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## 11th Annual Report Fiscal Year 1977

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Annual Report  
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# Contents

<b>SUMMARY</b> .....	2
----------------------	---

<b>PROGRESS REPORTS</b> .....	8
-------------------------------	---

Office of the Secretary  
 United States Coast Guard  
 Federal Aviation Administration  
 Federal Highway Administration  
 Federal Railroad Administration  
 National Highway Traffic Safety Administration  
 Urban Mass Transportation Administration  
 Saint Lawrence Seaway Development Corporation  
 Materials Transportation Bureau

<b>APPENDIX</b> .....	56
-----------------------	----

National Railroad Passenger Corporation  
 Consolidated Rail Corporation  
 Table I. U.S. Department of Transportation Program Levels, Budget Authority, Obligations, and Outlays, Fiscal Year 1977.  
 Table II. U.S. Department of Transportation Authorized Full-Time Permanent Positions, Fiscal Year 1977.  
 Table III. U.S. Department of Transportation Full-Time Minority and Female Employment, 1968-77.  
 Table IV. Summary of Reported Gas Pipeline Failures and Casualties, Calendar Years 1970-76.  
 Table V. Summary of Reported Gas Pipeline Failures and Casualties, by Type and Cause, Calendar Year 1976.  
 Table VI. Summary of Reported Liquid Pipeline Accidents and Casualties, Calendar Years 1968-76.  
 Table VII. Abstract of Coast Guard Operations Within the Enforcement of Laws and Treaties Program, Fiscal Year 1977.  
 Table VIII. U.S. Coast Guard Financial Statement, Fiscal Year 1977.  
 Table IX. Summary of Active Airpeople, as of December 31, 1975 and 1976.  
 Table X. U.S. General Aviation Accidents, Fatalities, Aircraft Hours Flown, Aircraft Miles Flown, and

Accident Rates, Calendar Years 1966-76.  
 Table XI. U.S. Certificated Route Air Carrier Accidents, Fatalities, Passengers Carried, Passenger Miles Flown, and Fatality Rates, in Scheduled Domestic and International Passenger Service, Calendar Years 1966-76.  
 Table XII. Summary of U.S. Train Accidents and Casualties, Calendar Years 1972-76.  
 Table XIII. Summary of U.S. Rail-Highway Grade Crossing Accidents and Casualties, Calendar Years 1972-76.  
 Table XIV. Summary of U.S. Motor Vehicle Activities and Fatalities, Calendar Years 1967 and 1972-76.  
 Table XV. Summary of U.S. Monthly Traffic Fatalities, Mileage, and Fatality Rates, July 1972 Through June 1977.  
 Figure 1. U.S. Department of Transportation Program Levels, Fiscal Year 1977.  
 Figure 2. U.S. Department of Transportation Authorized Full-Time Permanent Positions, Fiscal Year 1977.  
 Figure 3. Relative Changes in U.S. Traffic Fatalities and Fatality Rates, July 1974 through June 1977.  
 Figure 4. Relative Changes in Highway Fatalities by Principal Categories, Calendar Years 1967-76.

# Contents

## SUMMARY

## PROGRESS REPORTS

Office of the Secretary	1
United States Coast Guard	2
United States Customs Service	3
United States Fish and Wildlife Service	4
United States Highway Administration	5
United States Maritime Administration	6
United States National Highway Traffic Safety Administration	7
United States Transportation Administration	8
United States Army Development Corporation	9
United States Transportation Agency	10

## APPENDIX

United States Coast Guard	11
United States Customs Service	12
United States Fish and Wildlife Service	13
United States Highway Administration	14
United States Maritime Administration	15
United States National Highway Traffic Safety Administration	16
United States Transportation Administration	17
United States Army Development Corporation	18
United States Transportation Agency	19
United States Coast Guard	20
United States Customs Service	21
United States Fish and Wildlife Service	22
United States Highway Administration	23
United States Maritime Administration	24
United States National Highway Traffic Safety Administration	25
United States Transportation Administration	26
United States Army Development Corporation	27
United States Transportation Agency	28
United States Coast Guard	29
United States Customs Service	30
United States Fish and Wildlife Service	31
United States Highway Administration	32
United States Maritime Administration	33
United States National Highway Traffic Safety Administration	34
United States Transportation Administration	35
United States Army Development Corporation	36
United States Transportation Agency	37
United States Coast Guard	38
United States Customs Service	39
United States Fish and Wildlife Service	40
United States Highway Administration	41
United States Maritime Administration	42
United States National Highway Traffic Safety Administration	43
United States Transportation Administration	44
United States Army Development Corporation	45
United States Transportation Agency	46
United States Coast Guard	47
United States Customs Service	48
United States Fish and Wildlife Service	49
United States Highway Administration	50
United States Maritime Administration	51
United States National Highway Traffic Safety Administration	52
United States Transportation Administration	53
United States Army Development Corporation	54
United States Transportation Agency	55
United States Coast Guard	56
United States Customs Service	57
United States Fish and Wildlife Service	58
United States Highway Administration	59
United States Maritime Administration	60
United States National Highway Traffic Safety Administration	61
United States Transportation Administration	62
United States Army Development Corporation	63
United States Transportation Agency	64
United States Coast Guard	65
United States Customs Service	66
United States Fish and Wildlife Service	67
United States Highway Administration	68
United States Maritime Administration	69
United States National Highway Traffic Safety Administration	70
United States Transportation Administration	71
United States Army Development Corporation	72
United States Transportation Agency	73
United States Coast Guard	74
United States Customs Service	75
United States Fish and Wildlife Service	76
United States Highway Administration	77
United States Maritime Administration	78
United States National Highway Traffic Safety Administration	79
United States Transportation Administration	80
United States Army Development Corporation	81
United States Transportation Agency	82
United States Coast Guard	83
United States Customs Service	84
United States Fish and Wildlife Service	85
United States Highway Administration	86
United States Maritime Administration	87
United States National Highway Traffic Safety Administration	88
United States Transportation Administration	89
United States Army Development Corporation	90
United States Transportation Agency	91
United States Coast Guard	92
United States Customs Service	93
United States Fish and Wildlife Service	94
United States Highway Administration	95
United States Maritime Administration	96
United States National Highway Traffic Safety Administration	97
United States Transportation Administration	98
United States Army Development Corporation	99
United States Transportation Agency	100

# Summary

The summary of the report is as follows: The main objective of the study was to determine the effect of the use of the computer on the performance of the task. The study was conducted in a laboratory setting. The participants were divided into two groups: a control group and an experimental group. The control group performed the task without the use of the computer, while the experimental group performed the task with the use of the computer. The results of the study showed that the use of the computer significantly improved the performance of the task. The experimental group completed the task faster and with fewer errors than the control group. The study also found that the use of the computer reduced the time spent on the task. The results of the study suggest that the use of the computer is an effective way to improve the performance of the task. The study was limited by the fact that it was conducted in a laboratory setting. Further research is needed to determine the effect of the use of the computer on the performance of the task in a real-world setting. The study was funded by the National Science Foundation. The authors are grateful to the participants for their contribution to the study. The authors also thank the reviewers for their helpful comments. The authors are currently working on a follow-up study to further investigate the effect of the use of the computer on the performance of the task.

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## Summary

The primary responsibilities of the U.S. Department of Transportation are to assure the coordinated and effective administration of federal transportation policies and to develop national transportation policies and programs conducive to the provision of fast, safe, and convenient transportation at the lowest possible cost. The following paragraphs summarize a few of the Department's fiscal year 1977 activities in carrying out those responsibilities. More detailed accounts of these and other Departmental activities are given in the progress reports which follow this summary.

### Policy

A policy of encouraging emphasis on art and good design in transportation facilities was announced, and the Secretary held a series of meetings to gather information for issuance of a national transportation policy.

### Reorganization

On July 20, 1977, the Secretary announced his plan for reorganization of the Office of the Secretary.\*

### Environmental Protection

Decisions were reached on four transportation projects which had attracted special interest because of their environmental aspects. Two of the projects (I-66 in Virginia and I-478 in New York) were approved. The other two (I-40 in Tennessee and a new St. Louis airport) were rejected.

### Deepwater Ports

Licenses were offered to two applicants to construct, own, and operate deepwater ports in the Gulf of Mexico. One of the applicants, Loop, Inc., accepted the offered license; however, the other applicant, Seadock, Inc., was having trouble securing the necessary financing.

### Liability Insurance

The Department discovered that the high cost of professional liability insurance and construction bonding had become a significant factor in driving up the cost of transportation construction projects. As a result, efforts were begun to find ways to reduce these costs.

\*The reorganization was carried out early in fiscal year 1978 and will be covered in the fiscal year 1978 annual report.

## Maritime

The winter of 1977 was the worst on record for marine commerce. Coast Guard icebreaking vessels logged over 14,000 hours of icebreaking operations and assisted approximately 800 vessels.

A project to improve the positioning of Coast Guard aids to navigation was underway. New positioning methods were developed and personnel were being trained to use them. In addition, construction continued on 13 new Loran-C stations. The new stations, along with 5 existing stations, were to provide Loran-C coverage for the entire coastal confluence zone of the continental U.S., except for the north slope of Alaska.

The Coast Guard began an inspection program to eliminate unsafe vapor emissions and ignition sources on foreign tank vessels entering U.S. waters. The program was the result of conditions found in the course of an investigation of a major casualty involving a foreign tank vessel.

In its boating safety program, the Coast Guard monitored 209 recall campaigns to correct potential safety hazards. In addition, 78 types of boats were tested for compliance with federal safety standards. A total of 44 of the boats failed to meet one or more of the standards.

The Coast Guard Auxiliary conducted boating safety courses for approximately one-half million people and inspected about 350,000 boats. During the year, the Auxiliary assisted almost 56,000 people and was credited with saving 785 lives.

Prince William Sound vessel traffic service regulations became effective in July 1977. A marine safety office was established at Valdez, Alaska, to manage the service.

The airborne oil surveillance system became operational in April 1977. By the end of the fiscal year, it had checked almost one million square miles of ocean and was responsible for legal action taken against a major oil company. Development of an improved sensor for the system was proceeding on schedule.

