1999 Status of the Nation's Highways, Bridges and Transit: Conditions and Performance

Report to Congress



U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

May 2, 2000

The Honorable Albert Gore, Jr.
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

The enclosed report to Congress entitled Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report is submitted in accordance with the requirements of Section 502(g) of 23 United States Code (U.S.C.) and Section 308(e) of 49 U.S.C., for the highway and transit portions, respectively. This report also incorporates as Appendix A, the Interstate Needs Study required by Section 1107(c) of the Transportation Equity Act for the 21st Century. The analyses contain condition, performance, and investment information on the Nation's highway, bridge, and transit systems.

This report provides the Congress with an objective appraisal of highway, bridge, and transit physical conditions, operational performance, finance, and future investment requirements. It highlights the need to maintain our commitment to infrastructure investment to keep our highway and transit systems functioning effectively. Recognizing the close relationship between an efficient transportation system and economic productivity, this Administration has increased our emphasis on maintaining and improving our transportation infrastructure over the past several years. In light of the Nation's growing transportation needs, the Department has moved aggressively to find ways to stretch the Federal dollar. These include streamlining Federal programs, using innovative financing techniques to attract private investment to transportation, and adopting new technologies.

The unique contribution of this report is its analysis of future national investment requirements to meet the anticipated demand in both highway travel and transit ridership. An average annual highway capital investment by all units of government over the next 20 years of $56.6 billion could maintain the 1997 physical conditions and make worthwhile expansion and enhancement improvements. To make all beneficial highway improvements would require an average annual investment of $94.0 billion. The average annual investment required to maintain the same physical conditions and operating performance of our Nation's transit systems is $10.8 billion. The average annual cost to improve transit conditions and performance is estimated to be $16.0 billion.

The physical condition of our Nation's highway system continues to improve, while congestion, particularly in the largest urban areas, is still a concern. The condition of the urban bus fleet remains adequate, while the condition of the heavy rail fleet has declined.

All levels of government spent $101.3 billion for highways and bridges in 1997, an 8.4 percent increase over 1995. Of this total, $48.7 billion was for capital improvements. Governments also spent $25.1 billion for transit, of which $7.6 billion was for capital improvements.

In keeping with the principles of the Transportation Equity Act for the 21st Century, this report is evidence of the Department's commitment to an intermodal view of the Nation's transportation system. Combining information about our highways, bridges, and transit provides decision makers with a valuable intermodal perspective as we seek to make the best use of each mode in satisfying our Nation's growing transport requirements. We look forward to continuing the intermodal perspective in this report series so that the Department can provide the breadth of information needed to deal with our ever increasing and complex transportation requirements.

An identical letter has been sent to the Speaker of the House, the Chairmen and Ranking Minority Members of the Senate Committee on Environment and Public Works, the Senate Committee on Banking, Housing, and Urban Affairs, and the House Committee on Transportation and Infrastructure.

Sincerely,

Rodney E. Slater

Enclosure

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INTRODUCTION

This is the fourth in a series of combined biennial documents prepared by the Department of Transportation which satisfy requirements for reports to Congress on the condition, performance, and future capital investment requirements of the Nation's highway and transit systems. This report incorporates highway and bridge information required in 1999 by Section 502(g) of Title 23 United States Code (U.S.C.), as well as transit system information required in 2000 by Section 308(e) of Title 49 U.S.C. This edition also includes the results of a study on Interstate Needs required by Section 1107(c) of the Transportation Equity Act for the 21st Century (TEA-21).

Beginning in 1993, the Department combined two existing report series that covered highways and transit separately to form this report series. Prior to this, eleven reports had been issued on the condition and performance of the Nation's highway systems, starting in 1968. Five separate reports on the Nation's transit systems' performance and conditions were issued beginning in 1984.

Report Purpose

This document is intended to provide Congress and other decision makers with an objective appraisal of highway, bridge and transit finance, physical conditions, operational performance, and future investment requirements. This report offers a comprehensive, factual background to support development and evaluation of legislative, program, and budget options at all levels of government. It also serves as a primary source of information for national and international news media, transportation associations, and industry.

This report consolidates conditions, performance, and finance data provided by States, local governments, and mass transit operators, to provide a national level summary. Some of these underlying data are available through the Department's regular statistical publications. The future investment requirements analyses are developed specifically for this document and provide national level projections only. The Department does not project future investment requirements for individual States or localities.

Report Changes

Section 5102 of TEA-21 designated the highway and bridge portion of this document as the "Infrastructure Investment Needs Report," and required several changes in the content. This edition of the report has responded to these requirements by adding estimates of the current backlog of cost-beneficial highway and bridge projects, and adding a table to each chapter that

directly compares the key statistics from the current report with those from the 1997 edition. An investment requirements scenario showing the costs of maintaining the physical conditions of the highway system has been added, to improve comparability of this report to the 1993 and 1995 versions and to the bridge and transit investment requirements scenarios.

