that the continuation and further development of Amtrak is an appropriate federal responsibility and in the national interest. In addition, AASHTO believes that the Federal Government should support and participate in a public-private partnership to develop high-speed rail in those selected corridors in which it will demonstrably relieve highway and airport congestion, and improve intercity travel efficiency. Any comprehensive national transportation program must address rail passenger service needs.

Assess the Competitive Environment

In addition to competing among themselves for movement of freight, railroads also compete with the barge and trucking industries. The rail industry is unique in owning the right-of-way on which it operates. Through user fees and/or general appropriations, federal and state governments maintain the infrastructure used by barges and trucks. Various federal and state cost allocation studies have been completed which indicate that the barge and trucking industries fall short of paying their "fair share."

Major Recommendation

Assess the Competitive Environment

- AASHTO believes that Congress should compare the laws, government policies and user fees impacting the various transportation modes. Where a disparity is found, Congress should strive to create an equitable balance.

Provide for Railroad Safety Improvement and Enforcement

Transportation safety is a major public and governmental concern. This includes operational safety, employee safety, railroad highway grade crossing safety, hazardous and nuclear materials transportation and acceptable accident response. It is essential that an ongoing governmental presence be maintained. A strong federal - state - local partnership is necessary to assure an effective evenhanded safety program for the railroad industry.

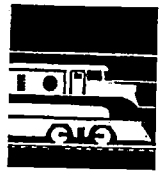
Research and development efforts are necessary in several safety areas. Areas of improved technologies, such as radar and sonar warning systems, must be publicly funded. This will assure that these systems become operational and that their development is coordinated with other transportation

modes. If strict procedures and proper equipment are developed to assure the public safety, railroads are the best suited transportation mode to move hazardous and nuclear materials.

Major Recommendation

Provide for Railroad Safety Improvement and Enforcement

- Any future comprehensive national transportation program must continue to provide funds for separating or otherwise protecting railroad - highway crossings. In addition, a federally funded state/federal partnership of railroad safety inspections is required to assure that the rail industry complies with federal safety standards. Also, federal research and development funding is essential in the areas of improved warning systems (such as radar and sonar systems) and hazardous and nuclear materials transportation.



Chapter 5
Water Transportation

Part I - Water Transportation

Introduction

A balanced multi-modal transportation network is essential for strong economic growth. Water transportation is an indispensable element which supports this growth.

There are several areas of critical concern for the water transportation industry which also impact other modes of transportation. These areas include:

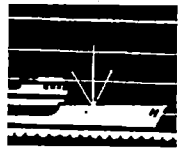
- Improvement in productivity and utilization of the existing water transportation system;
- Improvement of the competitiveness of U.S. industries in world markets;
- Efficient targeting of public investments to satisfy the nation's water transportation system's infrastructure needs, and to provide new facilities where warranted;
- Protection of the environment and public safety; and,
- Effects of intermodalism on water transportation.

Water transportation impacts many aspects of the nation's economic well being. These areas of concern can only be fully addressed through the coordinated efforts of Federal, state and local Governments, along with private industry. It should be recognized that the nation's future transportation needs take place in an intermodal context. Impacts from deregulation in several modes, increased freight containerization, technological improvements such as jumbo container ships and double stack rail cars -- and even the rediscovery of ferries as a vital public transportation network link -- are making water transportation businesses increasingly part of total intermodal service packages. All levels of government, including the Federal Government and the states, need to take this into account in setting policies and in managing water systems.

Historical Background

Waterways have served as major transportation facilities since the first settlement of this country. Most of our large cities are located on navigable waterways, and industrial expansion has traditionally followed the waterways of the nation. Waterways today are still a major element in the American transportation network and the national defense system. They provide a long proven benefit in transporting people and goods.

Water transportation is dynamic; continually improving its methods, equipment and capacity. Its importance to the national welfare is emphasized by the fact that direct access to water transportation is available to the majority of the nation's states. Technological advances in vessels and material handling equipment permit direct international shipments between remote inland ports and the ports of the world. Water also provides safe, energy-efficient



transportation for the nation's mineral resources, agricultural products and other bulk commodities.

Water Transportation Activity

About 1.8 billion tons of cargo are handled annually by the nation's port facilities. Two-thirds of the total U.S. waterborne commerce is handled by deep-draft ports. The deep water ports handle products ranging from automobiles and computers to bulk products and sand, gravel and other nonmetallic minerals. The remaining one-third is handled by the inland waterway system. The inland waterways carry about half of the U.S. grain exports and one-fifth of the U.S. coal exports. By moving large volumes of commodities at a low unit cost per ton, the nation's waterway system helps make our exports price competitive. It also contributes to the economies of many individual states and to the nation as a whole by providing jobs, income and production.

The nation's facilities are comprised of 188 deep-draft ports and 11,000 miles of segments on the nation's shallow draft inland and intracoastal waterway system. Most of the channels in the shallow-draft system have depths of 9 to 14 feet. These depths are maintained through a system of dams and 216 lock chambers and 167 lock sites. In addition the Federal Government maintains an extensive system of over 48,000 aids to navigation which mark the nation's waterways.

Financing

In order to maintain the nation's ability to trade in world markets, billions of dollars have been invested by Federal, state and local Governments in the public port industry for marine terminals and harbor and channel improvements. The investment in private port facilities has been greater. These investments in public and private port facilities have helped maintain a healthy trade position for the United States.

With the enactment of the Water Resources Development Act of 1986 (PL 99-662), the historic division of responsibility for development of the water transportation system has been significantly altered. The Federal Government is no longer assuming 100 percent of the cost for maintenance, operation and new projects on the nation's waterway system. Payment of part of the cost of the waterway system has been imposed on the shippers and vessels using the ports and waterways. The states and other local interests have found it necessary to assume part of the cost if port and harbor projects are to go forward.

The new law established the following cost-sharing provisions for harbor improvement projects:

	Construction Costs	
Project Depth	Federal	Non-Federal
20 feet or less	90%	10%
20 feet to 45 feet	75%	25%
More than 45 feet	50%	50%

The non-federal entity is also required to pay an additional 10 percent of the project cost over a period not to exceed 30 years. The non-federal entity is required to provide lands, easements, right of way, relocations and dredged material disposal areas. These costs are credited against the 20 percent non-federal share paid over the 30-year period.

The law imposed an ad valorem charge of .04 percent (.0004) per dollar value of cargo loaded or unloaded, except on cargo moving between Hawaii, Alaska or a U.S. possession with receipts to be placed in the Harbor Maintenance Trust Fund.

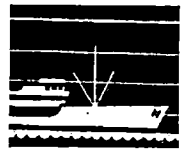
Operation and maintenance costs of federal navigation projects are fully paid by the Federal Government for work associated with channels of 45 feet or less. However, non-federal sponsors must pay 50 percent for the additional cost of maintaining new projects with channel depths in excess of 45 feet.

The law also authorized non-federal interests to levy port or harbor fees on vessels and cargoes to recover the costs of deepened or widened channels from those vessels and cargoes that make sure of the improvements.

Operators of commercial vessels on fuel taxed segments of the inland waterway system are subject to a federal inland waterways fuel tax. The fuel tax, authorized by Public Law 95-502 (Inland Waterways Revenue Act of 1978) and Public Law 99-662 (Water Resources Development Act of 1986), is currently $0.10 per gallon of fuel used by commercial vessels on the 27 designated inland waterways, but will increase to $0.20 per gallon by 1995. Fifty percent of the cost of new locks and dam projects is to be paid by the Federal Government and 50 percent from the Trust Fund. The Federal Government will continue to pay 100 percent of the operation and maintenance costs.

Current expenditures from the Trust Fund are helping to fund the construction of seven lock projects authorized by the Water Resources Department Act of 1986. The balance in the Trust Fund is $300 million at the present time. The anticipated fund receipts will approximate the scheduled outlays for the seven projects. Two additional projects are authorized to use the Trust Fund and there other potential claims for funding from the Trust Fund. The Water Resource Development Act of 1986 specifically authorized 50-50 funding for both rehabilitation and construction of inland navigation projects from the Trust Fund. At this time, there are 12 projects being rehabilitated and a potential for several additional projects by the year 2000.

Under the Water Resource Development Act of 1986, an Inland Waterway Users Board was established. The Board is composed of 11 members, representing various regions with a mix of shippers and operators. The Board advises the Corps of Engineers on construction priorities financed from the Trust Fund.



The Trust Fund can provide for 50 percent funding of the projects now scheduled or authorized to use the Fund. With the growth in revenue projected for the Fund, it could also finance several new projects. Projects which require smaller scale investments with high immediate payoff will tend to attract future funding priority.

Issues

Internal transportation policies, taxes, labor rates, etc. have all contributed to declining competitiveness by making U.S. exports more costly to deliver to world markets. Bulk commodities, relatively low-valued exports such as coal and grain, are particularly sensitive to increases in transportation costs. Actions that affect the transportation of these goods, particularly policies affecting waterways, railroads, and maritime transportation can significantly influence the balance of trade.

The ability of the U.S. to equip its transportation industries is in question. At one time, U.S. manufacturers completely dominated the transportation equipment industry. The U.S. automakers' declining share of national and international markets is well known. The same trend has occurred throughout heavy manufacturing. Other than the U.S. Navy, American ship yards have few customers. Foreign competitors have captured much of the ship building/repair business.

The country is also facing a decline in its industrial base. The nation is changing from a manufacturing to a service industry economy. This change will impact the type and amount of goods shipped by water. The water transportation system must be able to serve this changing market.

Continued population growth and an increase in leisure time activities will continue to put pressure on waterfront lands and on the use of the waterways system. Congestion in large urban areas will generate renewed interest in water transportation for public conveyance. Recreational usage and non-maritime commercial development will compete with water-borne transportation needs. The shortage of developable commercial properties in heavily populated areas may force ports to increase the efficiency of their cargo handling operations. The ports may also have to integrate their operations to include non-maritime tenants within the port lands or to change their emphasis from transportation to other commercial ventures.

Public Role

The quality of a nation's transportation network is one measure of its economic strength. A reliable water transportation system is an important segment of the nation's transportation network. The canals, rivers, dams and ports that make up the nation's water transportation system were constructed by past generations. These waterways have served as major transportation facilities since the early settlement of this country. Most of our major cities are located on navigable waterways and industrial expansion has traditionally followed them.

Water transportation continues to be of national importance; providing benefits in the areas of regional economic development, energy efficiency and national defense. It is also recognized that it provides benefits to the commercial waterway transportation industry as well as recreational and wildlife conservation interests. If the future generations are to enjoy these benefits, we will have to invest in the maintenance and improvement of our water transportation infrastructure. The Federal, state and local Governments, along with private industry, must be involved in the management of the inland and coastal waterway systems.

The impact of the waterway transportation system on the states extends beyond the rivers and the facilities in the ports along them. Shippers or receivers of commodities through these ports often are located as much as hundreds of miles away. As a result, the water mode with its landside connections can offer cost-efficient transportation to a wide geographic segment of our Nation. The economic development of an entire region is enhanced by the waterway system and the necessary port facilities. Commodities moving through the deep water ports, in many cases, terminate in the vicinity of the inland ports. In the reverse direction barges from inland ports bring commodities to ocean ports to be transshipped throughout the world.