The 400-foot icebreaker *Polar Sea* was delivered to the Coast Guard, and strengthened propellers were installed on its sister ship, the *Polar Star*. At the end of the year, strengthened propellers were also being installed on the *Polar Sea*. Meanwhile, modifications were being made to the diesel engines aboard the 378-foot high endurance cutters. The modifications were expected to cut fuel consumption by 15 percent.

In January 1977, a contract was awarded for 41 new medium-range search aircraft, to be delivered



## Summary

over a 5-year period. The procurement process also began for 90 new rotary-wing aircraft.

The Coast Guard's shore construction program also continued. Contracts were awarded for 20 major projects totaling \$25.5 million.

Tonnage through the U.S. portion of the Saint Lawrence Seaway rose to a record high of 63.3 million tons. Saint Lawrence Seaway Development Corporation revenues also rose, to a record \$8.6 million.

### Aviation

U.S. air carriers enjoyed one of the safest years ever. The 45 fatalities which were recorded were the fewest since 1954. General aviation also showed an overall improvement in safety, as the accident rate, fatality rate, and total accidents and fatalities all decreased. However, the total number of fatal accidents increased slightly.

During the year, the Federal Aviation Administration conducted a comprehensive review of the factors underlying its mandatory age 60 retirement rule for pilots of large air carrier aircraft. After analyzing the available information on aging and its effect on pilot performance, the age 60 rule was retained.

The Federal Aviation Administration issued a new rule requiring air carriers to establish approved systems for providing weather information to their flight crews. It also issued a rule requiring each air carrier to establish approved procedures for carrying handicapped persons.

The aviation security program continued to be effective. Nearly 2,000 firearms were detected in the passenger screening process, and over 800 of the incidents led to arrests. Five attempts to hijack aircraft were made during the year, but none were successful.

Air traffic activity continued to increase. The Federal Aviation Administration's traffic control centers handled 25.9 million aircraft; and airports equipped with Federal Aviation Administration control towers reported a total of 66.7 million takeoffs and landings.

A modernization program was completed at 20 of the busiest traffic control centers and 63 of the busiest terminals. Enhancement of the modernized facilities began almost immediately, as minimum safe altitude warning and conflict alert systems were added.

A total of 205 grants for airport planning projects were approved during the year. In addition, 757 airport development grants, totaling \$492 million, were approved. Approximately 86 percent of the development grant funds went to air carrier airports.

The Federal Aviation Administration continued to give special attention to aviation noise abatement. Four major airports received grants for noise related land use planning. A rule was issued which will require future aircraft to meet more stringent noise standards than are applicable to current aircraft. In addition, all commercial jet aircraft will be required to meet specific noise standards by 1985.

### Highways

As of September 30, 1977, 91 percent of the 42,500 mile interstate system was open to traffic and 3.7 percent was under construction.

As ways were being sought to speed construction of the final portions of the interstate system, the emphasis of the federal-aid highway program began to shift to the resurfacing, restoring, and rehabilitation of deteriorating highways and bridges. Fiscal year 1977 was the first year in which federal aid was available for restoration work on the interstate system, and \$111 million was obligated for such projects.

Considerable effort was made to improve the energy efficiency of the nation's highway system. For example, the Federal Highway Administration began experimenting with techniques for recycling pavement materials. In addition, almost \$450 million was obligated for projects to improve traffic flow.

A total of \$7.3 billion in federal highway aid was provided during the fiscal year. Approximately 45 percent of this total went to the interstate system. About 22 percent of the total went to non-interstate projects in urban areas, and most of the remainder went to the rural primary and secondary systems.

More than \$195 million in federal aid was obligated for the special bridge replacement program; and \$90 million was made available for emergency road repairs and catastrophe assistance.

About \$500 million in federal aid went specifically for safety related projects. Most of the projects were small, but resulted in significant reductions in the number or severity of accidents.

There were about 45,500 deaths from motor vehicle accidents in calendar year 1976. This was a 2.25 percent increase compared to 1975 and early indications were that the calendar year 1977 totals would be slightly higher. However, the fatality rate (fatalities per 100 million vehicle miles) continued to decline.

The 55 mph speed limit continued to have a favorable effect on the death rate, but efforts to enforce the speed limit were not entirely effective, and average speeds were gradually increasing.



## Summary

In a major policy decision, the Secretary ruled that every automobile sold in the U.S. would have to have some type of automatic crash protection (air bags or passive belts) by model year 1984. The requirements were to be phased in, beginning with large automobiles in model year 1982.

### Railroads

Track defects continued to be the most frequent cause of train accidents. A total of 41.6 percent of all train accidents in calendar year 1976 were attributed to track problems. The next most frequent category, human factors, accounted for only 23 percent.

The Federal Railroad Administration's track geometry inspection program continued for its second year. The program had proven to be an effective way of checking carrier compliance with federal track standards. At the end of the fiscal year, a second inspection vehicle was added to the program.

During the year, the first steps were taken to create an effective rail industry financial analysis system. The purpose was to develop a method for early identification of financial trends in the railroad industry. An important part of the system was to be development of a method to determine the cost of performing all of the various activities involved in operating a railroad.

The Federal Railroad Administration's enforcement activities continued to increase. A total of 20,670 alleged safety violations were resolved; and a total of \$3.4 million in penalties was assessed, an increase of 12.6 percent over fiscal year 1976.

Federal financial assistance to railroads also continued. During the year, the Federal Railroad Administration purchased \$61.9 million in railroad preference shares and guaranteed a \$12 million loan.

Work began on the track and roadbed improvement phase of the northeast corridor improvement project. Approximately 100 miles of track and roadbed were improved. By the end of the year, Amtrak's track improvement labor force had risen to 1,315. Funds were also obligated for the first bridge replacement project (the Woonasquatucket Bridge in Providence, Rhode Island). A total of \$8.7 million was committed to bridge work during the year, and 20 bridges were being improved.

A decision was made to install concrete ties on 400 miles of main line track in the northeast corridor. In addition, new wooden ties were to be installed on 600 miles of track.

Special attention was given to minority business in planning the northeast corridor project. A goal of

15 percent minority participation was established. With planned expenditures of \$1.8 billion, minority participation would be at least \$270 million. Total minority business participation during fiscal year 1977 amounted to approximately \$24 million.

With completion of the Alaska oil pipeline, traffic revenues declined sharply on the Alaska Railroad. Total revenues were down 35 percent compared to the previous year. However, expenses were reduced by more than 27 percent and passenger revenues increased by 3 percent. As a result, the Railroad showed a \$2.2 million positive cash flow for the year.

### Urban Transportation

In a major policy decision, the Secretary decided to require that all urban transit buses purchased after September 30, 1979, be fully accessible to the elderly and handicapped. The decision included the establishment of new bus specifications which were based on the Transbus prototypes developed by the Urban Mass Transportation Administration.

The Urban Mass Transportation Administration also decided to move ahead with its people mover (automated downtown transportation systems) program. Four cities were authorized to develop detailed plans for people mover systems. In addition, seven other cities were authorized to begin people mover planning.

During the year, a total of \$1.7 billion in capital assistance was provided to urban mass transportation systems. The funds went to 221 new projects and 93 continuing projects. A total of \$392 million of the capital funds came from interstate transfer funds.

The bulk of the capital grants (\$1.2 billion) went to rail transit projects. Included were the first light rail cars (streetcars) produced in the U.S. since 1952. The new cars replaced 1930's era cars on the Boston system. Almost all of the remaining capital funds went to bus systems. Only \$7 million went for boats or other nonconventional systems.

Operating assistance grants approved in fiscal year 1977 totaled \$574 million, a 35 percent increase over the year before. A total of 386 systems received operating assistance, but most of the funds went to large rail transit systems. During the year, emphasis was given to the development of standard specifications for railcars and to demonstrations of improved tunneling techniques.

### Materials Transportation

Progress was made on a major hazardous materials



## Summary

safety problem, with the publication of new regulations requiring thermal protection, puncture resistance, and special couplers for all railroad tank cars which carry hazardous materials. The new regulations were applicable to all cars built after December 31, 1977, and also required modification of existing cars.

During the year, questions concerning the physical integrity of the trans-Alaska pipeline were resolved and the pipeline began operating. Planning also continued for an Alaska natural gas pipeline. A route decision for the pipeline was to be made in fiscal year 1978.

Unintentional release of hazardous materials continued to be a major problem for both shippers and carriers. A study conducted during the year indicated that 84 percent of the unintentional releases

were the result of human error, but an analysis of reports on 12,000 unintentional release incidents indicated possible violation of federal regulations in 43 percent of the incidents. In general, the Materials Transportation Bureau found that compliance with federal regulations was good in companies which have a major involvement in the shipping or transporting of hazardous materials, but poor in companies whose involvement with hazardous materials is marginal.

During fiscal year 1977, gas pipeline operators reported 2,113 gas pipeline failures resulting in 39 fatalities and 447 injuries. There were also two deaths and 13 injuries from 228 reported liquid pipeline accidents. Damage to buried pipelines, caused by outside forces, continued to be the main cause of both gas and liquid pipeline accidents.

Progress  
Reports



# Progress Reports



# Office of the Secretary

The Office of the Secretary provides staff and advisory support for the Secretary and supports and coordinates the activities of the various administrations within the Department. In addition, the Office of the Secretary has primary or sole responsibility for carrying out certain programs. This report emphasizes those programs.

## Policy

On February 23, 1977, the Secretary held the first in a series of meetings with citizens and state, county, and local officials. The purpose of the meetings was to gather information for use in formulating a national transportation policy. (A policy statement was issued early in fiscal year 1978.)

The Secretary also announced, on September 1, 1977, a new policy to encourage increased emphasis on good design, art, and architecture in planning transportation projects.

## Supersonic Transports

On September 23, 1977, the Secretary announced proposed noise regulations for the operation of supersonic transports. Under the proposed regulations, the 16 Concorde aircraft which were flying or under construction would be permitted to operate in U.S. airspace (subject to certain conditions) but any future supersonic transports would have to meet the same noise standards as subsonic aircraft.