Highlights of the Report

The ***1999 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*** report to Congress continues in the tradition of this series, providing the American people with an important national perspective on the physical and operating characteristics of the highway, bridge, and transit portions of our Nation's intermodal transportation system. The Report draws together information on multiple aspects of the systems, which not only describes the systems but also provides indicators of their performance and contribution to our vital national interests and quality of life. Further, it characterizes the financial resources applied to these systems to date and the future investments necessary if they are to perform as designed and complement other national efforts to improve productivity.

Strikingly obvious is the immense scale of these systems: the extent to which the facilities themselves stretch across the Nation, representing the net result of technology and financial investments made over the past century; the sheer magnitude of the demands placed on these systems by a people for whom mobility is basic to their existence; the transportation services provided every day, around the clock; and the collective commitment necessary to maximize the benefits of these assets. The picture that comes through reflects achievements reached and goals still being strived for.

Key findings of the report include:

- Although most of our citizens are highly mobile, the findings of the latest National Personal Transportation Survey (NPTS) show there are disparities in transportation system usage among groups within our society. This indicates that significant barriers to mobility persist for people with disabilities, the elderly, low-income households, recent immigrants, and people of color.
- The priority of safety is reflected in the inclusion of safety statistics in the report as an indicator of system performance. The reduction in the fatality rate from 25.9 per 100,000 population in 1966 to 15.7 per 100,000 population in 1997 in an environment where licensed drivers grew by nearly 80 percent and automobile travel has grown by 177 percent is impressive. However, with 42,013 deaths and 3.35 million injuries in 1997, and rates per 100 million vehicle miles traveled (VMT) of 1.6 deaths and 131 injuries, significant opportunities for improvement remain.
- The balance among jurisdictional ownership, functional class, and location of highways and bridges has been relatively stable, with public road mileage overwhelmingly local and rural. With VMT increasing on every functional system, usage trends reinforce the dominance of travel in urban areas. Interestingly, from 1995 to 1997, rural highway VMT growth outpaced urban highway VMT growth at 7.2 percent as opposed to 4.1 percent in contrast to the 10-year trend in favor of urban travel growth.
- Transit system route mileage shows a 10-year increase of 44.2 percent in rail service and 10.4 percent in non-rail service. Service capacity, measured in bus-equivalent vehicle revenue miles, increased 22.4 percent for rail, while non-rail capacity increased 17.1 percent over the period. After declining slightly between 1987 and 1993, passenger travel on public transit

showed renewed growth between 1993 and 1997, as rail passenger miles increased by 18.3 percent and non-rail passenger miles increased 3.8 percent. In 1997, rail transit accounted for nearly 53 percent of passenger miles while providing 50 percent of vehicle capacity operating on just 5 percent of the Nation's transit route miles.

- Overall, highway system conditions as measured by pavement condition, ride quality, alignment adequacy, and bridge ratings are improving although they fluctuate by location and functional class. The estimated average condition of the urban bus fleet is adequate, and has been relatively constant for the last decade. Rail vehicle conditions have declined since 1987, due primarily to the deterioration of the Nation's heavy rail fleet. The condition of other rail capital assets has improved since the mid-1980s, reflecting the rehabilitation and replacement of these assets and the investments in new rail systems and extensions.
- Capturing the quality of operational performance, as represented by various measures of traffic congestion, is very difficult. However, there is a strong recognition of the significance of congestion to transport safety, cost, and time as the reliability of the system decays. Measures of congestion differ in whether congestion is getting better, worse, or is continuing about the same. Measures of travel density clearly show increasing density, in travel per lane mile. However, the effect of this increase in density is less clear. A traditional measure of congestion, the volume/capacity ratio during the peak hour has remained at about the same value in urban areas for the past decade. Delay per vehicle mile of travel, which was added to the report this year, is intended to capture the effects of congestion throughout the day. This measure is available only for the past 4 years. Over these past 4 years, overall urban delay per VMT has increased. However, for the past 2 years, this measure has decreased. Whether this 2-year track is the beginning of a trend remains to be seen. More work is needed to develop a useful metric of congestion that will be consistent, credible, and feasible to collect.

Public investment in surface transport is at its highest level ever. All units of government, including Federal, State and local jurisdictions, share the responsibility of developing and maintaining our transportation systems. The private sector is also involved in certain toll roads and transit systems.