The far reaching effect of the transportation benefits provided by our nation's waterway system cannot be overemphasized. The nation's waterways are not only vital to trade, economic development and national defense, but also provide flood control, irrigation, fire protection, fishing and other recreational opportunities. The Federal Government must continue its partnership with local and state governments to maintain water as a viable means of transportation. The Water Resource Act of 1986 must be viewed as a positive step toward a partnership for preserving water transportation. The mandatory cost-sharing provisions will improve the project selection and will help stretch scarce financial resources. Investments in speculative projects should be minimized by the Act, however, there is still a real need to develop efficient funding criteria to insure that future water transportation projects will represent worthwhile investments of public funds.

Part II - Findings of the Standing Committee on Water Transportation Information Development, Collection and Analysis Effort

Introduction

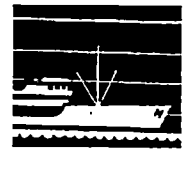
The nation's waterborne transportation network moves more than 1.8 billion tons of goods each year. Over half of this shipping is between U.S. ports. The Transportation 2020 forums highlighted the fact that waterborne trade is dependent on the intermodal exchange of goods with highway and rail for delivering and receiving products from all of the U.S. to the ports.

Beyond Gridlock - The Future of Mobility as the Public Sees It identified areas of concern that pertain to water transportation.

- The physical condition of transportation facilities is deteriorating. Essential services must be properly protected.
- Access to waterports must be improved. Adequate truck and rail access must be able to bring goods to and from marine terminals in a timely, cost-effective manner.
- Stable funding sources for future revenues must be identified to provide needed transportation improvements.

Summary and Conclusions Modal Technical Advisory Committee

The Modal Technical Advisory Committee (MTAC) was formed to provide information on the overall future issues and needs concerning transit, aviation, rail, and waterways. One of the primary activities of MTAC was to identify future landside access needs for the aviation, rail and water transportation facilities.



Through a survey of the states, highway and rail access needs to port facilities, which were not presently included in long-range plans and programs, were identified. The survey was designed to determine if specific highway improvements were needed on the interstate or non-interstate highway facility for port facilities in metropolitan or rural areas.

The survey results indicate that waterborne commerce access needs for interstate and non-interstate connections total about $2 billion. This amount is evenly divided between interstate and non-interstate needs, although many more lane miles of improvements were identified on the non-interstate system. The dollar amount of highway improvements in metropolitan areas was much greater than rural areas. However, the lane miles of improvements were higher in the rural areas.

The dollar amounts are not as important as the identification of where the needs appear to be. The greatest needs are within the metropolitan areas, on both interstate and non-interstate facilities. The potential port access highway projects on the interstate and non-interstate system were primarily "new facilities". New facilities were also identified as the highest dollar need category in both the metropolitan and rural areas.

Standing Committee on Water Transportation Findings

The Standing Committee on Water Transportation through its discussions with water industry leaders identified the following major issues which impact water transportation.

Rehabilitation and Modernization of Water Transportation Facilities

The replacement cost for the aids to navigation, locks, dams and channels on the nation's water transportation system (deep and shallow draft) represents an 100 billion dollar investment for the nation. The Federal Government maintains the locks, dams, shipping channels and aids to navigation to protect its past investments. Based upon a report by the National Council on Public Works Improvement, about $3.6 billion for port infrastructure needs includes about $1.9 billion per year in federal expenditures and $1.7 billion per year in non-federal expenses. The majority of the non-federal costs are borne by the private sector. Included in the federal expenses are $900 million for the Coast Guard for administration, operation and maintenance expenses, and $600 million for annual funding requirements of projects underway or authorized by WRDA by 1986. Only a portion of the $1.9 billion in federal funds for water transportation operation are covered by user fees. The two programs which provide the majority of these funds are the Inland Waterways Trust Fund ($70 million) and the Harbor Maintenance Trust Fund ($200 million). The remainder of the needed funds ($1.6 billion) is provided through general taxes or borrowing. These funding sources need to be secured to maintain an adequate water transportation system.

Federal Role

The federal role in operating, maintaining and/or modernizing the water transportation system is changing federal legislation, redirected agency emphasis, and budget tightening have forced the Corps of Engineers and the Coast Guard to modify their actions concerning water transportation. As a result of greater cost-sharing responsibilities, the burden on local governments is greater now than in the past. The non-federal entity will assume more responsibility in the planning, design and construction of water transportation projects. This assumption of responsibility by a non-federal entity should not relieve the Federal Government of its responsibilities to national defense and economic growth.

User Fees

Construction costs of harbor navigation projects, e.g., channel deepening, are share by the Federal Government and a non-federal interest (states and port authorities). The Water Resources Development Act of 1986 authorized the non-federal interest to levy port or harbor dues to recover its portion of the construction costs of a harbor navigation project. A workable method is needed for identifying project beneficiaries and for levying user fees in order to recover the non-federal share of costs.

Development/Recreational Pressures

Real estate development pressures on waterfront ares have made it increasingly difficult for marine-related industries to find suitable, affordable locations. This sector includes marine construction, dredging, towing, ship repairs and ship servicing vital to the water industry. In some areas, port operations are being affected by a lack of land needed to sustain growth. In other areas, port properties are being proposed for waterfront recreation, residential or other commercial (non-water related) development. Recreational boating activities are beginning to interfere with navigation on the nation's waterways. The port operator is expected to balance marine, recreation and other commercial development along the waterfront.

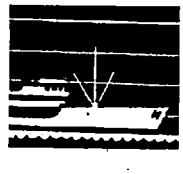
Dredged Material

Nationally, ports are facing increasing costs and tighter budgets. Dredged material disposal costs are becoming a critical factor in port economics. The lack of environmentally acceptable and economically feasible dredged material disposal sites for the ports could delay or void most new harbor deepening projects authorized by the WRDA of 1986. Dredging and the disposal of material is not merely a local issue but a national concern as the ports provide benefits and services to all Americans, whether they live on the seacoast or in middle America. Since the very beginning of the nation, maintenance of navigable waterways has been a matter of national concern.

Research and Development

Research and development (R&D) are recognized as essential elements in the nation's efforts to remain competitive in world markets. The R&D process for the maritime industry includes the development and application in hardware, operations and information management systems. Improvements in ship building, in productivity, in state-of-the-art cargo handling systems and in terminal advances. Government sponsored R&D activities have been adversely impacted by budget cutbacks.

Government sponsored R&D is necessary to support national security and public safety, to assist ports and waterways planning and development, to ensuring that technical information supports existing laws and to promote international competitiveness.



Part III - Total Systems Approach to Water Transportation Investment

Introduction

Addressing the transportation funding and service needs within budget constraints requires the recognition that all elements of our transportation infrastructure (rail, highways, water and air) are part of an integrated and interdependent system. Budgetary constraints have forced federal, state and local governments to reassess their needs and begin to strategically plan for future investments. The Federal Government is also turning over traditional federal responsibilities to non-federal entities. An increased state role in water transportation projects must be coordinated to ensure that our Nation's water transportation network is preserved. The levels of service provided by portions of the water transportation network must be compared with service provided by other modes to determine where and under what circumstances the water transportation mode has a natural advantage and is most cost effective. Under-utilized or inefficient water transportation related facilities should not continue to enjoy future public subsidies. To ensure that all parties act to maintain a viable water transportation network for the nation, there must be a comprehensive federal surface transportation program, which in consultation with state and local governments and the private sector, guides future water-related investments.

Goals

The goals for the nation's water transportation system are presented below.

Preservation

Preservation of a water transportation system should be a primary goal of a national transportation program since the water mode is part of the intermodal freight movement of goods which supports the nation's economic strength.

Funding

Established cost-sharing programs should be continued. Funds generated by water transportation-related activities from user fees, customs duties, etc. should be returned to the water transportation industry. Federal funding for channel maintenance and for construction of water transportation facilities should be secured to maintain an adequate water transportation system.

Safety

Aids to navigation, vessel inspections, environmental protection, drug interdiction, national defense, and other Coast Guard activities are services to the entire nation. The safety of the public and water transportation industry should be preserved.

Access

Intermodal connections between the water mode and other surface transportation modes should be preserved and enhanced where there is a clear public benefit.

Goal Achievement Strategy

States, local government and the private sector generally bear the cost of port landside facilities. The Federal Government maintains deep and shallow draft shipping channels and aids to navigation. An effective water transportation network depends upon adequate landside connections to rail and highway facilities to deliver or receive goods to or from areas far removed from the water. To ensure that all parties act to maintain a viable water transportation network for the nation, there must be a comprehensive federal surface transportation program which defines a water transportation network of national significance. The surface transportation program will provide recommendations for future water related investments as part of a total transportation system.

Part IV - Policy Recommendations

Listed below are policy recommendations to address the water transportation issues identified earlier in this Chapter.

Coordinated Water Transportation Plans

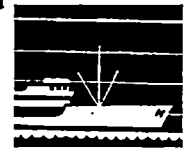
The waterways system, including its landside supporting transportation infrastructure, is an integral part of the nation's economy. The impacts of waterborne transportation extend well beyond the localities and states in which water transportation facilities are located. Water transportation is truly a national resource. In addition to its economic importance, the waterways are part of the nation's defense transportation network.

The nation faces major structural navigation needs. The rehabilitation or replacement of a large number of locks and dams on the Inland Waterway System and the modernization and deepening of some deep-draft ports are needed to permit the nation to compete in world trade. Part of these needs will be met through the ad valorem tax created by the Water Resource Development Act of 1986 and the fuel tax from the Inland Waterways Trust Fund. The remainder of the federal share of water projects must be provided through general taxes or borrowing. With growing competition for federal funds, future levels of funding available for water transportation projects may not be sufficient to finance all essential water transportation improvements. Strategic planning needs to be done at a federal level to prioritize competing claims for federal resources in the preservation and modernization of the nation's water transportation network. A clear statement of federal priorities and criteria for federal funding eligibility will guide states, local government entities and private interests in evaluating their investments in water transport projects. A federal review of the nation's water transportation network and associated projects is needed to identify which ports and channels are vital to the nation's economy. Distributing future federal funds based upon national needs, not local or regional concerns, will provide for a better allocation of limited resources.

Major Recommendation

Coordinated Water Transportation Plans

- AASHTO encourages the Federal Government to establish clear priorities for federal investments in ports and waterways. A national maritime policy is needed to guide federal, state, regional and local efforts in a manner that will encourage the development of projects that best serve the interest of the nation based on careful examination of the economic and



environmental impacts of alternative actions, while preserving the autonomy of non-federal entities.