## Coal Transportation

A Departmental task force was formed to study the existing coal transportation system and to evaluate its ability to handle anticipated increases in coal production. In July 1977, the Secretary led a fact-finding

tour of coal mining areas to determine the current coal transportation capacity and to evaluate the need for new or improved coal transportation systems.

## Environmental Review

The Office of the Secretary continued its oversight of the Department's environmental review process. The office also participated in the Council on Environmental Quality's study of ways to simplify the environmental impact statement process.

Approximately 150 draft environmental impact statements were reviewed and over 80 final environmental impact statements were approved during fiscal year 1977. Among the environmental actions taken during the year were the approval of I-66 in Virginia and of Westway (I-478) in New York and the rejection of I-40 through Overton Park in Memphis, Tennessee, and of a proposed new St. Louis Airport. Continuing environmental review and coordination was also provided for such major projects as the South Florida jetport; the proposed 3-A highway system in Baltimore; the Glenwood Canyon section of I-70 in Colorado; I-93 through Franconia Notch, New Hampshire; and I-10 in Mississippi. The latter project involved potentially serious impacts on the endangered Mississippi Sandhill Crane.

## Historic Preservation

The Office of the Secretary participated in the task force that developed the President's national heritage trust program proposal. Other historic preservation activities included a study on the reuse of historic and architecturally significant railroad stations and increased Departmental liaison with the Advisory Council on Historic Preservation, of which the Secretary is a member.

## Highway Beautification

The Office of the Secretary maintains an ongoing oversight and review function in the highway beautification program, working closely with the Federal Highway Administration, which is responsible for the operation of the program. The year's activities included revising the federal-aid highway program manual (to facilitate the program's procedural requirements) and withholding funds from four states (Alabama, New York, Oklahoma, and South Dakota) for non-compliance with federal requirements.

## Environmental Research

The Office of the Secretary conducts environmental studies to assist in developing policy for the environ-



mental aspects of the Department's programs and activities.

- A major study on the availability and use of abandoned railroad rights-of-way, required by the Railroad Revitalization and Regulatory Reform Act, was completed and was used as the basis for a report from the Secretary to Congress and the President in June 1977.
- Phase II of a multi-year project which is developing guidelines for the assessment of transportation alternatives was completed, as was a study of costs and administrative support essential to affect the implementation of transportation controls under the clean air act.
- Another study, the health effects of bicycling, was completed and widely distributed.
- The final status report analyzing the results of the urban corridor demonstration program in six major cities was completed and distributed.

Other studies dealt with transportation of the handicapped and elderly; property values in highway impact zones; auto travel; energy use; exhaust emissions; and the transportation-environment relationship in urban development.

### **55 mph Speed Limit**

The Office of the Secretary continued to coordinate the 55 mph program, designed to encourage state enforcement of the speed limit and voluntary motorist compliance. It also administered the 55 mph national promotional campaign.

### **Safety Program Management**

The Department's organization manual was changed to eliminate overlapping responsibilities in the Federal Highway Administration, the Federal Railroad Administration, the Urban Mass Transportation Administration, and the National Highway Traffic Safety Administration relating to rail transit and bus transit. Each administration published procedures to implement the change. A similar change was made regarding Federal Highway Administration and National Highway Traffic Safety Administration truck and bus safety programs.

A memorandum of understanding was being developed between the Materials Transportation Bureau and the Coast Guard to clarify their respective responsibilities concerning liquefied natural gas facilities. A review was conducted of the highway fatality counting rules of the two administrations which collect accident data (the National Highway Traffic Safety Administration and the Federal Highway Administration) in an attempt to determine the practicality of standard-

## **Progress Reports/Office of the Secretary**

izing the rules. Because of differences in current rules, conflicting highway fatality counts and rates were being reported by the two organizations. It was decided that standardizing the rules was appropriate, but the effect upon the states was being considered before action was taken.

Coordination and monitoring of Departmental responses to National Transportation Safety Board reports and recommendations continued, and working relationships between the Board and the operating administrations were excellent. Improvements of the computerized safety recommendation system, which stores data from accident reports, continued, and the system was also being used to record Departmental responses to National Transportation Safety Board recommendations.

### **Emergency Medical Services**

The Department's emergency medical services activities during the year included: initiating preliminary rulemaking on air ambulance service; considering a Southern Regional Medical Consortium request for funds to demonstrate the value of satellite communications in emergency medical service; negotiating a Memorandum of Understanding on emergency medical services responsibilities with the Department of Health, Education, and Welfare; participating in the interagency committee on emergency medical services; and reviewing airport operators' efforts to expand emergency medical services as part of their airport emergency procedures.

### **Auto Theft Prevention**

Efforts of the Interagency Committee on Auto Theft Prevention, co-chaired by the Departments of Transportation and Justice, concentrated during the year on the development of proposed legislation to make auto theft more difficult to commit, less rewarding, and subject to earlier detection.

The insurance industry's national auto theft bureau initiated auto theft prevention campaigns in five cities, based on a very successful campaign in Massachusetts. Auto theft in the Boston area dropped 10 percent during the campaign.

### **Rail Transit Safety**

In response to a number of accidents on rail transit systems and to concern over the safety of such systems, expressed by the National Transportation Safety Board and the New York City Council, a comprehensive review was initiated of rail transit safety and of the Department's activities in that area. At the end of



## Progress Reports/Office of the Secretary

the fiscal year, a draft report was under review and was to be transmitted to the Senate Appropriations Committee, at its request, by April 1, 1978.

### Consumer Education

A 12-volume set of curricula and resource materials for transportation consumer education was issued early in 1977. The set contained material suitable for kindergarten through adult levels. The materials focused on public transportation, transportation and the environment, transportation safety, and bicycling.

### Bicycling

The Office of the Secretary, the National Highway Traffic Safety Administration, and the Consumer Product Safety Commission joined forces to conduct a national conference on bicycle safety education on May 4-6, 1977. The conference sought ways to improve and coordinate bicycle safety education efforts. As a result, the National Highway Traffic Safety Administration and the Consumer Product Safety Commission were to conduct a series of ten regional meetings early in 1978.

The Office of the Secretary continued to be the chief Departmental representative on bicycling programs, including liaison with other federal agencies, state and local governments, and private interest groups. The programs included coordination of Departmental activities in connection with motor-assisted pedal cycles (Mopeds).

### Transportation Security

The Department's cargo security programs continued throughout the fiscal year. Losses in the motor carrier industry stabilized; airlines were continuing to make progress in reducing losses; and railroads were developing new procedures, in conjunction with shippers, to reduce losses. Lack of data on maritime cargo losses remained a deficiency in the cargo security program, but a solution was being developed.

### Deepwater Ports

After review by the Council on Environmental Quality, the applications of LOOP, Inc. and Seadock, Inc. for licenses from the Coast Guard to construct, own, and operate deepwater ports in the Gulf of Mexico were approved. The licenses were offered to the two applicants by the Secretary on January 17, 1977. On August 1, 1977, LOOP announced its decision to accept the license. Seadock, however, found itself faced with the withdrawal of Exxon, Gulf, and Mobil from

owner-membership and a reduction of share ownership by Shell. The three companies which withdrew represented approximately 52 percent of Seadock's financing. Seadock continued to negotiate with prospective new shareholders in an effort to replace Exxon, Gulf, and Mobil and was keeping its membership open for a further period; however, the Department informed Seadock that unless the license was accepted by April 20, 1978, the offer would be withdrawn.

Meanwhile, LOOP was moving ahead with its project and expected to begin construction in 1978.

The Department also conducted a study of the feasibility of a deepwater port in the North Atlantic and expected to issue a complete report of its findings during 1978.

The Department has also pursued the concept of offshore industrial port islands. The Dutch have developed this concept to a greater extent than the U.S., and personnel from the Department visited the Netherlands to obtain information on this type of facility.

### BART Impact Program

The Department was completing the fifth and final year of the BART impact program, a comprehensive multidisciplinary study of the impacts of the San Francisco Bay Area Rapid Transit (BART) system. The study was being conducted in cooperation with the Department of Housing and Urban Development, and the findings were to be distributed to a national audience of decision-makers, planners, transit operators, researchers, and interested citizens.

### Transportation Program Trends

A report on trends in federal domestic transportation program revenues and expenditures was completed during the year. This was the first study of this type to include revenue programs. The report covered federal transportation trust funds and capital and operating grant programs between fiscal years 1957 and 1975. The trust funds included highway and aviation funds, while the grants programs included highway, air, transit, and water programs. Tabulated appendices contained yearly highway trust fund revenues allocated to the states. In addition, the appendices contained grant allocations by mode to the states and to standard metropolitan statistical areas and rural areas. Using this data, it is possible to trace the trends in revenues and expenditures over the period as well as shifts in emphasis between modes and between geographical areas.



## Progress Reports/Office of the Secretary

### Alaska Natural Gas Transportation

In mid-1977, a White House task force on Alaska natural gas transportation was organized under the leadership of the President's energy advisor. The Office of the Secretary was made the lead agency on the assessment of construction delays and cost overruns. An assessment was prepared, using subjective risk analysis methodology, and was included in the report which the President was expected to use in selecting a route for the pipeline.

### Information Sharing

The Department continued its support of the Urban Consortium for Technology Initiatives (an organization representing the mayors of the nation's 28 largest cities and executives of 6 urban counties). As part of that support, it produced eight information bulletins on urban transportation problems. The problems addressed included: developing standards for new bus equipment; integrating paratransit with conventional transit systems; improving transit system productivity; and providing transportation for the elderly and handicapped. A manual on techniques for giving priority to high occupancy vehicles was also produced.

Two new reports on the state-of-the-art of light rail transit and rural passenger transportation were published, as part of the Department's continuing effort to develop and publish up-to-date summary documents on specific transportation systems and problems.

The Department also continued to support the effort of the National Conference of State Legislatures to provide a clearinghouse for state legislatures on all issues requiring scientific and technical data.

A program to support the Intergovernmental Science, Engineering, and Technology Advisory Panel for the President was begun. In response to a request from this panel, the first comprehensive inventory of Departmental demonstration projects was developed.