- All levels of government spent $101.3 billion for highways and bridges in 1997, an 8.4 percent increase over 1995. Of this total $48.7 billion was for capital improvements, a 10.2 percent increase. The Federal government contributed 41.1 percent of the capital outlay, down from 44.5 percent in 1995.
- All levels of government spent $25.1 billion for transit, a 5.5 percent increase over 1995. Of this total $7.6 billion was for capital improvements, an increase of 8.6 percent. Fares and other system generated revenues were 33 percent of total revenues. In 1997, contributions from the Federal government accounted for 54 percent of transit capital expenditures, 27 percent of public funding for transit, and 18 percent of total system revenues. Each of these percentages represented a slight increase in the federal share relative to 1995.

The unique contribution of this report is its analysis of future national investment requirements to meet the anticipated demands in both highway travel and transit ridership. The analysis focuses on two sets of investment requirement scenarios, and identifies the impacts of investment levels on various system performance benchmarks. These projections are developed using economics-based analysis tools described in detail for highways, transit, and bridges.

- If average annual capital investment on highways and bridges by all levels of government for the next 20 years reaches $56.6 billion in 1997 dollars, it is projected that the physical conditions of highways and bridges would be maintained. This level of investment would not maintain the same level of operational performance. This estimate includes a mix of preservation, expansion, and enhancement improvements intended to attain the highest possible level of benefits for highway-users, while achieving the goal of maintaining pavement and bridge conditions. An additional $3.5 billion would be required annually to maintain user costs at the current level. Maintaining travel times at current levels would require an additional $17.1 billion. To accomplish all beneficial improvements to the highway and bridge systems is estimated to take an average annual investment of $94.0 billion.
- The estimated average annual investment required to maintain the same physical conditions and operating performance of our Nation's transit systems as in 1997, by replacing and rehabilitating deteriorated assets and expanding capacity to accommodate expected transit passenger travel growth, is $10.8 billion. The cost to improve conditions and performance is estimated to be $16.0 billion.
- Capital spending on highways and bridges would need to rise 16.3 percent above 1997 levels to reach the $56.6 billion projected as the "Cost to Maintain" the physical conditions of highways and bridges. Over the life of TEA-21, this difference is expected to decline to 5.7 percent. Capital spending on transit would need to increase 41.0 percent to reach the $10.8 billion projected as the "Cost to Maintain" transit systems. This difference is expected to decline to 12.9 percent over the life of TEA-21. To reach the level of the investment requirements to "improve" the systems would require an increase in capital spending of 92.9 percent for highways and bridges and 110.2 percent for transit.
- If average annual highway investment remains at 1997 level in constant dollars over the next 20 years, urban VMT would be expected to grow at an average annual rate between 1.78 and 1.83 percent. Rural VMT would be expected to grow at an average annual rate of between 2.68 and 2.72 percent. Travel growth for urbanized areas over one million population would be expected to grow at an average annual rate of between 1.66 and 1.70 percent. Increased investment would be expected to result in higher travel growth rates. These projections recognize that if additional highway capacity is provided, more travel is expected to occur than if the capacity additions are not provided. If congestion on a facility increases, some travelers will respond by shifting to alternate modes or routes, or will forgo some trips entirely. In the long term, increased congestion may lead to changes in lifestyles and industrial practices. Such adjustments will affect the productivity and economy of the Nation.

Report Organization

In this edition, the four major sections contained in previous versions of the report have been divided into ten smaller chapters, each of which focuses on a narrower topic area. Most chapters begin with a combined summary of highway and transit issues, followed by separate sections discussing highways and transit in more detail. This structure is intended to accommodate report users who may only be interested in one of the two modes. Information that relates to only one of the two modes represented in this report is included in appendices.

- The Executive Summary contains one page of highlights each on the highway and transit components in each chapter;
- Chapter 1 discusses issues relating to personal mobility;

- Chapter 2 describes recent trends in highway and transit demand and system characteristics;
- Chapter 3 depicts current physical conditions of highways, bridges, and transit systems;
- Chapter 4 describes the current operational performance of highways and transit systems;
- Chapter 5 discusses issues relating to the safety performance of highways and transit systems;
- Chapter 6 outlines highway and transit revenues sources and expenditure patterns for all units of government;
- Chapter 7 projects future highway, bridge and transit capital investment requirements under certain defined scenarios;
- Chapter 8 compares current levels of capital investment for highways, bridges and transit with projected future investment requirements;
- Chapter 9 describes the impacts that past investment has had on the conditions and operational performance of highways, bridges and transit systems and predicts the impacts that different levels of future investment would have; and
- Chapter 10 discusses how the projections of future highway and transit investment requirements would be affected by changing the assumptions about travel growth and other key variables.
- Chapter 11 identifies limitations in the current analysis, and raises issues for future discussion.
- Appendix A reports the results of the Interstate System Needs Study required by Section 1107(c) of TEA-21;
- Appendix B provides information about the National Highway System that corresponds to the information provided in Chapters 2-10 for all highways and bridges;
- Appendix C provides information on the condition of NHS intermodal freight connectors;
- Appendix D discusses issues relating to asset management and investment strategies;
- Appendix E provides information on the conditions and performance of Federal Lands Highways;
- Appendix F discusses how Federal highway safety programs work to address the issues raised in Chapter 5;
- Appendix G describes changes in the highway investment requirement methodology;
- Appendix H discusses the costs and benefits of transit; and
- Appendix I includes supplementary technical information on the transit investment requirement methodology.