National Ports and Waterways System

To ensure that future water transportation improvement plans are coordinated, the Federal Government should also be encouraged to develop a National Ports and Waterways System similar to the system in existence for the nation's airports. This effort would classify ports and waterways by the types and amounts of cargo handled and by their importance to the nation's economy and/or defense. The inland waterways should be defined in terms of their national significance similar to the highway classification system. This classification will also encourage rationalizing the nation's ports without limiting the freedom of local entities to invest non-federal funds in water transportation. Those ports and connecting channels and waterways which are deemed to be vital to the nation, as evaluated by consistently applied criteria, would receive a higher priority for federal aid than those ports which provide a lesser national service. Projects which provide strictly local service should be funded locally. In addition, a clear definition of federal priorities as defined within a National Ports and Waterways System will help focus the land access needs of the nation's ports. The intermodal links serving the ports will be considered as part of a national policy for the surface transportation system.

Major Recommendation

National Ports and Waterways System

- AASHTO believes that there is an appropriate federal role in the oversight of the operation, maintenance and development of the nation's water transportation-related projects. AASHTO urges the Federal Government to develop a National Port and Waterways System which integrates water transportation with its necessary intermodal connections into a surface transportation program.

Intermodal Connections

The nation's ports handle 1.8 billion tons of cargo annually. Their ability to sustain this activity depends not only on channel depth, berth length or on the facilities available to handle the cargo but also on the landside connections to the nation's highway and rail networks. Significant landside access improvement needs have been identified for ports. These needs are concentrated in the urban areas on non-interstate highways. Improvements to highways and rail are needed to alleviate traffic congestion and to speed the flow of cargo through the ports to its final destination. Containerization of goods for shipment has placed special demands on port facilities and supporting transportation systems. Increased investments are required for landside facilities, such as dock rail lines, enlarged storage areas, cranes, etc., to permit rapid movement from ship to intermodal connections. In the rural areas, large volumes of bulk products rely on rail and highway access to the ports to permit timely distribution to the product users and to allow for the efficient movement of export products.

Major Recommendation

Intermodal Connections

- AASHTO urges the Federal Government to recognize the need for landside access improvements to our nation's ports. Existing funding sources are inadequate to meet current and projected highway-port and rail-port connector needs. An integrated surface transportation program must

consider port landside transportation access improvements as part of federal funding programmed for highway and rail transportation modes.

Water Resource Development Act

AASHTO supports the provisions of the Water Resources Development Act of 1986 that established partial cost recovery for improvements to deep-draft ports and the Inland Waterways System. The nation's waterway system serves interstate commerce and it is essential that the Federal Government maintain a pro-active role in project development. The Federal Government should promote programs which replace or rehabilitate priority waterways, locks and dams and reduce or eliminate hazards and unsafe conditions. It is in the interest of the nation to have a thorough evaluation of water projects for which federal funding is proposed and carried out by the Federal Government. The federal interest in an improved system of harbor facilities serving the needs of U.S. Waterborne Commerce warrants an increased federal contribution to the cost of project feasibility studies. For this reason, the states support a reduction in the non-federal share of project feasibility studies.

Major Recommendation

Water Resource Development Act

- AASHTO urges the Federal Government to fund 100 percent of the costs of feasibility studies for deep-draft and inland harbor improvement projects. Improvements to the nation's deep-draft and inland harbors generate benefits far beyond the local area, including reduced transportation costs, increased competitiveness of U.S. goods in world markets and increased opportunities for national and regional economic development.

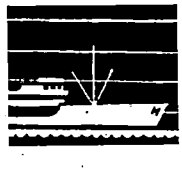
User Fees

With the enactment of the Water Resource Development Act of 1986, the construction costs of harbor navigation projects are shared by the Federal Government and a non-federal entity. The WRDA of 1986 authorized the non-federal entity to levy port or harbor dues to recover its portion of the construction costs of a harbor navigation project. Under the existing provisions of the WRDA, this cost recovery method must avoid adversely impacting existing port users who do not desire or benefit from the improvement. To date, no additional user charges have been assessed against port users to finance authorized harbor deepening projects. It appears that no port will be able to utilize the limited cost-recovery methods permitted within the WRDA.

Major Recommendation

User Fees

- AASHTO believes that Congress should amend Section 208 of WRDA of 1986 which permits the recovery of the non-federal share of the cost of an authorized project. The Act should be amended to provide the ports greater flexibility in determining the method of assessing and allocating the non-federal share of a project among port users.



Disposal of Dredged Material

Nationally, ports are facing increasing costs and tighter budgets. In order to be competitive and serve the vessels bringing goods and commodities, ports must maintain their channels. After enactment of the Water Resources Development Act (WRDA) of 1986, many ports took advantage of the project authorizations and signed local cost sharing agreements with the Corps of Engineers to advance channel maintenance and deepening projects. Dredged material disposal costs are the responsibility of the non-federal entity, and are becoming a critical economic factor in port and waterway deepening and maintenance projects. The lack of environmentally acceptable and economically feasible dredged material disposal sites for ports could jeopardize projects authorized by the WRDA due to extremely high disposal costs.

Ports serve national markets. The effort to manage dredged material must be a national effort and not a local port issue. Ports need a national guide to follow in determining whether the dredged material is clean or contaminated.

Major Recommendation

Disposal of Dredged Material

- AASHTO urges the Army Corps of Engineers, in close cooperation with ports and states, to establish regional scientific criteria for disposal of dredged material. The criteria used must include a reasonable margin of safety and should give consideration to the economics of dredged material disposal. Testing procedures for dredged material disposal permit compliance must be standardized throughout the nation.

- AASHTO also urges that the Federal Government develop a program to educate the public about the economic necessity of dredging. The public's lack of hard information about dredged material increases the likelihood that all dredged material will be lumped with sludge or toxic materials.

Research and Development

Research and development (R&D) in the water transportation industry is an essential element in the nation's efforts to remain competitive in world markets. Improvements in ship building, in productivity, in state-of-the-art cargo handling systems and in terminal operations resulting from R&D efforts, all contribute to U.S. maritime industry advances. The R&D process for the maritime industry includes the development and application of hardware, operations and information management systems. Research also includes an investigation of the laws and government policies impacting water transportation to ensure that the U.S. maritime industry is not handicapped by needless rules and regulations. High R&D costs are creating barriers to innovations in marine terminal equipment and facilities, in dredging and disposal of dredged material techniques, in repair or renovation of locks and dams, in ship design and operation, in the clean-up of hazardous materials like the oil spill near Valdez, and in the prevention of spills through improvements in handling techniques of hazardous materials.

Major Recommendation

Research and Develoopment

- AASHTO believes that Congress should establish and fund an integrated Research and Development Program for water transportation. The Navy, Coast Guard, Corps of Engineers and the Maritime Administration should coordinate their research efforts within this National R&D Program to ensure the most cost effective use of their individual R&D resources.

Waterfront Development Pressures

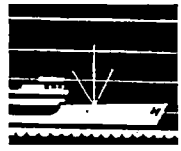
Urban development pressures along waterfront properties have made it difficult for water-related industries to find suitable, affordable locations. These industries include marine construction, dredging, towing, ship repairs and ship servicing vital to the water industry. In some areas, port operations were being affected by a lack of land needed to sustain growth. More efficient use of port properties is an important area for future development. Through more efficient cargo handling and storage methods, the ports would require less land area to accommodate future expansions.

Recreational boating is beginning to interfere with commercial navigation on the nation's waterways. The maritime industry must work to ensure that redevelopment of waterfront areas and the increased recreational usage of the nation's waterways does not impede commercial navigation or endanger pleasure boaters.

Major Recommendation

Waterfront Development Pressures

- AASHTO encourages the Federal Government to investigate methods to increase the efficiency and capacity of existing port terminals and their inland connections. AASHTO also encourages the development of a national recreational boater education/safety program specifically aimed at operations near ports and commercial vessels.



Chapter 6
Research, Development, and Technology Transfer (RD&TT)

Part I

Introduction

The nation's transportation system is a complex, dynamic network of physical facilities, operations, and management practices. This system for moving people and goods is essential to domestic productivity, international competitiveness, and quality of life. Today, faced with crowded, deteriorating facilities, transportation professionals struggle to reverse the decline in the nation's mobility by finding innovative ways to provide safe and efficient movement of people and goods under increasingly difficult conditions. Transportation research, development, and technology transfer (RD&TT) are important weapons in this struggle.

There are strong linkages between transportation research and technological development; between technology and innovative practice; and between innovation and the quality of our transportation system.The nation's existing multi-billion dollar transportation system must be protected, and the opportunities for a more effective system must be developed using new technologies only available through research.

Historical Background

An early milestone in transportation research occurred almost 100 years ago, when, in 1893, the Office of Road Inquiry was established by the U.S. Department of Agriculture to investigate road-building methods and to disseminate information. Through the years, a strong federal-state partnership developed in the highway research area in particular. A major portion of current highway research activities is supported by the Highway Trust Fund through the Highway Planning and Research (HP&R) program, which, since 1944, has provided that 1.5 percent of federal-aid apportionments may be used only for planning or research.

Those who have worked in the transportation industry during the last 30 years have been part of a process that produced an unprecedented rate of change in the amount, variety, and complexity of transportation services and facilities. Most would agree that there has been more progress in transportation during this century than in the total prior history of mankind, and most of this progress has resulted directly from technological innovation made possible by research.

In recent years, the nation has seen rapid innovation in many fields -- such as the space program, national defense, health care, environmental protection, and communications; and of many kinds--technological, managerial, and operational. In the years ahead, it may be technology that exerts the greatest influence on the health of our transportation system. It is clear that the pace of technological change is so rapid that no industry can be stagnant and remain effective. The rapidly changing environment for both freight and passenger travel presents an array of challenges. Emerging problems, more varied needs, regional differences, deregulation, the changing economy, and resource constraints are making new demands on RD&TT. At the same time, evolving computing, control, and communications technologies suggest opportunities for improved products, service, safety, and mobility.

Issues

It is essential that the needs and opportunities for transportation innovation include consideration of not just research (both fundamental and applied) but also development, education, technology transfer, and other activities needed to bring about improvements in practice, both in administrative as well as technical activities.

Starting early in 1989, AASHTO's Standing Committee on Research undertook an effort (1) to evaluate the issues that will affect the future of highway and transportation research, (2) to recommend positions for consideration by AASHTO, as part of the Association's Transportation 2020 program, and (3) to consider current and prospective programs of research and provide AASHTO with the information needed to determine priorities. This effort was particularly timely and important in the light of changes expected in transportation research programs with the expiration of current federal-aid highway and transit legislation in 1991. It is clear that, although the most pressing need is for AASHTO to be prepared to discuss the role of federal legislation in the future of highway research, it is important also to consider sources of funding other than federal and to evaluate research needs in modes other than highways.

AASHTO must focus on two issues: First, is the nation investing adequately in transportation research for the long term to sustain the enabling technology? Second, are priorities among transportation RD&TT opportunities determined in a way that will best advance the transportation system? These would be important issues even if the budget climate were better. In a period of limited resources, there is an even greater premium on making well-informed budget allocations.

Funding of RD&TT

Many urgent researchable problems remain to be solved, and there is a general recognition that research has provided useful, cost-effective solutions in the past. Nevertheless, transportation research budgets continue to be inviting targets for those who must limit the expenditure of public funds. Because research is usually seen as a discretionary expenditure, and because the products of research are in the future and sometimes difficult to quantify, it is easy to reduce or eliminate research budgets for short-term savings.