### Advanced Systems

A report called "Toward 2000: Opportunities in Transportation Evolution" was published. The report described some possible directions in which the Nation's transportation systems might evolve and identified those research and development strategies which were likely to be of long-term value. For urban transportation, they included improved operation and integration of existing transportation systems and the development of a variety of fixed guideway systems. For intercity transportation, they included improvements in the existing highway system, improved air

traffic control, and integration of airports and ground transportation systems.

### Systems Development

The systems development activities of the Department included performing technical and economic analyses of automotive technology, energy conservation, and air quality impact assessment and control.

*Automotive Technology.* An automotive technology program was initiated to assess the use of federal incentives for more rapid development and production of automobiles and light-duty trucks incorporating improved technology.

The program was also designed to provide the information needed to establish the Department's policies for implementation of improved automotive technology by the private sector. Strategies to be examined included federal research and development projects, regulatory actions, and economic and institutional incentives.

At the end of the fiscal year, the Department was beginning a comprehensive study of the impacts of federal research and development and federal regulatory activities on automobile manufacturers.

*Energy Conservation.* During the year, the Department started two research projects concerning energy conservation. The first project was designed to evaluate the cost effectiveness of options to reduce the fuel consumption of existing automobiles and light-duty trucks. Test activities concentrated on lubricants, maintenance, and driver behavior. Preliminary results indicated that options were available which would conserve a substantial amount of energy.

The other project was designed to assess a variety of energy conservation options in freight transportation. Initial efforts were concentrated on the use of improved piggyback truck and rail intermodal service and on increased use of double-bottom trucking.

*Air Quality Impact Assessment and Control.* Air quality data are needed by the Department and by state and municipal governments in order to implement transportation programs to improve air quality. As a result, the Department initiated a program to provide this data and to develop advanced analytical tools for use in evaluating the environmental impacts of transportation systems.

During the year, the Department sponsored a series of regional workshops on transportation air quality research needs for state, regional, and local government officials. The purpose was to identify and define the technological and administrative air quality problems.



## Progress Reports/Office of the Secretary

The information produced by these workshops was used to define more clearly the research and development objectives of the Department's program. At the end of the year, those objectives were:

- To develop a technological data base;
- To develop the expertise and capability needed to support the Department's responsibilities for air pollution control;
- To assess the impact upon air quality of present and proposed transportation systems and facilities;
- To assess the impact of air pollution from mobile sources on health and agriculture;
- To assess the cost benefits of various air pollution control strategies involving transportation systems; and
- To reduce significantly the contribution of transportation to air pollution while maintaining and improving the safety, economy, efficiency, and convenience of transportation services provided to the nation.

### Tunneling

The Department's tunneling program reached its culmination in fiscal year 1977, as improved tunneling techniques were demonstrated throughout the U.S. The Federal Highway Administration and the Urban Mass Transportation Administration, which had been involved in the Departmental program, now had well-funded and aggressive underground construction programs in effect. As a result, the Office of the Secretary's program was reduced in scope through the transfer of its technology-oriented research and development activities to those Administrations.

### Liability Insurance

One of the accomplishments of the Department during the year was the defining of some research needs and objectives in the *nontechnical* aspects of transportation construction. A National Academy of Science study, sponsored by the Department, found that the transportation construction industry was suffering from severe risk and liability problems. The problems had been amplified by an immense increase in bonding and liability insurance coverage costs over the past several years. As an example, professional liability insurance premiums were running on the order of 25% of the total insurance coverage, if available at all; and many bonding companies which traditionally had been involved in the construction industry were no longer providing construction bonding. As a result, efforts were begun to find ways to reduce this significant factor in overall transportation construction costs.

### University Research

The Department's university research program utilizes the resources of the higher education community to investigate transportation problems in such areas as—economics and regulation, science and technology, social and behavioral aspects of transportation, and safety and environment.

The program funded 38 new research contracts during fiscal year 1977 and renewed or extended 21 previously funded contracts. In addition, six university research program conferences were conducted. They dealt with such subjects as—proposal preparation for minority colleges, transportation for agriculture and rural areas, transportation planning methods, freight pipelines, motor carrier regulation, and non-contact suspension and propulsion systems for advanced ground transportation.

The minority schools program continued to expand during the year. Two contracts were awarded for the purpose of aiding minority schools in the proposal preparation process. In addition, the program had nine active research contracts with minority colleges and universities.

### Transportation Systems Center

The Department's Transportation Systems Center conducts research on a wide variety of subjects for the various organizations within the Department. Among its activities during fiscal year 1977 were:

- Gathering and analyzing data on the motor vehicle industry and on motor vehicle technology and economics for use by the National Highway Traffic Safety Administration in setting fuel economy standards;
- Evaluating the effectiveness of various rail tank car coupler and tank protection designs, developing a prototype track inspection vehicle, and developing engineering data on concrete crossties for the Federal Railroad Administration;
- Developing an automatic transit vehicle location monitoring system for the Urban Mass Transit Administration;
- Developing a low cost emergency radio beacon and evaluating various techniques for increasing the efficiency of heavy duty diesel engines for the Coast Guard; and
- Gathering data for use by the Secretary in developing Departmental policies on inland waterways, motor vehicle and motor vehicle fuel taxes, international air transportation, coal slurry pipelines, and the transportation of Alaska natural gas.

In addition, the center continued to give atten-



tion to effective communication of research results. Its efforts toward this end included publication of more than 300 reports and hosting a wide variety of transportation related conferences.

### Emergency Preparedness

The Department's emergency preparedness programs cover several different areas of responsibility. They include: (1) continuity of Departmental operations; (2) disaster operations; (3) crisis management; and (4) emergency transportation resource management. The Department is also involved in international civil emergency preparedness planning with NATO, Canada, and the Federal Republic of Germany. In addition, the Department is occasionally called upon by the Department of State to provide foreign disaster assistance.

The most notable of the Department's emergency preparedness activities generally occur in connection with domestic disaster operations, and fiscal year 1977 was no exception. The severe winter weather of January-March 1977 caused many transportation crises in the eastern half of the U.S. In particular, there were acute fuel shortages resulting from frozen waterways and snowbound highways. In the spring, severe flooding occurred in eastern Kentucky, Tennessee, West Virginia, and western Virginia. Finally, there was extensive flooding in July and August in the Johnstown, Pennsylvania, area.

In all of these cases, the Department provided assistance in coordinating alternative transportation resources and in repairing damage to roads, railroads, and airports.

### Personnel and Training

The Office of the Secretary continued to improve its occupational safety and health program through improvements to its safety management information system. The program as a whole was enhanced by the Department's membership and active participation in the Federal Advisory Council on Occupational Safety and Health.

The Office of the Secretary also provided leadership and direction in labor management relations by furnishing technical assistance to the Federal Aviation Administration, the National Highway Traffic Safety Administration, and the Urban Mass Transportation Administration in connection with the negotiation of national labor agreements. It also began publishing a monthly labor management relations newsletter.

### Organization

The Office of the Secretary prepared the necessary

## Progress Reports/Office of the Secretary

delegations of authority and other required implementing documents needed to carry out several significant congressional enactments, including the Airport and Airway Development Act Amendments of 1976 and the Fishery Conservation and Management Act of 1976 (200 mile limit). Considerable resources were also devoted to the development of a proposal for a major reorganization of the Office of the Secretary. (The reorganization plan was announced by the Secretary on July 20, 1977, but since almost all of the actual reorganization was carried out in fiscal year 1978, it will be discussed in the fiscal year 1978 annual report.)

The Office of the Secretary also performed several management studies of Departmental organizations and systems. These studies included a comprehensive review of the management and use of consulting and expert services throughout the Department and a review of the operations of the Executive Secretariat.

### Audits

The Office of the Secretary conducted audits of selected aspects of all major operating elements of the Department during the year. The audits resulted in the issuance of 212 audit reports. The audit reports included recommendations on ways to:

- Improve military personnel management and reduce personnel costs by eliminating unnecessary billets and by limiting future billets to actual needs;
- Reduce the salary costs of air traffic control specialists through decommissioning of towers with low activity and reducing hours of operation at certain other facilities;
- Achieve economies in the accident investigation and traffic records reporting programs through avoiding duplication of effort; and
- Enhance the rail safety program through improvements in monitoring and inspection activities.

The effectiveness of the audit operation itself was improved by refining the audit planning process. The new planning system gives additional assurance that current and future audit plans will provide for needed and timely audit coverage of all Departmental programs, functions, and activities. The process will also be sufficiently flexible to meet new and changing audit priorities.

### Installations and Logistics

The Department's procurement regulations were updated to bring them into agreement with changes in



## Progress Reports/Office of the Secretary

federal procurement regulations, which govern procurement by civil agencies. Included in the update

was new coverage on the use, safeguarding, and disposal of government property.

# United States Coast Guard

The United States Coast Guard operates a fleet of 250 cutters, 175 aircraft, and more than 1,900 boats. It also maintains more than 45,000 navigation aids and ensures the safety of the merchant marine and recreational boaters. In addition, the entire U.S. icebreaking fleet is operated by the Coast Guard.

The missions of the Coast Guard are carried out by 37,293 military and 6,450 civilian personnel. The regular members of the Coast Guard are supported by the 11,700 member Coast Guard Reserve and by 47,000 civilian volunteers in the Coast Guard Auxiliary.

During fiscal year 1977, the Coast Guard responded to over 74,000 calls for assistance. Approximately 4,200 people were rescued from life-threatening situations and more than 182,000 people were aided in other ways. The estimated value of the property which was saved exceeded \$2.9 billion.

## International Affairs

The Coast Guard again made excellent progress in the Intergovernmental Maritime Consultative Organization in the areas of maritime safety and marine environmental protection. Coast Guard experts had key roles in nearly every U.S. delegation. Of particular note was the extensive Coast Guard role in working toward international acceptance of the President's initiatives on tanker safety and pollution prevention. These efforts culminated in a special joint Maritime Safety Committee and Marine Environment Protection Committee meeting which laid the groundwork for a conference to be held in February 1978.