Highway Data Sources

Highway condition and performance data are derived from the Highway Performance Monitoring System (HPMS), a cooperative data/analytical effort dating from the late-1970s that involves the Federal Highway Administration (FHWA) and State and local governments. The HPMS includes a statistically drawn sample of about 130,000 highway sections. All HPMS data and estimates of future travel demand are provided to the FHWA through State departments of transportation from existing State or local government databases or transportation plans and programs, including those of Metropolitan Planning Organizations (MPOs).

The HPMS data are collected in accordance with the "Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Data Base." This document is designed to create a uniform and consistent database by providing standardized collection, coding, and reporting instructions for the various data items. The FHWA reviews the State-reported HPMS data for completeness, consistency, and adherence to reporting guidelines. Where necessary, and with close State cooperation, data may be adjusted to improve completeness, consistency, and uniformity.

State and local finance data are derived from the financial reports provided by the States to FHWA in accordance with the "Guide to Reporting Highway Statistics." This is the same data used in compiling the annual "Highway Statistics" report. The FHWA adjusts these data to improve completeness, consistency, and uniformity.

Bridge Data Sources

Bridge condition data are obtained from the National Bridge Inventory (NBI), which includes all bridges that are covered by the National Bridge Inspection Standards and are located on a public road. Generally, each bridge is inspected at least once every 2 years, although bridges with higher risks of engineering problems are inspected more frequently, and certain low-risk bridges get less frequent inspections. All bridge information is verified for completeness, consistency and adherence to reporting guidelines.

Transit Data Sources

Transit data are derived from the National Transit Database (NTD). (This information was formerly known as Section 15 data). The NTD includes detailed summaries of financial and operating information provided to the Federal Transit Administration (FTA) by the Nation's transit agencies. The NTD program provides information needed for planning public transportation services and investment strategies. Supplementing this information on transit facilities and fleets with information collected directly from transit operators provides a complete picture of the Nation's transit facilities and equipment.

Investment Requirement Analytical Procedures

The earlier versions of the reports in this series relied exclusively on engineering-based estimates for future investment requirements, which considered only the costs of transportation agencies. This philosophy failed to provide another critical dimension of transportation programs; that is, to provide service to users while minimizing overall costs. Executive Order 12893, *Principles for Federal Infrastructure Investments*, directs each executive department and agency with infrastructure responsibilities to base investments on "...systematic analysis of expected benefits and costs, including both quantitative and qualitative measures...". To address the deficiencies in earlier versions of this report and to meet the challenge of this executive order, new approaches to this analysis have been developed. The analytical tools now used in this report have added an economic overlay to the projection of future investment requirements. These newer tools use benefit/cost analysis to minimize the combination of capital investment and user costs to achieve different levels of highway performance.

The highway investment requirements in this report are developed in part from the Highway Economic Requirements System (HERS) that uses marginal benefit/cost analysis to optimize highway investment. The HERS addresses highway deficiencies by quantifying the agency and user costs of various types and combinations of improvements, including vehicle operating, travel time, and safety costs.

The transit investment analysis is based on the Transit Economic Requirements Model (TERM). The TERM consolidates older engineering-based evaluation tools and introduces a benefit/cost analysis to ensure that investment benefits exceed investment costs. Specifically, TERM identifies the investments needed to replace and rehabilitate existing assets, improve operating performance, and expand transit systems to address the growth in travel demand, and then evaluates these needs on the basis of costs and benefits in order to select future investments.

This report introduces the National Bridge Investment Analysis System (BIAS) which adds an economic component to the bridge analysis. However, the bridge investment requirements still rely in part on an older engineering-based model.

Plans for Future Reports

The Department intends to submit the fifth in this series of combined highway, bridge and transit reports by June 2001. This document will incorporate the highway and bridge information required in 2001 by Section 502(g) of Title 23 United States Code (U.S.C.), as well as transit system information required in 2002 by Section 308(e) of Title 49 U.S.C. This report will be developed utilizing 1999 data.