The rate of spending on research and development in the United States is not keeping pace with other industrialized nations. The estimated ratio of civilian R&D expenditures to Gross National Product in 1985 for Japan was 2.8; for West Germany--2.5 and for the United States--1.8. With these kinds of statistics, it is not surprising that the National Council on Public Works Improvement found that ". . . the level of effort and resources applied to infrastructure research and development in the United States falls far short of current as well as future requirements."

Spending on highway research currently constitutes only about 0.2 percent of the nation's highway expenditures--a level of effort judged by most experts to be inadequate. This very low level of R&D investment for highways is more clearly understood when it is compared even with low technology industries, such as building materials, mining, and textiles, which, relative to their sizes, spend on the average more than eight times as much as the highway industry does.

Furthermore, in comparison to highways, research spending on problems of concern to AASHTO in the other modes (aviation, railroad, transit, and water) is extremely low.

Although the current level of transportation RD&TT funding is low, there is increasing interest and support for research within AASHTO and its member departments. In response to a recent survey of member departments, Chief Administrative Officers answered that the ideal level of funding to support vigorous and effective research programs in their states would require an average increase of 61 percent.

AASHTO recognizes the high levels of uncertainty, risk, and opportunity associated with the outlook for highway and transportation research following the expiration of the 1987 Surface Transportation and Uniform Relocation Assistance Act (STURAA). More than 80 percent of the funds expended on highway research are derived from the Highway Trust Fund (HTF) through federal-aid apportionments. Given the likelihood that future federal-aid legislation will include provisions substantially different from the current act, the consequences for transportation research programs must be anticipated, and steps must be taken to ensure that the nation has the kind of transportation research programs needed after 1991.

Coordination of RD&TT

If the nation is to have an effective transportation system for the 21st century, research is needed; and, if research is to be effective, limited resources must be appropriately distributed and effectively applied. There is a pressing need for a national agenda for comprehensive transportation research in the U.S. This new agenda must accommodate and balance the needs of both the individual modes and the system as a whole.

The nation's transportation research system is a complex array of interrelated programs. This complexity, which flows from the decentralized nature of the nation's transportation system, threatens the credibility and support for the system, and it creates a risk that inadequate coordination among programs might lead to undesirable gaps or duplication in the total research effort.

Barriers to innovation must be overcome if research is to be effective. These barriers can stem from such factors as organizational inertia, and fragmentation of funding and policy responsibilities, and can block the pursuit and application of innovative solutions to transportation problems. The decentralized nature of the transportation industry, with diverse geographic, economic, political, and technical characteristics, results in a variety of problems in initiating and executing research programs. Fragmentation makes it difficult for research to address problems that cut across the various modes of infrastructure. Proper coordination enhances the capabilities of all involved.

Transportation 2020--RD&TT

As part of the Transportation 2020 process, the AASHTO member departments and AASHTO's Advisory Committee on Highway Policy sponsored 65 public forums--at least one in every state--seeking broad testimony on the nation's surface transportation needs looking toward the year 2020. A report, titled *Beyond Gridlock*, was prepared summarizing the results of these forums. The nation's need for research to enable surface transportation to meet the needs of the next century emerged as a topic of substantial interest in the Transportation 2020 forums. Speakers from colleges, universities, scientific organizations, and the public sector called for more emphasis on the nation's research effort.

Recognition of RD&TT as an important component of AASHTO's vision for transportation in the next century is also reflected in the AASHTO report, *Keeping America Moving, The Bottom Line*, and in TRB Special Report 220, *A Look Ahead - Year 2020*, which summarizes the 1988 Conference on "Long-Range Trends and Requirements for the Nation's Highway and Public Transit Systems."

AASHTO's Standing Committee on Research has produced a comprehensive report, *Innovation - AASHTO Strategy for Research, Development, and Technology Transfer*, which outlines the desirable scope, scale, organization, and funding for future transportation RD&TT and recommends specific actions by AASHTO. The *Innovation* report includes detailed discussions of subjects that will be crucial to future transportation research.

Some 22 research areas are described in the report, and the priority assigned to each area is indicated based on a survey of AASHTO member departments.

The report contains a thorough discussion of state-level and national-level RD&TT programs of interest to AASHTO and its member departments. In addition to a detailed analysis of highway programs, separate sections are included on RD&TT activities related to public transportation, railroads, aviation, water transportation, and intermodal issues. The roles of the major highway RD&TT programs are defined, and the means of coordinating highway research activities are discussed.

The report includes a major section on RD&TT funding--its scale, distribution, and sources--and contains recommendations to meet AASHTO's needs after 1991. The report concludes with a strategy intended to bring about greater innovation through transportation RD&TT. The strategy is organized by specific objectives and includes more than 70 individual action items.

Conclusion

An integral component of any strategy to address critical transportation issues over the long term will be an aggressive RD&TT program. Such a program will be necessary if the United States is to remain competitive in developing and applying new technology. The case to be made for elevating transportation RD&TT as a high priority requiring adequate funding is based not on an assertion that RD&TT is more important than other parts of the transportation agency's mission but rather on the belief that RD&TT is essential to that mission.

Part II

Policy Goals and Recommendations

In developing and operating transportation facilities, AASHTO member departments need access to accurate information, efficient equipment, and innovative procedures, which can only be provided through an effective system of research, development, and technology transfer. The AASHTO Standing Committee on Research has identified seven goals that must be accomplished in order to reach the desired level of innovation.

Highway Research and Development Programs

Goal: Preserve and enhance the current system of highway research and development programs.

Highway Research is comprised of four major programs: State-level programs, the National Cooperative Highway Research Program (NCHRP), the Strategic Highway Research Program (SHRP), and the Federal Highway Administration (FHWA) program. These programs are distinguished by the functions they carry out.

State-level programs, which collectively account for more than one-half of all highway research, development and technology transfer (RD&TT) expenditures, are characterized by their dedication to solving problems at the state level.

The National Cooperative Highway Research Program, since 1962, has enabled the states to leverage their resources by cooperatively funding applied research on national-level highway problems selected by AASHTO. The program places a strong emphasis on meeting the research needs of AASHTO committees.

The Strategic Highway Research Program is an AASHTO-sponsored program focused on six specific technical areas of major financial importance to highway agencies. Only the Long Term Pavement Performance component of SHRP is designed to extend beyond 1992.

The Federal Highway Administration's program of RD&TT is defined by FHWA's responsibilities and operating characteristics and includes: (1) applied research on national level problems related to the agency's mission, (2) high risk, high payoff studies requiring a longer term effort, (3) fundamental research to provide a solid technological base for highway innovation, and (4) leadership in transferring highway technology.

These four programs comprise a productive system of highway research activities that maintains an effective balance of fundamental and applied research, short-term and long-term research, and various problem areas of both local and national interest.

Major Recommendation

- AASHTO believes that member-department research activities should be expanded to provide for more effective problem solving at the state level.
- AASHTO also believes that the National Cooperative Highway Research Program should be continued and expanded for applied research on problems shared in common by state highway agencies and on other problems of national significance.
- AASHTO also believes that, to derive full benefit from the member departments' investment in the Strategic Highway Research Program's Long Term Pavement Performance program, this component of the SHRP program should be sustained for 15 years beyond 1991.
- AASHTO further believes that the Federal Highway Administration's program of RD&TT should be expanded to enable this program to more fully execute its role in fundamental research and technology transfer.

Intelligent Vehicle-Highway Systems

Goal: Develop and demonstrate intelligent-vehicle highway technology as an effective means of addressing many of the problems on the highway network.

The most prominent new initiative in highway research is emerging with growing interest in the application of new and advanced technology for improvements in highway operations and safety. Many transportation researchers and industry professionals believe that new vehicle-highway applications of microelectronics and advanced communications systems hold the promise of increasing the capacity, service level, and safety on the nation's highways.

Examples of intelligent vehicle-highway systems include: the use of "real-time" data in the operation of large area traffic signal systems; advanced forms of in-vehicle displays of traffic information and routing guidance; advanced systems for automatic traffic control, automatic vehicle identification, weigh-in-motion, and satellite position finding; vehicle-mounted systems such as radar obstacle detection and braking, automatic anti-lock braking, electronic failure detection, steerable headlights, infrared imaging systems for low visibility, and driver impairment detection systems; and dual mode vehicles, operating under fully automated control on dedicated highway lanes and under manual control on conventional highways.

Major Recommendation

- AASHTO believes that Congress and the Administration should establish and support an adequately funded national program to develop and demonstrate intelligent vehicle-highway systems.

RD&TT - All Modes

Goal: Ensure that AASHTO's member departments are able to use RD&TT to develop innovative solutions to problems in all modes of transportation.

Very little research is conducted at the state level on problems related to aviation, public transportation, railroads, and water transportation. Nevertheless, member departments face numerous problems in these modes that could benefit from research.

Aviation research is needed by AASHTO and its member departments to improve security and safety, increase efficiency, and ameliorate environmental impacts. Promising areas include: traffic control technology, airports, weather technology, landside capacity, and access.

Public transportation issues that continue to require research include human resources management, service configuration and marketing, service delivery models, internal efficiencies, maintenance, equipment, and financing.

Railroad research areas of interest to the states include: line abandonments and the effect on essential rail service for goods movement, support and technical assistance for short line railroads, and safety for passenger and freight transportation.

About 80 percent of the states are affected by water transportation issues. This area encompasses inland and intercoastal waterways as well as port facilities. Research in planning, finance, operations, and management of water resources and facilities continues to be needed.

Major Recommendation

- AASHTO believes that the Federal Highway Administration's research program should be considered as a model for other transportation modes in conducting research requiring longer term, larger funding, and special expertise.

- AASHTO also believes that appropriate federal modal administrations within the U.S. DOT should consider AASHTO's interests in the development of federally funded research programs.

- AASHTO believes that consideration should be given to creation of a cooperatively funded research program in each transportation mode modeled after the NCHRP. In particular, AASHTO should work with the Urban Mass Transportation Administration, the American Public Transit Association, the Transportation Research Board, and others to advance the prospects for a research program that would have federally mandated set-aside funding and that would address AASHTO's research needs as recommended in TRB Special Report 213, *Research for Public Transit, New Directions.*

- AASHTO further believes that the Federal Aviation Administration should consider the initiative currently being discussed within the aviation community to establish a National Cooperative Aviation Research Program.

RD&TT - Intermodal Issues

Goal: Ensure that intermodal issues that need to be researched are not overlooked because they do not fall clearly under the scope of a single mode.

The concept of intermodal movements has revolutionized freight transportation. Likewise in passenger transportation, where intermodal issues are considered, great benefits are realized by the public in reduction of congestion and travel delay, in decreasing costs, and in increasing mobility. Intermodal transportation brings with it critical research needs, but there is presently no stable home to locate research projects. A number of research needs relate to intermodal issues. For example:

- Eliminating railroad clearance obstructions and improving highway and rail access to ports.

- Assessment of the transportation impacts of new technology and new container services, e.g., 4,500-container-capacity ships, dedicated double-stack trains, land bridge services, and domestic containerization.

- Effects of computerization on the movement of freight and the operation of intermodal container transfer terminals.