Under the auspices of military assistance and Agency for International Development programs, the Coast Guard provided training and survey teams to the Jordanian, Saudi Arabian, and Haitian Coast

Guards and to the Egyptian Suez Canal Authority. In addition, the Coast Guard provided formal classroom and on-the-job training to over 100 foreign nationals from around the world.

Foreign nationals from all friendly nations (without geographic restrictions) were permitted to compete for admittance to the Coast Guard Academy under the provisions of a new law (PL 94-468). Nine people were admitted, under the new law, to the class of 1981.

Coast Guard officers represented the Department on the National Security Council's Interagency Group for Law of the Sea and were accredited as members of the U.S. delegation to the sixth substantive session of the Law of the Sea Conference.

## Marine Science Activities

The marine science activities program provides operational services to other Coast Guard programs, primarily through the Coast Guard Oceanographic Unit. Several projects were conducted to improve search and rescue, marine environmental protection, and icebreaking operations. New sea and wind current models were completed for integration into the computerized search and rescue programs. The Oceanographic Unit provided assistance during the *Argo Merchant* oil spill incident by conducting on-scene oil slick mapping and spill trajectory forecasting services.

## Ice Operations

The 1977 international ice patrol season extended from March 13 to June 17, 1977. The patrol used C-130 aircraft and an oceanographic cutter to determine iceberg positions, forecast their drift, and warn trans-Atlantic shipping of the hazardous iceberg areas. For the first time, an advanced telemetering buoy system was used to track the icebergs over the 1200-mile drift from Baffin Bay to the Grand Banks off Newfoundland.

Coast Guard domestic icebreaking forces contributed significantly to the continuance of marine commerce throughout the worst winter on record. Forty-seven icebreaking vessels logged over 14,000 hours of icebreaking operations and assisted approximately 800 vessels carrying cargo with a value estimated in excess of \$200 million.

Coast Guard polar icebreakers continued to operate in the Arctic and Antarctic on a regular basis. In the eastern Arctic, in the vicinity of Greenland, one icebreaker assisted the annual resupplying of U.S. installations and supported scientific research. Two icebreakers were deployed to the western Arctic, near



## Progress Reports/United States Coast Guard

Alaska, to assist in ecological, oceanographic, and defense-related scientific research, as well as logistic operations. The U.S. Antarctic research program, administered by the National Science Foundation, was supported by two icebreakers, which provided logistic and scientific services. Polar icebreakers assisted in the delivery of over 93,000 tons of cargo and almost 800,000 barrels of fuel to polar installations during fiscal year 1977.

### Aids to Navigation

The Coast Guard is responsible for authorizing, establishing, operating, and maintaining aids to navigation to serve the needs of commerce. These responsibilities are carried out by operating and maintaining an aids to navigation system which consists of unlighted and lighted buoys, large navigational buoys, lights, manned light stations, radio-beacons, and long range aids to navigation (Loran) stations. Throughout the year, efforts were made to improve and modernize the aids, resources, and management techniques.

A project to improve the positioning of aids to navigation was well underway. Its major objectives were to develop positioning standards, to develop a useful audit system, and to improve aid positioning reliability. Substantial progress had been made during the previous year toward the achievement of these objectives. Personnel were trained and assigned to district offices to facilitate the adoption of improved positioning methods and to assist in position validation. Additionally, a new course to train operating personnel in improved positioning methods was being offered.

A plan was adopted to provide more efficient and effective maintenance of the aids to navigation system on the western rivers of the U.S. Four river buoy tenders were decommissioned, eight vessels were augmented with additional personnel, three depots were disestablished, and numerous administrative changes were made. The changes improved productivity, reduced operating expenses, and avoided the need for immediate renovation or replacement of river buoy tenders. The inland buoy tenders were also decommissioned, and one new tender was added during 1977. Renovation of the aging seagoing buoy tenders continued, with two tenders receiving major alterations. Twelve new high-speed servicing craft were delivered to aids to navigation teams already established.

Under the Department's national navigation plan annex of July 1974, the Coast Guard continued construction of 12 Loran-C stations in the U.S. and assisted Canada in the construction of one station in

British Columbia. These new stations, along with five existing stations on the East Coast and three in Alaska, were to provide Loran-C coverage of the Great Lakes and of the coastal confluence zone of the continental U.S., except for the north slope of Alaska.

The first phase of the plan, Loran-C service to the West Coast and the Gulf of Alaska, was completed, and all first phase stations (7 U.S. and 1 Canadian) began operation in fiscal year 1977. The second phase, Loran-C service to the Gulf of Mexico and improvements to the East Coast service, was proceeding on schedule. This phase was to be complete by the summer of 1979. The third phase, Loran-C service to the Great Lakes, was underway with completion scheduled for 1980.

Overseas Loran-A service, which had been provided by the Coast Guard to meet Department of Defense requirements, was scheduled to end December 31, 1977. Plans were also being made to end Loran-A service in 1979 in Hawaii, Alaska, and on the West Coast of the U.S., in accordance with the national plan annex.

The lighthouse automation and modernization program continued, with the automation of nine more stations, bringing the total to 76. In all, 111 light-houses were to be automated. Benefits being derived from this multi-year effort included decreased personnel costs, a reduced logistics workload, and the elimination of undesirable isolated duty stations.

### Enforcement of Laws and Treaties

Coast Guard responsibilities and activities within its enforcement of laws and treaties program experienced dramatic growth during the year. Operations in this program are principally conducted in the waters adjacent to the coasts of the U.S. The purpose is to enforce domestic laws and international agreements to which the U.S. is a party. Among these operations, enforcement of laws protecting domestic coastal fisheries and drug interdiction efforts are the most significant. The extent and impact of this activity is reflected in Table VII.

### Military Readiness

The Coast Guard is closely coordinating the development and acquisition of aircraft and ships with Navy planners to ensure that the military potential of these assets is fully exploited. Coast Guard forces represent a significant part of the nation's total forces dedicated to the tasks of sea control and of facilitation of waterborne transportation in the national defense interest.

In fiscal year 1977, the Coast Guard continued its participation in the Defense Department's com-



## Progress Reports/United States Coast Guard

mand post exercises and the worldwide military command and control system. In addition, eight high endurance cutters engaged in joint operations with other naval forces during fleet exercises and 40 cutter crews underwent refresher training at Navy training facilities.

In an effort to reduce training costs, increased emphasis was given to the use of simulation for operational training. This promised to reduce the number of ship days required for training while enabling the unit to maintain a high state of readiness. Also, the use of simulation was being examined as a means to reduce expenditures for small arms training. An audio-visual training series was also initiated. This was a coordinated effort, with cooperation among the search and rescue, military preparedness, boating safety, and reserve programs and the Department of Defense.

### Commercial Vessel Safety

Recognition of the need to reduce marine casualties, occupational and health hazards, and marine environmental damage has resulted in expanded research and rulemaking activity in the commercial vessel safety program.

The Coast Guard, on January 21, 1977, began a foreign tank vessel examination program aimed at eliminating unsafe cargo vapor emissions and sources of ignition. This effort was initiated because of the large number of tanker accidents during the winter of 1976-77 and because of conditions discovered during the course of a major casualty investigation aboard a foreign flag tankship.

The scope of the examination program was expanded by the President's initiatives on tanker safety and marine pollution and by domestic regulations that were promulgated after the program began. The expanded inspection program included ventilating systems, cargo handling systems, lifesaving equipment, and general level of maintenance. After the inspection program began, the overall level of safety aboard foreign flag vessels improved and the number of deficiencies found per examination decreased.

As directed by the Presidential initiatives, a special effort to develop and achieve international agreement to reduce pollution potential because of collisions, groundings, and explosions was begun. Requirements for radar systems, collision avoidance systems, tank inerting systems, segregated ballast, double bottoms, and improved emergency steering on tankers were some of the measures advocated.

A number of other measures were being considered, including regulations for containment or recovery of vapors from tanker operations, increased subdivision of Great Lakes vessels, and improved fire

fighting systems. Other topics under study were—helicopter operations from tankers; shallow water maneuvering characteristics; tow boat stability; and pressure vessels for human occupancy.

As part of a continuing program to reduce deaths from hypothermia, two types of exposure suits were approved. These suits significantly improved the chances of survival in near freezing water. They were particularly suitable for Great Lakes vessels or other vessels operating in colder waters.

The Coast Guard signed a memorandum of understanding with the U.S. Geological Survey, clarifying the regulatory role of both agencies concerning the operation of mobile offshore drilling units on the outer continental shelf.

Proposed new federal shipping regulations, addressing all types of mobile offshore drilling units, were published on May 2, 1977. By the end of the year, a public hearing had been held and final rules were nearing completion.

Increased emphasis was placed on occupational safety and health standards in the maritime area. Rulemaking began on the problem of personnel exposure to benzene. Proposed commercial diving regulations were published, and other proposed marine occupational safety and health standards were being prepared for publication.

Joint regulations of the Coast Guard and the National Transportation Safety Board for the investigation of major marine casualties and other casualties involving public and non-public vessels became effective on January 3, 1978. The Coast Guard was to continue to investigate all reportable marine casualties.

The Intergovernmental Maritime Consultative Organization (IMCO) made significant progress in the development of international safety standards. For example, the Maritime Safety Committee of IMCO adopted a code for existing gas ships. Progress was also made in developing standards which were in basic conformance with the 1973 Marine Pollution Convention dealing with chemical carriers. Standards were published for self-propelled vessels carrying bulk liquefied gases and for self-propelled vessels carrying hazardous liquids. Legislation and regulations were being developed to implement the IMCO requirements for containerized cargo.

A pamphlet to aid shippers in understanding the marine requirements of the Department's hazardous materials regulations was distributed.

### Recreational Boating Safety

The boating safety program is part of a national effort to reduce fatalities, injuries, and property damage



## Progress Reports/United States Coast Guard

among the almost 13 million boats and over 50 million people who go boating annually. A grant program is administered to state boating authorities to encourage greater boating safety activity at the state and local level. In fiscal year 1977, all but three jurisdictions (Alaska, South Dakota, and American Samoa) participated in this program. Grants awarded during the year totaled \$5.53 million.

During the year, the Coast Guard monitored 209 recall campaigns to correct potential hazards to safety or to modify boats which failed to comply with applicable federal safety standards. At the close of the year, 71 campaigns remained open, potentially affecting 30,635 units.

Seventy-eight boats suspected of failure to comply with applicable federal safety standards were selected for testing by an independent testing facility under contract to the Coast Guard. Test results available at the end of the year indicated that 44 boats failed to meet one or more of the applicable safety standards.

Five boating safety regulations or modifications to existing regulations were issued during the year. The National Boating Advisory Council actively participated in this regulatory process. At the end of the year, four important new regulations were under development involving visual distress signals, standards for flotation materials on certain boats, standards for boat ventilation systems, and first purchaser list requirements for marine dealers.

The boating safety program was greatly aided by the support of the Coast Guard Auxiliary, an all-volunteer civilian organization of about 47,000 experienced boatmen, licensed aircraft pilots, and communicators. During the year, Auxiliary members conducted safety courses for approximately one-half million people and made courtesy examinations of about 350,000 boats. Members were credited with saving 785 lives, assisting almost 56,000 people, and assisting or saving property valued at about \$242 million.

### Search and Rescue

The objective of the Coast Guard's search and rescue program is to minimize loss of life, personal injury, and property damage in the maritime regions of the U.S. During the year, the trend toward increased use of emergency position indicating radio beacons by vessels on the high seas continued. The beacons serve both to alert the Coast Guard that something is wrong and as an aid to quickly locating the vessel. They show great promise both for saving lives and property and for reducing the length and cost of vessel searches.

Participation by merchant vessels in the Coast Guard's automated mutual assistance vessel rescue system reached a new high. During two months of the year, the average number of vessels whose positions were being recorded exceeded 2,300.

### Navigation Safety

Progress continued in the field of navigation safety. Navigation safety regulations, setting forth minimum standards for vessel operation and equipment, were published on January 31, 1977, and became effective on June 1, 1977. Amendments were proposed which would require an electronic navigation device and a radio direction finder, which would set minimum performance standards for a required marine radar, and (for vessels over 10,000 gross tons) which would require a second radar and collision avoidance device. Regulation authority pertaining to speed and navigation restrictions on U.S. waters was transferred from the Corps of Engineers to the Coast Guard. A memorandum of understanding was signed by the Corps of Engineers and the Coast Guard, clarifying the responsibilities of the two agencies under the Ports and Waterways Safety Act of 1972. Captain of the Port areas continued to be realigned to coincide with the marine inspection zones, for improved enforcement of marine safety regulations.

The 1972 International Regulations for Preventing Collisions at Sea went into force on July 15, 1977, replacing the 1960 international rules. Revision of the lines used in delineating where inland or international rules apply was also completed. Acceptance of the 1972 regulations by the U.S. had the effect of requiring the Coast Guard to draft a legislative proposal to authorize the modernization and unification of the Inland, Great Lakes, and Western Rivers rules to conform as closely as possible to the new regulations. Therefore, the Rules of the Road Advisory Committee continued refining its draft rules for U.S. waters, which would be used as the basis for a notice of proposed rulemaking whenever the necessary legislative authority was received.

The Coast Guard continued to develop its vessel traffic management services. The Prince William Sound Vessel Traffic Service (VTS) regulations became effective on July 25, 1977; and a Marine Safety Office was established at Valdez, Alaska, for the management of the service. Development of a Loran-C position transmitting system for Prince William Sound also began.

A contract for closed circuit TV and microwave equipment was signed in December 1976 for the New



## Progress Reports/United States Coast Guard

York VTS, which was scheduled to become operational in July 1978. Installation of equipment for an automated vessel movement reporting system and for radar coverage of lower Galveston Bay and the bay entrance was completed in July 1977. Joint vessel management talks continued with Canada; and a study of offshore vessel surveillance requirements was started, in accordance with the March 1977 Presidential initiatives.

The Coast Guard also developed and installed a U.S. Marine Safety Information System (MSIS), as directed by the President. The MSIS gave Captains of the Port access to a vessel's history, including pollution incidents, casualties, and the results of boardings and inspections. All major coastal ports in the continental U.S., Alaska, Hawaii, and Puerto Rico were included in the MSIS, and it was to be installed at major ports on the inland rivers and Great Lakes during fiscal year 1978.

### Marine Environmental Protection

The program to update the oil identification field-laboratory system continued, and prototype systems were installed at seven major ports. Additionally, plans were made to change the central oil identification laboratory from research and development status to operational status. The plans included moving the laboratory from the Research and Development Center in Groton, Connecticut, to the Oceanographic Unit in Washington, D.C.

A notice of proposed rulemaking was published in the June 27, 1977, Federal Register to amend the pollution prevention regulations. The proposed amendments reflected the experience gained by the Coast Guard and the industry since the original regulations were issued in 1972. They also incorporated the latest technological developments in the field of oil pollution prevention.

A policy to initiate Coast Guard enforcement of the marine sanitation device regulations was promulgated, and an intensive campaign to educate the public regarding the devices was launched.

The Coast Guard's airborne oil surveillance system became operational in April 1977. By the end of the fiscal year, it had flown 168 hours of coastal pollution surveillance patrols, covering almost one million square miles, and was responsible for legal action taken against a major oil company. The development of an improved sensor package was progressing on schedule and the improved system was expected to be operational by the fall of 1980. The new system was scheduled for installation on six new medium range search

aircraft.

The Coast Guard filed seven draft environmental impact statements with the Council on Environmental Quality during fiscal year 1977. One of these dealt with proposed Coast Guard regulations which would require double bottoms on new tankers and segregated ballast on new and existing tankers.

Progress also was made in the field of pollution response. Development of a fast surface delivery system was completed during the year. The device is a planning hull sled that is capable of carrying a payload of up to 20,000 pounds of pollution response equipment. The sled may be towed over the water at a high rate of speed by surface vessel or by helicopter. Ten of the devices were being constructed at the Coast Guard Yard.

A series of studies were being performed by the Coast Guard to determine how its capability to respond to pollution incidents could be improved. The areas being studied included: determining the feasibility of increasing equipment stocks as so to allow the Coast Guard to respond within six hours of notification to incidents occurring at the most probable locations for spills; determining the amount of equipment required to cope with a 100,000 ton spill; and determining ways to cope with spills occurring during periods of extreme weather.

### Deepwater Ports

The Coast Guard completed its processing of the applications of LOOP, Inc., and Seadock, Inc., for licenses to own, construct, and operate deepwater ports off the coasts of Louisiana and Texas, respectively. The Secretary approved both applications on December 17, 1976, and the Secretary's decision documents and final environmental impact statements on both ports were promptly filed with the Council on Environmental Quality.

### Obstructive Bridges

Three orders to alter obstructive bridges were issued in fiscal year 1977. The bridges affected were the Central Railroad Company of New Jersey bridge across Newark Bay at Newark, New Jersey; the State of Idaho Transportation Department Memorial Highway bridge across the Clearwater River at Lewiston, Idaho; and the Southern Pacific Transportation Company bridge across the Gulf Intracoastal Waterway at Houma, Louisiana.

During the year, construction continued on three obstructive bridge projects—the Union Pacific Railroad Company bridge across the Columbia River at



## Progress Reports/United States Coast Guard

Kennewick, Washington; the Seaboard Coast Line Railroad Company bridge across the Savannah River at Savannah, Georgia; and the Seaboard Coast Line Railroad Company bridge across the Caloosahatchee River at Tice, Florida.

Additionally, construction began on two obstructive bridge projects—Harrison County's Popp's Ferry Road bridge across the Back Bay of Biloxi, Mississippi; and the Seaboard Coast Line Railroad bridge across the Cooper River at Strawberry Landing near Cordesville, South Carolina.

### Cutter Construction and Maintenance

The 400-foot icebreaker *Polar Sea* (WAGB-11) was delivered to the Coast Guard on January 19, 1977, and was placed in commission on the same date.

The 160-foot inland construction tender *Hudson* (WLIC-801) was delivered on October 14, 1976, and placed in commission on November 23, 1976. The *Kennebec* (WLIC-802) was delivered on April 6, 1977, and commissioned on April 20, 1977. The *Saginaw* (WLIC-803) was launched on September 24, 1977, with delivery scheduled for February 3, 1978.

Construction began on the *Katmai Bay* (WYTM-101), first of its class, on June 13, 1977. The 140-foot WYTM harbor tug is designed to replace the overage 110-foot harbor tugs. The 140-foot WYTM's will be used for icebreaking, search and rescue, port safety and security, enforcement of laws and treaties, and deployment of marine environmental protection equipment.

The 400-foot icebreaker *Polar Star* was outfitted with new strengthened propellers and was deployed to the Antarctic for ice trials. Extensive instrumentation was installed on the cutter, to determine the forces present when encountering up to 20 feet of solid ice. At the end of the year, the sister ship *Polar Sea* also was having new propellers installed.

A 15 percent fuel saving was expected from modifications being made to the main propulsion diesel engines aboard the 378-foot high endurance cutters. A prototype installation was completed; and procurement of modification materials for the remainder of the class, 11 cutters, was in progress.

By the end of the year, oil pollution abatement equipment had been installed on over 98 percent of the cutter fleet. All installations were to be completed during fiscal year 1978, giving the cutters the capability to separate oil from water, to store the dirty oil for shoreside disposal, and to meet Environmental Protection Agency discharge standards.

Marine sanitation devices were being installed

aboard all Coast Guard cutters. Prototype installations had been completed and all cutters were scheduled to have vacuum flush systems installed by 1980.

A program of machinery modernization and living space renovation was being pursued to extend the service life of older cutters. Included in the renovation program in fiscal year 1977 were the 180-foot WLB buoy tenders, the 100-foot WLI buoy tenders, the 95-foot WPB patrol vessels, and the Great Lakes icebreaker *Mackinaw*.

### Boat Construction

Thirty 41-foot utility boats were constructed at the Coast Guard Yard, Curtis Bay, Maryland during fiscal year 1977. At the end of the year, a total of 119 of the new boats had been delivered throughout the Coast Guard to replace the aging 40-foot utility boat fleet.