- Integration of intercity rail terminals and urban transit systems.

Currently, intermodal research is performed by whichever mode perceives it has a dominant role in the topic, and only if that mode has research funding. Unfortunately, however, intermodal research too often is left undone because it is not perceived as central to the mission of the mode or because funds for research are reserved only for use in one mode and cannot support other modes.

AASHTO is one of the few organizations which recognizes the needs in this emerging area and has done something about it by creating the Special Committee on Intermodal Issues. The committee is an appropriate body to identify research needs related to the intermodal challenges facing the member departments.

Major Recommendation

- AASHTO and other transportation organizations and agencies should identify intermodal problems that might benefit from research. AASHTO believes that if an intermodal problem includes a substantial highway component, it should be considered for submittal as a candidate for NCHRP funding.

- AASHTO believes that when interest in an intermodal research need is shared by several member departments, it should be evaluated as a candidate for pooled funding using a system modeled after the relevant parts of AASHTO's Joint Development process and other pooled fund efforts.

Application of Technology

Goal: Accelerate the application of new technology to solve transportation problems.

No research-related activity is of more concern to research program administrators, budget and financial planning officers, and highway program administrators than is technology transfer. The process of successfully moving research results from the laboratory to practical technology employed in the field as standards of practice is a vital part of the transportation research system.

Technology currently used in many parts of the transportation system does not represent the state of the art. For many reasons, engineers and other transportation officials are careful in adopting new solutions to recurring problems. It is important that AASHTO assist in accelerating the pace of technological evolution, by helping to ensure that information is spread and shared systematically. This objective will take on even greater importance with the arrival of SHRP research results.

Private sector investment in highway-related research is small and diminishing in recent years as a result of numerous disincentives; it has been directed generally toward the development of new construction equipment, materials, and scientific instrumentation. Any truly effective research strategy for the future must include meaningful involvement by the private sector. Barriers such as those related to procurement procedures and testing requirements must be eliminated where possible.

Major Recommendation

- AASHTO believes that the FHWA and other modal administrations of the U.S. Department of Transportation should increase their implementation activities for the purpose of moving thoroughly evaluated technology into practice. Technology assistance programs, training, demonstration and experimental projects, and related activities should be continued and expanded.

- AASHTO further believes that obstacles to the private sector's introduction of innovations into the highway market place should be eliminated, and that recent initiatives by regional Associations of State Highway and Transportation Officials and the FHWA need to be extended to explore more effective mechanisms for testing, evaluating, and reporting on new highway products and materials for the purpose of reducing the time and cost of technology introduction and to encourage industry to invest in R&D for highway markets.

Coordination of RD&TT

Goal: Ensure that the necessary organizational framework and coordination exist for each research program to carry out its role efficiently and for the total transportation RD&TT system to be fully effective.

The transportation RD&TT system, having evolved to fit the decentralized nature of the industry it serves, can give the appearance of being a fragmented, uncoordinated enterprise. This perception is an obstacle to obtaining the support of transportation administrators who need to be convinced that research is focused on high priority problems, is coordinated, and is free of unnecessary duplication. One way of ensuring coordination is by defining clear roles for the major programs.

Each of the major research programs addresses most, if not all, technical areas in its research projects. The determination as to which program provides a "home" for a project sometimes depends on where a champion for that project is found and where the funding for that project is available. In the highway mode, the role of the major research programs has evolved as a result of the responsibilities and characteristics of the managing organizations. Although the same technical areas are often addressed by each of the programs concurrently, multiple attacks emphasizing different aspects of a common problem area can be effective. There are many research needs and opportunities that will be important to AASHTO in both the short and long term. Member departments will determine priorities for their own state-level programs, and AASHTO committees should have a strong voice in setting the agenda for national programs (NCHRP, SHRP, and FHWA). The activities of AASHTO's Standing Committee on Research, its Research Advisory Committee, and the Research Liaison Representatives recently appointed by AASHTO's committees, will all be important in determining priorities for the transportation RD&T programs of AASHTO, TRB, FHWA, other federal agencies, and the private sector. In particular, the Research Advisory Committee can play an important role in establishing priorities for state-level research by ensuring that information on current federal-aid and state-funded research is available through a more effective database.

Major Recommendation

- AASHTO should expand its activities aimed at identifying new research opportunities and ensuring that member departments' interests are reflected in research priorities for national-level programs.

- AASHTO believes that the member departments should have a strong voice in setting the nation's transportation research agenda. The states through AASHTO should continue to provide the vision and guidance that will permit transportation research programs to address future needs and opportunities as well as current problems. The states should be responsible for setting research goals and priorities.

- AASHTO believes that improvements in computerized information systems will continue to be needed to minimize the possibility of undesirable duplication of research. AASHTO should take a lead role in working with the Federal Highway Administration, the Transportation Research Board, and other appropriate organizations to develop a database of domestic publicly funded research project information--for proposed, in-progress, and completed studies.

- AASHTO further believes that activities of the newly formed Highway Research Coordinating Council should be continued to ensure that major sponsors of highway research are aware of each other's programs and will work together for a more coordinated system.

Funding For RD&TT

Goal: Provide an appropriate level and a stable source of funding for transportation research, development, and technology transfer programs, and ensure that resources are distributed for maximum effectiveness.

Funding for RD&TT has not kept pace with the growing needs and opportunities for technological innovation in the transportation industry. Highway research spending as a share of total highway program expenditures is currently about 0.20 percent--far less than even "low-tech" industries devote to developing new technology. Regrettably, the transit industry and other modes are currently without significant research and development programs aimed at the problems of operating agencies.

Funding levels for RD&TT have been trending downward at a critical time when the transportation system is maturing and rehabilitation programs requiring new cost-effective technology are underway. Research funding should not be allowed to decrease at a time when the infrastructure crisis and the need to rebuild our nation's highways and other transportation facilities cry out for technological advancements.

The nation's transportation system is organized in a decentralized manner; operation is divided among thousands of federal, state, county, city, and private organizations. Decentralized industries tend to underspend on research, and the federal involvement is needed to provide a focus to encourage and support innovation. For example, federally supported highway research activities have been an important part of the federal-state highway partnership, for almost 100 years. Although less than 20 percent of the nation's highway expenditures are paid using federal aid through the highway Trust Fund, more than 80 percent of the nation's highway *RD&TT* expenditures are supported by the Trust Fund.

Because research is frequently seen as a discretionary expenditure, and because the returns on research investments are in the future and are difficult to quantify, it is easy to reduce or eliminate spending for short-term savings.

The essential elements of the current federal-state partnership in highway RD&TT should be retained in future legislation for continuation of transportation programs. Federal agencies should continue to play important roles in the planning and administration of RD&TT programs of national interest.

Formula-based allocations (e.g., Highway Planning and Research funding) controlled by operating agencies have proven to be an effective method of earmarking a stable, dependable flow of funds, maintaining RD&TT interest and support, and assisting the transfer of technology. Such an arrangement ensures that the nation's transportation research investment is focused on emphasis areas that closely correspond to the most pressing needs of the transportation community.

Major Recommendation

- AASHTO believes that the recent decline in transportation RD&TT spending should be reversed to reflect current needs and opportunities, and to bring the scale into line with research spending in other industries, with transportation RD&TT spending in other developed countries, and with past levels of transportation RD&TT spending in the U.S.

- AASHTO believes that funding of transportation research of national significance is a basic responsibility of the Federal Government in its leadership role in advancing new technologies to serve the public and in its fiduciary role in utilizing national resources efficiently. Federal funding, through federal user taxes, should continue to be a principal source of funding for research to permit needed technological advancements to occur.

- AASHTO believes that allocation of federal-aid funds for support of transportation RD&TT should be based on specified formulas applied to annual apportionments.

- AASHTO also believes that specific amounts should be allocated annually, and matched equally by private-sector and other participants, for a coordinated public/private program to develop and demonstrate intelligent vehicle-highway systems.

- AASHTO further believes that funding for the Highway Planning and Research program, FHWA's RD&TT activities, and the IVHS program should be derived from federal-aid highway allocations before the split into the categorical and flexible programs recommended by AASHTO.

Commentary

The following discussions were considered by the Board of Directors/Policy Committee in approving this AASHTO Report, and are regarded as guiding principles for their associated policy recommendations.

FEDERAL HIGHWAY FUNDING LEVEL (page 3-14)

AASHTO should articulate the full *The Bottom Line* report needs as the real expression of what is needed for the nation's highway system, and that the Federal Government should be a significant and reliable partner in helping to meet those needs.

In recognition of the federal budget deficit problems, AASHTO recognizes that the necessary increase in the dollar size of the federal highway program from the current inadequate levels may need to be gradual and incremental.

Therefore, AASHTO has proposed that the federal highway program funding commitment start at a modest level in fiscal year 1992, and then be gradually increased so that by fiscal year 1995 the federal responsibility for *The Bottom Line* report needs on the nation's highways is maintained at the minimum levels experienced in 1987--54% of the highway system of national significance and 32% of the flexible highway program. Such a gradual expansion of federal funding could be:

FY 1992	$17.6 billion
FY 1993	19.6 billion
FY 1994	22.7 billion
FY 1995	25.9 billion

Current federal tax resources extended over the four years - annual revenues, interest earnings, scheduled termination of the gasohol exemption, and accumulated balances--are sufficient to finance the proposed 1992 and 1993 programs, including the opportunity for states to make use of their apportionment balances. However, additional revenues will be required before the start of fiscal year 1994 in order to sustain the higher program levels.

FEDERAL TRANSIT FUNDING LEVEL (page 3-14)

Federal funding levels for public transportation capital projects would be increased to $3.5 billion in FY 1992 and would rise annually, reaching $5.0 billion in FY 1995.

In recognition of federal budget problems, the recommended funding levels have been constrained, particularly in the first year, with funding gradually rising to a more desireable level by FY 1995.

The $5.0 billion level is only a mid-range between the high and low capital investment requirements identified in AASHTO's *The Bottom Line* report as adjusted for inflation. The $3.5 billion beginning level is approximately mid-way between the current federal capital spending of $1.9 billion and the FY 1995 target of $5.0 billion.

Full use of the funds in the Mass Transit Account of the Highway Trust Fund should be made, and the balance in the Account should be expended. This will delay the need for additional revenues.

Accomplishments possible under this recommended federal program include keeping pace with rehabilitation/replacement needs on existing systems, upgrading the nation's vehicle fleeet to a more desirable standard (primarily by decreasing average vehicle ages), and continuing funding for system expansion (new starts) at the FY 1989 amount. This level does not fund transit growth to (1) maintain market share; (2) expand service in new or poorly served urban and rural areas; (3) meet new national goals, such as serving the disabled or achieved clean air mandates; or (4) undertake the projects allowed under AASHTO's broadened definition of project eligibility.

PUBLIC TRANSPORTATION DISTRIBUTION FORMULA (page 3-14)

Mass Transit Account (MTA) funding in excess of current funding levels would be distributed 50 percent by the Section 9 formula and 50 percent by total population. The formula would include a hold-harmless provision so that if future general fund appropriations for Section 9 are reduced below the FY 1989 level (as in the case of increased MTA funding merely substituting for general funds), MTA formula funds equal to the size of the Section 9 appropriation reduction would first be distributed 100 percent by the Section 9 formula.