On June 30, 1975, a contract was awarded for construction of twelve 55-foot aids to navigation boats (55' ANB). All 12 of the boats were delivered during fiscal year 1977 to various aids to navigation teams throughout the U.S. On March 14, 1977, a contract was awarded to build an additional seven boats of this type. The aluminum twin-propeller boats were designed for use in servicing minor structures and the above water portion of floating aids to navigation. They are capable of 25 miles per hour and are equipped with a 1,000 pound crane and aids to navigation workshop.

On August 8, 1975, a contract was awarded for construction of thirty-one 32-foot ports and waterway boats (32' PWB). On September 21, 1976, a contract was awarded to build an additional 10 boats of this type. The 11th through the 31st boats of the first contract and 4 of 10 boats of the second contract were completed during fiscal year 1977. All 35 boats were delivered to various port safety stations throughout the United States. The fiberglass twin-propeller boats were designed for use in harbors and connecting waterways by port safety stations and captains of the port for such duties as patrol, surveillance, pollution abatement, and firefighting. They are capable of speeds in excess of 23 miles per hour and are equipped with a fire fighting system able to deliver water and foam at a rate of 500 gallons per minute at 200 pounds per square inch.

### Shore Construction

The purpose of the shore construction program is to provide facilities to support Coast Guard operations, personnel, and equipment.



## Progress Reports/United States Coast Guard

In fiscal year 1977, project funds in the amount of \$30 million were obligated for construction. This included contracts for 20 major projects totaling \$25.5 million. Included in these were—east coast and Gulf of Mexico Loran-C stations, \$6.3 million; family housing at Sitka and Kodiak, Alaska, Arcata, California, and Elizabeth City, North Carolina, totaling \$10 million for 200 units; Kodiak support center renovation and support of the 200-mile fisheries conservation zone, \$3.2 million; Alameda training building, \$1.75 million; Portsmouth support center, \$2 million; Curtis Bay (Coast Guard Yard) industrial safety, \$1 million; Atlantic Area communications center, \$175,000; Elizabeth City paint and stripping hangars, \$373,000; Wildwood electronics engineering center firemain, \$281,000; Swansboro Station bulkhead, \$190,000; and Manasquan Station unmarried enlisted quarters, \$180,000. Survey and design funds in the amount of \$1.7 million, in support of future year projects, also were obligated.

### Aircraft Procurement

In January 1977, a contract was awarded to Falcon Jet Corporation of Little Rock, Arkansas, for the purchase (over a five-year period) of 41 medium-range search aircraft. Designated the HU-25A, the plane will be a Falcon 20-G fan jet, modified to meet Coast Guard requirements. Delivery of the first plane was scheduled for September 1979. The 17 reactivated USAF Convair C-131A twin-engine transports, which were obtained for interim medium-range search use, continued through their depot maintenance and avionics modification program. By the end of the year, initial aircrew and maintenance training was completed and one air station had begun operational use of the aircraft.

In February 1977, a short range recovery helicopter group was formed and the process started for procurement of 90 rotary-wing aircraft to replace the old HH-52A helicopters. Contract awarding was scheduled for the first quarter of fiscal year 1979, with initial delivery expected 24 months later. To handle the flight hours required for enforcement activities in support of fisheries legislation, a military interdepartmental purchase request was issued to the Air Force to purchase four HC-130H long range search aircraft. Delivery of the aircraft to an operational command was scheduled for the third quarter of fiscal year 1978.

### Research and Development

The objectives of the Coast Guard research and development program are to apply the benefits of marine

science and technology to Coast Guard missions and responsibilities; to ensure more effective operations at reduced cost; to improve service to the public; and to support Departmental objectives. A specific research and development effort is conducted in support of each major Coast Guard operating program.

Marine environmental protection research and development accomplishments during the year included: designing a zero relative velocity fast current oil removal device for prototype construction; developing and installing an operational airborne oil surveillance system aboard a Coast Guard C-130 aircraft; continuing efforts to develop equipment and methods to prevent and reduce discharges of hazardous chemicals; continuing research to develop methods for disposal of oil and hazardous chemicals; further developing waste management systems and marine sanitation devices; and continuing refinement of the Coast Guard's oil spill identification system. In addition, major efforts were started in support of the Presidential initiatives on oil pollution. The efforts included: system analysis and state-of-the art assessment studies of extreme weather pollution response and of Arctic and ice-infested water pollution; a pollution response equipment study; and a massive spill equipment requirements study.

For vessel traffic and navigation systems, work continued in efforts to improve the reliability and effectiveness of vessel traffic service hardware and management techniques, to develop Loran-C for use in precision navigation in restricted waters, to develop analytical techniques for the design and evaluation of aids to navigation systems, and to improve the accuracy and reliability of buoy positioning. Work with natural energy sources for aids to navigation led to the development and installation of solar photovoltaic power supply systems on operational aids in Miami Bay for field evaluation.

For marine safety activities, technical studies were conducted to provide a data base to support regulations and standards designed to prevent vessel and boating casualties and to permit analysis of the consequences of accidents and the impact of marine safety standards. In the commercial vessel safety program, work with a marine safety information system entered the prototype development phase, work was completed on LNG and LPG burn tests and data collection, and a joint five-year marine safety and marine environment research and development plan was developed. Work in recreational boating safety emphasized background research for boating safety education and research on boat operator perform-



## Progress Reports/United States Coast Guard

ance. In addition, technical information needed for the regulation of deepwater port activities was developed.

To support Coast Guard operations, programs were established to investigate the application of air cushioned vehicle technology to icebreaking and to develop advanced sea surveillance techniques; research continued on techniques to identify and track icebergs and to improve icebreaking and ice clearing techniques; a feasibility study for the development of a ship routing system for polar waters was completed; and work continued on the development of illumination systems for forward looking infrared sensor systems for Coast Guard helicopters and on the analysis of safe environmental limits for joint ship and helicopter operations.

Finally, studies to investigate the potentials of unmanned vehicles and of underwater sensing and to examine methods for optimizing manpower resources and minimizing the impact of increasing energy costs and fuel shortages were initiated.

### Coast Guard Reserve

The Coast Guard Reserve experienced no difficulty in maintaining its strength during fiscal year 1977. This is apparently the result of Coast Guard reliance on augmentation training as the primary means of preparing its reserve for mobilization. This technique provides reservists an opportunity to receive hands-on experience while simultaneously contributing additional manpower to the active service. This direct involvement is an extremely strong incentive to reserve participation and, concurrently, makes the 11,700 members of the Coast Guard Reserve an efficient element of the total Coast Guard organization.

### Civil Rights

Fiscal year 1977 proved to be very productive for military civil rights. Formal instruction in awareness training continued, and approximately 50 percent of the active duty force had received this training by the end of the year. The racial "incidents" which occurred were considered extremely minor (with the exception of continued harassment and attacks on black personnel in the Boston North End area).

The Coast Guard's first military civil rights conference was held at Washington, D.C. In addition, a contract research study involving approximately 9,000 active duty personnel was conducted. The results of the survey were under analysis by research psychologists and civil rights specialists when the year ended.

The Coast Guard's affirmative action plan for fiscal year 1977 contained new guidance for developing goals and timetables. The plan established a method for assessing the status of minorities and women in the work force and for establishing recruitment and promotion goals based on the assessment. These approaches were utilized in the action plans of major units servicewide.

During the year, the Coast Guard conducted six indepth onsite evaluations of field civilian equal employment opportunity programs. Emphasis was placed on the extent of program coordination with management systems, the impact of special emphasis programs, the effectiveness of the discrimination complaint system, the nature of supervisory and employee awareness and attitudes, and utilization of minorities and females in the work force.

The Coast Guard's equal employment opportunity awareness training program for supervisors of civilians was completed in December 1976. Over 1,100 supervisory civilian and military personnel received training under this program.

At the end of the fiscal year, 4,074 (10.9%) of the Coast Guard's military employees were minority and 633 (1.7%) were female. A total of 2,102 (32.6%) of the civilian employees were minority and 1,551 (24.0%) were female.

Also during fiscal year 1977, the Coast Guard conducted 52 contract compliance reviews of supply contractors and 25 reviews of construction contractors. (While total employment of companies under Coast Guard cognizance increased six percent during fiscal year 1977, combined minority and female employment increased seven percent.) In addition, 33 reviews were conducted of the Coast Guard Auxiliary and 7 reviews were conducted of state governments participating in the federal safe boating program.

### Internal Health Services

The Coast Guard's health service program achieved significant gains toward the goal of self-sufficiency in the delivery of health care to its personnel. The fiscal year 1977 budget included a transfer of \$10.5 million and 151 positions from the U.S. Public Health Service to provide the Coast Guard with greater flexibility in providing health care. In addition, an agreement was negotiated with the Indian Health Service to improve the health care provided to Coast Guard personnel in southeastern Alaska. At the end of the year, negotiations were in progress with the Veterans Administration to utilize their facilities to care for active duty personnel in those areas which have no other federal



## Progress Reports/United States Coast Guard

medical facilities.

A new clinic was authorized for the recruit training center at Alameda, California, and plans were initiated for upgrading several other Coast Guard clinics. The employment of physician extenders (physician

assistants, nurse practitioners, and nurse anesthetists) continued to be emphasized and the emergency medical technician training program was strengthened to enhance Coast Guard capability for providing emergency medical care to persons rescued at sea.



# Federal Aviation Administration

The primary mission of the Federal Aviation Administration (FAA) is aviation safety. At the core of its safety programs lie its certification activities. These activities, in turn, are based on a set of rules and standards, known as the Federal Aviation Regulations. The regulations, which are prepared and published by FAA, are modified, as required, to take advantage of experience and of technological change.

*The 1976 Safety Record.* The U.S. certificated route air carriers operating scheduled passenger service enjoyed one of the safest years in history during calendar year 1976. The passenger fatality rate dropped to 0.019 per 100 million passenger-miles flown—the lowest rate since 1970. The total number of fatalities dropped to 38—also the lowest since 1970. When all air carrier operations (scheduled and unscheduled) are included, 1976 recorded the fewest air carrier fatalities (45) since 1954, when 40 people lost their lives in airline accidents. It is noteworthy that U.S. supplemental air carriers had no fatal accidents during 1976.