As with other federal transit funds, MTA formula funds would be allocated directly to transit funding recipients in areas over 200,000 population and would be allocated to the states for fair and equitable distribution to urban areas under 200,000 and to rural areas. MTA formula funds would lapse after a given time be returned to UMTA for redistribution.

HIGHWAY SYSTEM OF NATIONAL SIGNIFICANCE (page 3-15)

The highway system of national significance should include the existing Interstate and Defense Highway System and some portion of the principal arterial system as redefined.

Redefinition of the national system needs beyond the Interstate is required because of the lack of uniformity across the states in the identification of the existing principal arterial system, and will require a cooperative and rigorous effort between AASHTO and the FHWA. In redefining the highway system of national significance AASHTO and FHWA will, if possible, initially designate a system within a range of between 150,000 and 180,000 centerline miles. AASHTO and the FHWA should develop consistent criteria to be used by states in designating principal arterial routes.

Within the mileage limit, states are encouraged to identify existing routes and new corridors within their boundaries, beyond their current portion of the existing Interstate System, which would comprise a national system, considering at least the following criteria:

- Serve interstate and international commerce and travel
- Provide for national defense needs
- Enhance economic vitality and international competitiveness
- Provide service to all portions of the nation

- Respond to changing population and travel patterns over time through an objective review process.

The identification of the highway system of national significance would be a cooperative effort between AASHTO and FHWA. The states would submit their potential routes through AASHTO to FHWA. In response, FHWA would be given an appropriate amount of route mileage to assign in order to ensure system rationalization and route connectivity. The new highway system of national significance should result in a nationally consistent, state designated, federally approved system plan.

COMPLETION OF THE INTERSTATE (page 3-16)

AASHTO has historically supported the Interstate and Defense Highway System as the major focus of the federal-aid highway program.

AASHTO has historically supported the rehabilitation and preservation of the Interstate and Defense Highway System as an ongoing need of the nation's highway system.

AASHTO has historically supported the timely completion of the Interstate and Defense Highway System by 1991.

AASHTO recognizes that there is an obligation to fully compensate the states which acted in good faith in exchanging approved Interstate highway portions for substitute highway and transit projects.

AASHTO, in its Transportation 2020 effort, supports the continuing federal-aid highway program focus on the rehabilitation and preservation of the Interstate and Defense Highway System.

AASHTO, in its Transportation 2020 effort, supports capacity improvements on the existing Interstate and Defense Highway System.

AASHTO, realizing that the cost to complete the approved sections of the existing Interstate and Defense Highway System as defined in the 1989 Interstate Cost Estimate (ICE) and to fund the currently approved and committed Interstate Substitution projects may exceed the funding committed through 1991, strongly supports the prompt funding and completion of the remaining Interstate and Interstate Substitution commitments.

DISCRETIONARY BRIDGE PROGRAM (page 3-16)

Although a significant number of bridges have been improved in recent years under the bridge replacement and rehabilitation program and the regular federal-aid programs, the nation's bridge improvement needs remain extensive. As of June 1988, 8,195 bridges on Interstate highways, 35,022 bridges on other arterial highways, and 62,733 bridges on collector highways, were classified as deficient or obsolete. Despite the authorization of over $10 billion in federal-aid since 1982 for replacement and rehabilitation of bridges, the proportion of the Nation's bridges that are classified as being deficient or obsolete increased over the 1982 to June, 1988 period.

AASHTO's report, *The Bottom Line*, estimates that at least $4 billion per year is needed to address bridge needs.

Recognizing this critical and growing need to provide for the maintenance, repair and/or replacement of bridges on the nation's highway systems, the members of the AASHTO Policy Committee voting in workshops during their July, 1988 meeting identified "Bridge Needs" as one of the highest ranked objectives for the highway program. Based upon the voting process used in the workshops it was voted second in importance only to System Maintenance among the seven highway objectives voted upon.

While routine bridge needs can probably be addressed by each state using their formula apportionments of categorical and flexible funds there is a need to ensure that the states can and will finance the needed rehabilitation, replacement or capacity supplementation of major structures, which because of their high costs, might not be fundable under an annual formula apportionment.

Since 1978, the states had identified 217 large deficient bridges (total cost almost $7 billion) which are too costly to replace or rehabilitate from formula apportionments of Federal funds. These states requested help in funding these projects from the existing Discretionary

Highway Bridge Replacement and Rehabilitation Program. Because of the limited funding available through June 30, 1988, the FHWA was only able to provide funding for 107 of these identified projects in 45 states, leaving over 100 of these costly projects without an identified source of funding. The list of large costly bridges which will age and deteriorate over the next few years and require replacement, rehabilitation or capacity supplementation can be expected to grow.

In response to criticism that Discretionary Bridge grants were being dispensed as "pork barrel" and not directed to the most urgent needs, the FHWA has developed a sophisticated formula which is used to rank eligible candidate bridges and set priorities for funding. This formula can be modified to ensure that the limited available funds will be used cost-effectively to address the most critical structural and capacity needs on a priority basis.

To address these "lumpy" and difficult to finance critical needs the following is proposed:

(1) A separate funding source of up to 2 percent of the amounts made available from the Highway Trust Fund to finance the proposed Total Highway Program to adequately finance a continued Discretionary Highway Bridge Replacement and Rehabilitation Program; and

(2) The rehabilitation or replacement of structurally or capacity deficient bridges on any public highway, including capacity supplementation through construction of a parallel structure, costing more than $10 million or 10 percent of any state's annual apportionments for the proposed Categorical and Flexible Highway Programs, whichever is less, shall be eligible for funding under the program; and

(3) The selection of projects shall be in accordance with priorities established by FHWA using a rating system for the Discretionary Bridge Replacement and Rehabilitation Program which takes into account both structural and capacity deficiencies, with consideration given to balance among the states.

HIGHWAY PROGRAM TRANSITION CONSIDERATIONS (page 3-16)

While the AASHTO Policy Committee has acted on all significant policy proposals for the next federal surface transportation act, there are still a number of important matters to consider in the transition

from a still incomplete, many categorized old federal highway program to a new streamlined program. Study and resolution methods are required to:

1. Implement the AASHTO policy for funding and completion of the remaining Interstate highway and substitution commitments.

2. Allow states to readily make use of their accumulated apportionment balances in the event that obligation limits were to be continued in the next federal act.

3. Smoothly move from the old federal program to the new program.

4. Assure that accumulated apportionment balances remain available to the states for transportation purposes.

At the appropriate time, a cooperative effort of the states and Federal Highway Administration should be organized to study and appropriately resolve these transition matters.

MASS TRANSIT ACCOUNT EQUITY (page 3-16)

1. A stable federal revenue source must continue to be available to all areas, urban and rural, to fund extraordinary public transportation capital needs that cannot be accommo dated from regular formula funds.

   The need for extra funding to undertake non-routine capital projects occurs throughout the nation. All areas should continue to have access to adequate discretionary funding to meet such needs.

2. The current MTA funding commitment to rail and bus modernization as well as committed new start projects should be retained.

   Current transit funding falls significantly short of meeting transit needs nationwide. A restructuring of the MTA that does not protect current programs could have a serious impact on transit systems that have major capital projects already underway or otherwise depend on continued MTA funding.

3. Discretionary MTA revenues should be distributed on the basis of rational, objective project selection criteria.

   There will always be limited resources to meet all of the nation's public transportation needs. The challenge is to meet those needs in the most effective manner, based on objective considerations.

4. All MTA revenues should be fully appropriated.

   Since the MTA was established in 1983, appropriations from the account have been substantially below levels that can be supported. As a result, the balance in the MTA has been growing while badly needed transit capital needs have gone unmet. Revenue from this funding source should be fully available for public transportation purposes.

5. Funding from the MTA above current amounts appropriated for bus and rail modernization and committed new start projects should include a broad-based distribution plan.

To achieve consensus on the MTA and to address public transportation needs in all areas of the nation - from urban to rural areas - any additional revenues must be broadly and fairly distributed with particular emphasis on rural public transportation which has been severely underfunded in the past.

6. Funding from the MTA above current amounts appropriated for bus and rail modernization and committed new start projects should emphasize a flexible, broadened definition of public transportation projects.

   The nation's changing mobility needs can best be met through a variety of services and approaches which include some forms of high occupancy and shared ride services.

URBAN AND RURAL HIGHWAY ELEMENTS (page 3-17)

AASHTO supports strong state and local decision-making in the prioritizing and programming of surface transportation projects.

AASHTO finds that the split between urban and rural surface transportation needs varies greatly from state to state.

AASHTO finds that solutions to surface transportation problems vary greatly from one urban area to another, as well as from one rural region to another.

AASHTO believes that all urban and rural surface transportation needs can be addressed under one of the following: a) urban mobility, b) suburban congestion, c) rural access, d) modal interlinks.

AASHTO believes that state and local flexibility will allow these varying surface transportation needs, occurring within the various states, to be met in the most productive manner.

AASHTO understands that some states and local governments desire the development of urban and rural surface transportation elements.

AASHTO will continue its strong support, evidenced in its policy recommendations, for the flexibility of decision-making, prioritizing and programming at the state and local levels.

AASHTO is willing to consider the merits of any proposed urban and rural elements which include sufficient flexibility regarding state and local transfer of funding and priorities among urban and rural needs at state and local discretion.

HOLD HARMLESS PROVISION (page 3-20)

The AASHTO Board of Directors/Policy Committee adopted the following policy at its December 4, 1988 meeting in Wichita, Kansas:

"Through a hold harmless provision, no state should receive less than the current highway program would provide in 1991, as if all states had completed their Interstate highway systems."

This policy statement is interpreted to mean that:

(1) In fiscal year 1992 (or in whatever year the new federal program is fully implemented) all states are guaranteed to be apportioned and receive at least the same federal-aid highway dollar amounts as they received in fiscal year 1991 from:

- Interstate completion (each state receives one-half percent of the apportioned amount)
- Interstate 4R
- Primary
- Secondary
- Urban
- Bridges
- Metro Planning
- Hazard Elimination
- Rail-Highway Crossings
- Minimum Allocation

(2) Unusual, disparate amounts would not be included in the hold harmless amount. Therefore, dollar amounts for Interstate Construction above one-half percent, Interstate Substitution, and discretionary and/or demonstration project funding would not be included.

Appendix

THE AASHTO TRANSPORTATION 2020 PROGRAM

The purpose of this Appendix is to describe the origins and overall activities of the AASHTO Transportation 2020 Program through October, 1989, leading to the publishing of the Final Edition of the AASHTO report *New Transportation Concepts for a New Century*. It needs to be recognized that the Transportation 2020 Program is not completed, and that AASHTO's Transportation 2020 effort will continue into 1990 and possibly beyond.

Part I. Introduction

Founded in 1914, the Association has throughout its history been engaged in the development of transportation policy to guide the development of America's transportation system, from the state perspective. Initially concerned only with highways, in 1973 the Association expanded its activities to all transportation modes. Following this expansion of its purview, the Association developed and adopted its first comprehensive recommendations on National Transportation Policy in 1974, a document that has been updated since. In addition to developing an overall National Transportation Policy, the Association has adopted policy statements and resolutions addressed to each of the modes and related transportation issues , which is an ongoing activity.

The effort leading to the *New Transportation Concepts for a New Century report* began in 1986, when an AASHTO Task Force on Highway Finance was created. This Task Force proceeded to organize a national conference on state highway financing considerations and methods that was held in August, 1986, at Smuggler's Notch, Vermont, which resulted in publication of a January, 1987 AASHTO report titled "Understanding the Highway Finance Evolution/Revolution." With this project completed, the Task Force then turned to the future of the nation's highways and the Federal-aid highway program. This resulted in a proposal to the AASHTO Policy Committee in early 1987 to establish what has become the Transportation 2020 program.

The initial recommendation to the Policy Committee was to concentrate only on the future of the highway program. The Policy Committee broadened the effort to also include public transportation, and on February 20, 1987 adopted a resolution that committed the Association to:

> "...undertake to develop and implement a strategy for achieving public and private sector consensus on, and commitment to, a redirected national highway and transportation program that will address transportation needs and federal, state, and local roles well into the 21st Century."

The February 20 resolution reconstituted the Task Force on Highway Finance as the Task Force on a Consensus Transportation Program, and approved an overall work plan. The work plan included as a goal developing and implementing a new consensus on the future of the nation's surface transportation program, working in conjunction with other major national organizations concerned about the nation's transportation system and its future.

Under the adopted work plan, AASHTO proceeded to create an Advisory Committee on Highway Policy (ACHP), appointing representatives from nearly 30 public and private sector organizations to its Steering Committee, and Lester P. Lamm, President of the Highway Users Federation, as chairman.

The Association also proceeded to initiate organization of the Transportation Alternatives Group (TAG), as a mechanism to develop a consensus among 12 principle organizations concerned with the nation's highway and public transportation policy. The President of AASHTO appointed Thomas W. Bradshaw, Jr. of North Carolina as acting chairman of the TAG, and after organization of the TAG was completed in November, 1987, the 12 TAG organizations named him chairman. During early 1987 AASHTO also developed and adopted a logo and named the effort the Transportation 2020 program, and extended use of the logo and name to the TAG and the ACHP, as well as AASHTO.

Within AASHTO, the Task Force on a Consensus Transportation Program proceeded to organize a number of committees from the Association's member departments, and established cooperative working relationships with the Federal Highway Administration and the Urban Mass Transportation Administration, in addition to a large number of other organizations.

In 1988, AASHTO decided to expand its Transportation 2020 effort to include the other modes, and undertook activities to examine aviation, rail and water transportation needs and policies. The work on these additional three modes was assigned to the respective AASHTO Standing Committees on Aviation and Water Transportation, and the AASHTO National Conference of State Railway Officials (NCSRO). In 1989 a further expansion of AASHTO's Transportation 2020 program occurred, when an analysis of research needs was undertaken by the AASHTO Standing Committee on Research and preparation of a comprehensive report accomplished.

As envisioned by AASHTO, the Transportation 2020 Program is a multi-year initiative, organized into a four-phase process. Phase I was to examine transportation needs and issues, which AASHTO has nearly completed, and Phase II was to develop alternatives to meet transportation needs and challenges, and to make recommendations. The publication of the Final Edition of the *New Transportation Concepts for a New Century* report concludes Phase II for AASHTO. Phase III is to reach consensus regarding the best transportation program for the nation, and through the TAG and related efforts this Phase is well along. Phase IV is to work to implement new National Transportation Policy and a new surface transportation program, and this Phase is now underway. The overall focus of this effort is the year 2020, as the name for the Program implies, with a major interim target being the next authorization of a Surface Transportation Assistance Act by the U.S. Congress. The surface transportation program is currently authorized through fiscal year 1991.

A major factor leading to AASHTO's initiation of the Transportation 2020 Program was the pending completion of the Interstate and Defense Highway System. Construction of this 44,000 mile system was started in 1956 and has provided a major focus for the nation's surface transportation system for the past 33 years. The 1987 Surface Transportation and Uniform Relocation Assistance Act (STURAA) was intended to provide the final federal construction funding for completion of the Interstate system. With completion of construction on the Interstate system near, transportation leaders in AASHTO and other organizations agreed upon the need to examine the nation's transportation system through the next thirty year horizon.

A second factor which led to the Transportation 2020 Program was the difficulty in obtaining passage of the 1987 STURAA. This legislation passed only after the Congress was able to override a Presidential veto by one vote. Transportation leaders realized that they needed to work together more closely to develop a consensus-oriented transportation program for consideration by the members of Congress and the Administration.

Part II of this Appendix details activities that have thus far been conducted under the Transportation 2020 Program. Part III provides a list of publications available from AASHTO that have been

produced under the Program, which were utilized in the preparation of the Final Edition of the *New Transportation Concepts for a New Century Report.*

Part II. Summary of Major Transportation 2020 Program Activities

1. AASHTO Policy Committee

As described in Part I, the AASHTO Policy Committee, which consists of the Chief Administrative Officers of the 52 AASHTO member departments of highways and transportation, approved a resolution in February, 1987 that led to establishment of the Transportation 2020 Program. Since then it has taken several actions and has been a strong participant in a number of Transportation 2020 activities. As indicated in item 5 below, AASHTO Policy Committee members provided leadership for the 65 Transportation 2020 public forums held throughout the nation by the Advisory Committee on Highway Policy, for example.

The principle work of the AASHTO Policy Committee concentrated on the development and approval of the *New Transportation Concepts for a New Century* document. Through a survey distributed in May, 1988 the Policy Committee members identified key transportation issues. Through workshop sessions held in July, 1988 at Itasca, Illinois, the Chief Administrative Officers further defined the key issues, and assigned them priority. The results of this activity were summarized and used as a working document by the Task Force on a Consensus Transportation Program, along with the input from a number of other Transportation 2020 activities, to develop the first edition of the *New Transportation Concepts for a New Century* report, which was approved by a two-thirds vote of the AASHTO Policy Committee in December, 1988 at the AASHTO Annual Meeting in Wichita, Kansas.

First and second sets of revisions and additions to the December, 1988 report were then developed by the Task Force, and were approved by a two-thirds vote of the AASHTO Policy Committee at its February, 1989 and July, 1989 meetings, respectively, and resulted in revised editions published under those respective dates. The Task Force then developed a final set of revisions and additions to the report, which were considered and adopted by the Policy Committee in October, 1989 during the AASHTO Annual meeting in Atlanta, Georgia. The vote in Atlanta was nearly unanimous.

2. Task Force on a Consensus Transportation Program/Related Committees

Following the passage of the February, 1987 resolution by the AASHTO Policy Committee, the President of AASHTO proceeded to appoint members to the Task Force on a Consensus Transportation Program, with Charles L. Miller, Director of the Arizona Department of Transportation, as chairman. The Task Force is composed of two representatives from each of the four AASHTO regions as well as the chairmen of the AASHTO modal committees, including the Standing Committees on Highways, Public Transportation, Aviation, and Water Transportation and the National Conference of State Railway Officials. In addition, the chairman of the Standing Committee on Planning is a member of the Task Force.

The Task Force and its related committees/subcommittees, in conjunction with the AASHTO Standing Committees, have developed needs assessments and policy recommendations regarding the nation's future transportation program.

The major working committee of the Task Force on a Consensus Transportation Program is the Policy Review Committee (PRC). This Committee is composed of a senior level staff person to each of the AASHTO Chief Administrative Officers serving on the Task Force, and has held many meetings around the country in the process of developing needs assessments and policy recommendations for consideration by the Task Force.

The major subcommittees of the Policy Review Committee include the following:

1. Highway Technical Advisory Committee (HTAC)
2. Modal Technical Advisory Committee (MTAC)
3. SCOP Task Force on a Consensus Transportation Program
4. Subcommittee on Economic Expansion and Development
5. Task Force on a Highway System of National Significance
6. Task Force on Highway Finance and Funding Allocation
7. Task Force on Transit Equity/Task Force on Transit Finance and Funding Allocation

Over 50 meetings of the Task Force, the PRC and its subcommittees and task forces have been held since 1987, in addition to a number of telephone conference calls. These meetings have involved the Chief Administrative Officers of the AASHTO member departments and/or senior level staff representatives. A brief description of the activities of each of the above listed subcommittees and task forces of the PRC follows:

Highway Technical Advisory Committee (HTAC) - This committee participated in the assessment of highway needs through the year 2020 as reported in *The Bottom Line* report, including drafting Appendix 1, "Highway Needs, Structural Issues and Highway Operations."

Modal Technical Advisory Committee (MTAC) - This committee developed needs assessments for public transportation and modal interlinks through the year 2020 as reported in *The Bottom Line* report, including drafting Appendix 2, "Public Transportation Needs" and Appendix 3, "Modal Interlink Needs for Air, Water and Rail."

SCOP Task Force on a Consensus Transportation Program - This group, selected from the AASHTO Standing Committee on Planning (SCOP), assisted in the data collection efforts of the Policy Review Committee, particularly with regard to new facilities and local road needs.

Subcommittee on Economic Expansion and Development - This subcommittee is examining the linkages between transportation and economic productivity/development. Recommendations from this subcommittee are included in Chapter 1 of the *New Transportation Concepts for a New Century* report. Additional activities are underway through this subcommittee, including a research project under the AASHTO-sponsored National Cooperative Highway Research Program (NCHRP), a project with the National Chamber Foundation and the Eno Foundation, and further activities to bring together the public and private interests in transportation and economic productivity.

Task Force on a Highway System of National Significance - This Task Force worked to further define the AASHTO policy recommendation to establish a Highway System of National Significance (HSNS). As identified by the AASHTO Policy Committee in February, 1989, the HSNS is proposed to include the Interstate system and a portion of the Principal Arterial System as redefined.

The Task Force, working in cooperation with the Federal Highway Administration (FHWA), held a series of meetings and regional workshops. A process was developed through which the states submitted a proposed Principal Arterial system and proposed alternatives for an HSNS. This information serves as a guide as to what such a system would look like. Further work with FHWA and local governments would be needed if this concept is included in the next highway authorization legislation.

Task Force on Highway Finance and Funding Allocation - This Task Force, through a series of conference calls and meetings, examined alternative factors for the distribution of highway funds as well as funding levels for the FY 1992 to 1995 period and made recommendations to the Policy Review Committee.

Task Force on Transit Equity/Task Force on Transit Finance and Funding Allocation - The Task Force on Transit Equity examined the current distribution of the Mass Transit Account of the Highway Trust Fund and alternatives to the current distribution. This work was then followed by the work of the Task Force on Transit Finance and Funding Allocation, which did further analysis and made recommendations to the Policy Review Committee regarding the distribution of transit funds, transit funding levels for the FY 1992 to 1995 period, and a broadened definition of public transportation for the use of Mass Transit Account funds allocated to the Flexible Transit Program.

3. AASHTO Standing Committees

In September, 1988, the chairmen of the AASHTO Standing Committee on Aviation, Standing Committee on Water Transportation, and the National Conference of State Railway Officials were requested by the President of AASHTO to begin work on needs assessment reports and policy recommendations for their respective modes comparable to the Transportation 2020 activities being completed for highways and public transportation. The policy recommendations developed for aviation, rail and water transportation were forwarded to the AASHTO Policy Committee for consideration, and the actions of the Policy Committee resulted in the recommendations included in Chapters 2, 4 and 5 respectively of the final edition of the *New Transportation Concepts for a New Cenutry* report.

In October, 1989 at the meeting of the AASHTO Policy Committee in Atlanta, needs reports for aviation and rail transportation were presented by the Standing Committee on Aviation and the National Conference of State Railway Officials to the Policy Committee, for consideration and approval. The reports, respectively titled *Beyond the Horizon: The Future of the Nation's Air Transportation System, 1988-2020* and *Railroad Perspectives: A Summary of Railroad Industry Major Concerns and Trends for 1988-2020*, were both approved for publication.

The Standing Committee on Water Transportation is developing its needs assessment as well, and is completing its report for consideration by the AASHTO Policy Committee in the coming months.

In early 1989, the AASHTO Standing Committee on Research initiated an effort to examine research needs and to make recommendations in conjunction with the Transportation 2020 program. A report was prepared entitled *Innovation: A Strategy for Research, Development, and Technology Transfer*, and was approved for publication by the Policy Committee in a mail ballot. The Standing Committee also made recommendations to the Policy Committee, for consideration with regard to inclusion in the *New Transportation Concepts for a New Century* report. The Policy Committee adopted the recommendations, with minor amendments, resulting in the recommendations included in Chapter 6 of this report.

4. Advisory Committee on Highway Policy

In addition to the organizations represented on the Steering Committee of the Advisory Committee on Highway Policy, the ACHP now includes a large number of cooperating organizations forming an overall coalition of more than 100 public and private sector organizations. The major activity of the ACHP was in helping sponsor the public forums and producing the *Beyond Gridlock* report described in item 5, all done under the leadership of Lester P. Lamm and with strong staff support from the Highway Users Federation.

The ACHP has been actively involved in a number of Transportation 2020 activities and has provided input to AASHTO and other organizations throughout the Transportation 2020 process. It has also functioned in the consensus building effort. During the summer of 1989, members of the ACHP responded to a 38 question survey regarding key transportation issues, designed to identify areas of consensus. Over 50 organizations responded to the survey and provided their positions regarding present and future issues associated with surface transportation.

5. Public Forums/*Beyond Gridlock* Report

As an initial Transportation 2020 activity under Phase I of the work program, 65 public forums were held around the nation in 1987 and 1988 under the overall sponsorship of the Advisory Committee on Highway Policy and the member departments of AASHTO. Chief Administrative Officers of the AASHTO member departments and their staffs were actively involved in organizing the forums, usually in conjunction with representatives of the Highways Users Federation. A large number of individuals and organizations expressed their concerns regarding transportation needs and issues, with over 2,300 persons making presentations at the forums. Attendance at the forums exceeded 9,000. A report entitled *Beyond Gridlock*, which summarizes the highlights of these forums, was produced by the ACHP with staff support from the Highway Users Federation, and was distributed by the Federation and AASHTO, from whom copies may be obtained.

6. Futures Conference

Another initial Transportation 2020 activity under Phase I was a Futures Conference held by the Transportation Research Board (TRB) in June, 1988 to examine transportation-related issues to the year 2020, including fuel availability, air quality, demographics, changes in vehicle related technology and related subjects. The Conference was financed jointly by AASHTO, the Federal Highway Administration and the National Association of Regional Councils, and the Transportation Alternatives Group was a cooperating sponsor. A report entitled *A Look Ahead: Year 2020* published by and available from TRB presented the findings of that conference.

7. Transportation Alternatives Group (TAG)

As noted in Part I, AASHTO took the lead in organizing the Transportation Alternatives Group (TAG), with eleven other major organizations. The TAG was established to provide a forum for the development of consensus on major transportation issues, and was funded with contributions from the sponsoring organizations and a large number of other persons and organizations in the private sector. Stephen C. Lockwood was engaged to serve as TAG Executive Director, under the direction of Chairman Thomas W. Bradshaw, Jr. and the members of the TAG Executive Committee. The 12-member organizations of the TAG are:

AASHTO

American Automobile Association

American Public Transit Association

American Public Works Association

American Trucking Associations

Highway Users Federation

National Association of Counties

National Association of Regional Councils

National Conference of State Legislatures

National Governors' Association

National League of Cities

U.S. Conference of Mayors

Organization of the TAG was completed on November 11, 1987, and it has engaged in an extensive series of meetings since then to discuss transportation issues and move toward consensus positions. The TAG has produced two documents to date, and will be releasing a third document in the near future. The first document is the "TAG Issue Statement", which discusses issues collectively identified by TAG members for consideration in the development of future national surface transportation policy and programs.

The second document is entitled "Basic Directions for a New National Surface Transportation Program," and represents an initial staff consensus of TAG member organizations on the major policy themes to serve as a point of departure for subsequent detailed program development.

The third document, to be released in the near future, is the result of a staff level effort to reach consensus on a number of issues, followed by a meeting of the leadership of the TAG member organizations at Hunt Valley, Maryland on October 13-14, 1989. The senior officials attending the Hunt Valley meeting examined the consensus positions reached by the staff and refined these consensus positions.

Consensus was reached among the TAG member organizations regarding the following issues:

- Program Orientation

  Federal Program Focus/Priority
  Federal-Aid Program Structure
  Nature and Extent of "National Highway System"
  Flexibility of Urban, Suburban and Rural Programs
  Specific Program Issues
    Safety
    Bridge Replacement and Rehabilitation
    Systems Productivity (Operations and Management Emphasis)
    Freight/Trucking Operations
    Intermodal Access and Integration
    Air Quality
    Scenic Byways
    Intercity Passenger Rail and Bus
    Research, Development and Technology Transfer

- Intergovernmental Roles and Responsibilities

  Decision-making: Level, Style and Process
  Funding Allocation and Recipients

- Investment Level and Sources

  Level of Federal Investment and State/Local Matching

This TAG consensus development, in addition to its long-range focus, provides positions for consideration by the member organizations of the TAG, and also by others, including the U.S. Department of Transportation in the development of its National Transportation Policy, and by the Congress in the development of the next surface transportation authorization.

In addition to the TAG members, several other organizations concerned with transportation issues serve on a Chairman's Advisory Committee (CAC), and provide additional information and raise issues for consideration by the TAG.

8. Transportation 2020 Implementation Team

At the AASHTO Annual Meeting held in Atlanta, Georgia in October, 1989, the AASHTO Policy Committee endorsed the establishment of an AASHTO Transportation 2020 Implementation Team, to help with the Phase IV implementation effort. The Transportation 2020 Implementation Team, in conjunction with the AASHTO Task Force on a Consensus Transportation Program, is to engage in a research and education program in support of the Transportation 2020 program.

RELATED ACTIVITY

U.S. Department of Transportation National Transportation Policy

While formal separation has existed between the Transportation 2020 Program and efforts of the U.S. Department of Transportation (U.S. DOT) to develop federal transportation policy, a high degree of cooperation has existed.

After Samuel Skinner became Secretary of Transportation, in 1989 he initiated a broad and intense effort to develop a National Transportation Policy. AASHTO and those engaged in the Transportation 2020 Program have contributed to and assisted Sec. Skinner's effort.

AASHTO and its member departments have provided input to the U.S. DOT as that department works toward the development of a National Transportation Policy scheduled for release in January, 1990. Chief Administrative Officers of AASHTO member departments and their staffs have provided testimony at the series of meetings sponsored by U.S. DOT around the nation, and AASHTO staff has attended meetings held in Washington, D.C. to discuss the AASHTO Transportation 2020 program with U.S. DOT.

Copies of the Transportation 2020 reports developed by AASHTO were provided to each of the members of the six market cluster groups organized for the U.S. DOT effort. These transportation market cluster groups include:

Urban/Suburban Transportation

Rural Transportation

Intercity Freight Transportation

Intercity Passenger Transportation

International Transportation

Innovation and Human Factors in Transportation

AASHTO will continue to provide Transportation 2020 information to the U.S. Department of Transportation for consideration as its National Transportation Policy is developed.

Part III. AASHTO Transportation 2020 Program Publications

The following reports and publications have been produced through 1989 by AASHTO under its Transportation 2020 Program effort. Copies can be obtained from AASHTO, within limits of stock.

"Understanding the Highway Finance Evolution/Revolution", 1987, AASHTO.
(Single copies at no cost. Multiple copies at $5.00 each)

Beyond Gridlock, 1988, Advisory Committee on Highway Policy.
($4.95 each)

The Bottom Line, 1988, AASHTO, Full Report.
(Single copies at no cost. Multiple copies: 2-50, at $5.00 each; 51-100 copies, at $2.50 each; and 101+ copies, at $2.00 each)

The Bottom Line, 1988, AASHTO, Executive Summary Only.
(Single copies at no cost. Multiple copies at $1.00 each)

Appendix 1: Report of the AASHTO Transportation 2020 Highway Technical Advisory Committee (HTAC): Highway Needs, Structural Issues, and Highway Operations, 1988, AASHTO.
(Single copies at no cost. Multiple copies at $2.00 each)

Appendix 2: Report of the AASHTO Transportation 2020 Modal Technical Advisory Committee (MTAC): Public Transportation Needs, 1988, AASHTO.
(Single copies at no cost. Multiple copies at $2.00 each)

Appendix 3: Report of the AASHTO Transportation 2020 Modal Technical Advisory Committee (MTAC): Modal Interlink Needs (Air, Water and Rail), 1988, AASHTO.
(Single copies at no cost. Multiple copies at $2.00 each)

Transportation Safety in 2020, 1989, AASHTO.
(Single copies at no cost. Multiple copies at $2.00 each)

Railroad Industry Perspectives: A Summary of Railroad Industry Major Concerns and Trends for 1988-2020, 1989, AASHTO.
(Single copies at no cost. Multiple copies: 2-50, at $5.00 each; 51-100 copies, at $2.50 each; and 100+ copies, at $2.00 each)

Beyond the Horizon: The Future of the Nation's Air Transportation System, 1988-2020, 1989, AASHTO (final edition under preparation).
(Single copies at no cost. Multiple copies: 2-50, at $5.00 each; 51-100 copies, at $2.50 each; and 100+ copies, at $2.00 each)

Innovation: A Strategy for Research, Development, and Technology Transfer, 1989, AASHTO.
(Single copies at no cost. Multiple copies: 2-50, at $5.00 each; 51-100 copies, at $2.50 each; and 100+ copies, at $2.00 each)

New Transportation Concepts for a New Century, 1989, AASHTO, Full Report.
(Single copies at no cost. Multiple copies at $2.00 each)

New Transportation Concepts for a New Century, 1989, AASHTO, Executive Summary Only.
(Single copies at no cost. Multiple copies at $1.00 each)