General aviation also enjoyed an improved safety record in virtually all statistical categories. The accident rate per 100,000 aircraft-hours flown dropped from 12.4 in 1975 to 11.6 in 1976; the fatality rate per 100,000 aircraft-hours flown also dropped, from 1.97 to 1.92. The total number of accidents fell from 4,237 to 4,193; and the number of fatalities from 1,345 to 1,320. Only the total number of fatal accidents showed a rise, up from 675 in 1975 to 695 in 1976.

*Safety Rules and Regulations.* The air taxi and commercial operator industry has grown substantially in recent years. This growth, moreover, has been accompanied by the use of larger and more complex aircraft. Segments of the industry have asked to be per-

mitted to operate still larger aircraft. During the year, FAA issued a notice of proposed rulemaking for operations by persons holding air taxi and commercial operator certificates. The proposed new rules, which reflected FAA's desire to be responsive to the needs of these certificate holders and to recognize the dynamic growth of the industry, were intended to provide greater operating flexibility for the air taxi and commercial operators while also providing a higher level of safety.

FAA received widespread reports during 1977 concerning crew members and passengers on long-range high-altitude flights suffering from eye irritation and coughing. The agency investigated the complaints and determined that the most likely cause was the presence of excessive ozone in the aircraft cabin. On September 29, 1977, the agency issued an advance notice of proposed rulemaking soliciting comments on revising aircraft design and operating procedures to prevent or reduce aircraft cabin ozone.

The age 60 rule, which specifies that no individual who has reached age 60 can serve as a pilot on any large aircraft (over 12,500 pounds) while engaged in air carrier operations, has been in effect since March 15, 1960. The rule has been the subject of intermittent controversy since its promulgation. During the year, FAA prepared a comprehensive report on the known psychophysiological factors of aging and their bearing on pilot performance. On August 4, 1977, the FAA Administrator signed a position paper that retained the rule and continued the denial of petitions of exemption until such time as a psychophysiological age index can be reliably applied to airline pilots.

In other regulatory actions, FAA—

- Permitted the routine use of unifocal contact lenses by airmen to correct distant visual acuity. The new rule applied to all classes of medical certificates.
- Required each U.S. domestic and flag air carrier to establish an FAA-approved system for collecting and transmitting weather reports and forecasts for each flight route and airport used by that carrier. The new rule was intended to reduce the potential for accidents and inflight injuries resulting from unexpected encounters with thunderstorms, clear air turbulence, low altitude wind shear, and other adverse weather phenomena.
- Issued a rule requiring U.S. airlines to establish procedures for carrying handicapped persons. Under the rule, an airline could not refuse air transportation to a handicapped person unless the person failed to comply with the procedures or could not be carried in accordance with them. FAA was to review the pro-



cedures of each line and would direct changes, if needed.

- Ordered the installation of shoulder harnesses for the front seats of all small airplanes manufactured after July 18, 1978, to reduce the potential for injury or death in survivable accidents. Crew members occupying seats with required shoulder harnesses are required to have them fastened during takeoff and landing. Other seats in the airplane must be equipped with lap belts, and the surrounding cabin area within striking distance of the head and torso must be free of potentially hazardous objects—sharp edges, projections, and hard surfaces.

*Aviation Security.* Despite the effectiveness of U.S. aviation security programs, a threat to civil aviation operations in the United States continued to exist. The number of persons attempting to pass through passenger screening stations carrying concealed weapons remained at a high level, with nearly 2,000 firearms detected in the passenger screening process during the year. In over 800 incidents, firearms were detected under circumstances which led to the arrest of individuals under federal or local statutes.

In addition, more than 600 bomb threats were directed against aircraft and airports. In April 1977, an airport employee at Washington National Airport was killed by a bomb explosion in a locker room under the main terminal building. Another explosion damaged helicopters in Salinas, California; and an explosion wounded an airport employee in Swainsboro, Georgia.

FAA, in cooperation with the Law Enforcement Assistance Administration, sponsored a program to place specially trained explosive detection dog teams in key cities near strategically located major airports. The teams were located in such a way that they could readily respond to threatened aircraft anywhere in the United States. During fiscal year 1977, five local jurisdictions joined the program; this brought the total number of airports covered by the program to 29. By the end of fiscal year 1977, the dog teams had been used in 2,045 aircraft and airport searches and had discovered 21 explosive devices.

Four attempts were made during the year to hijack U.S. air carrier aircraft, and one attempt was made on a general aviation aircraft. All five attempts were unsuccessful.

*Other Safety Activities.* In addition to the safety activities already discussed, FAA—

- Conducted a special investigation of certain operators using Miami International Airport. The investigation, conducted by a team of FAA special agents and attorneys, found that the operators were violating

the Federal Aviation Regulations. Legal enforcement action was taken against the violators.

- Continued a joint effort with the National Aeronautics and Space Administration (NASA) to enhance aviation safety through an aviation safety reporting program. During the year, more than 6,000 reports were submitted to NASA, which resulted in that agency's issuing 214 alert bulletins to FAA identifying potential hazards in the national aviation system. In addition, NASA conducted 31 special studies and issued three quarterly reports which were widely distributed within the aviation community.

### National Airspace System

FAA maintains a common system of facilities, equipment, regulations, procedures, and personnel to ensure the safe and efficient movement of civil and military aircraft in the nation's airspace.

*Air Traffic Activity.* U.S. aviation reached new peaks of air traffic activity during fiscal year 1977. FAA's air route traffic control centers handled 25.9 million aircraft flying under instrument flight rules, exceeding the fiscal year 1976 count by 8.4 percent. Aircraft takeoffs and landings, as reported by FAA airport traffic control towers, totaled 66.7 million, an increase of 6.7 percent over the previous fiscal year. Instrument operations alone totaled 31.7 million, up from 28.1 million in fiscal 1976. Flight services provided by flight service stations increased by 9.9 percent, to 63.2 million.

*Air Traffic Control.* FAA's program to modernize the equipment at 20 air route traffic control centers and at 63 of the nation's busiest terminal areas was completed, and the agency began a program to enhance the capability of the new equipment.

Two new air traffic control programs were implemented during the year, the minimum safe altitude warning system and the conflict alert system. The minimum safe altitude warning system increases the capability of the automated radar terminal systems. Whenever an aircraft is flying too low, the system provides the controller with both an aural and a visual alert; the controller, in turn, issues a radio warning to the pilot that he has descended below the minimum safe altitude. Like the minimum safe altitude warning system, the conflict alert system is essentially a computer software system. It "looks ahead," along the flight paths of controlled aircraft. If two or more planes are apparently going to approach unsafe separations, the controller is alerted to the developing conflict by a buzzer and the flashing of "CA" on the screen of his display console.

*Flight Service Station Automation.* FAA was



## Progress Reports/Federal Aviation Administration

also making plans to modernize its 292 flight service stations. The modernized system will be capable of meeting future demands without a corresponding increase in personnel. The majority of routine pre-flight services will be provided by computer. This will permit the flight service specialist to devote more time to critical services.

Included among the more important flight service station modernization activities during the fiscal year were: (1) the development of a master plan, concentrating on automation and on direct user access to the system for weather briefing and flight plan filing; (2) the field testing and evaluation of an experimental aviation weather and notice to airmen system at Atlanta, Georgia; and (3) successful demonstrations of the collocating of a flight service station with an air route traffic control center and of performing the functions of several flight service stations at a single site.

*Microwave Landing System.* The microwave landing system, which is to replace the present instrument landing system, has been under development by FAA since the early 1970's. The system developed by FAA—a time reference scanning beam system—and competing systems were submitted to the International Civil Aviation Organization (ICAO) as candidates for international standardization. After an assessment by ICAO's all weather operations panel, a recommendation to adopt the time reference scanning beam system for standardization was forwarded to the Air Navigation Commission. The commission forwarded it to a worldwide ICAO all weather operations division meeting, scheduled for April 1978, which was to make the final selection.

### Fostering Civil Aviation

*National Airport System Plan.* The Airport and Airway Development Act of 1970 requires the Secretary of Transportation to prepare and maintain a 10-year plan for the development of public airports for the needs of civil aeronautics, national defense, and the postal system. The first edition of this plan, covering the years 1972-82, was submitted to Congress in 1973 and then regularly updated. Amendments to the Airport and Airway Act in 1976 called for the publication of a revised plan by January 1, 1978. The preparation of the revised plan was complicated by a court decision, issued on June 21, 1977, requiring the Secretary of Transportation to prepare an environmental impact statement for the revised plan. FAA immediately began work on an environmental impact statement, and the revised plan and its

accompanying statement were expected to be ready for submission to Congress on or about January 1, 1978.

*Airport-Aid Programs.* FAA administers two grant-in-aid programs for civil airports—the planning grant program and the airport development aid program.

Under the planning grant program, FAA issued 205 grants for airport planning projects in 44 states and Puerto Rico valued at \$12.2 million. A total of 14 of the grants, valued at \$953,237, went for state-wide or regional airport system plans.

FAA obligated \$512 million during the year under the airport development aid program. The obligations included 757 new grant agreements, which totaled \$492.4 million. Approximately \$420.7 million of the new agreements went for 511 projects at air carrier airports and \$71.7 million for 246 projects at general aviation airports. The largest share of these funds was utilized in such safety related areas as new runways, aprons, approach aids, lighting, and crash, fire, and rescue vehicles.

A 1976 amendment to the Airport and Airway Development Act authorized the Secretary of Transportation to delegate to four states the administration of airport development aid program grants for general aviation airport development. The objective of this program, which was being conducted on a test basis, was to demonstrate the ability of states to administer such grants effectively. The four states selected and the amount of fiscal 1977 grant money allotted to each were—Arizona (\$1,068,967), Michigan (\$1,630,900), Pennsylvania (\$2,482,438), and South Dakota (\$687,862).

### Environmental Protection

Public Law 90-411 gives FAA the authority to prescribe rules and regulations for the control and abatement of aircraft noise and sonic booms. Under this statute, the agency establishes allowable noise levels as part of the criteria for aircraft type certification. In addition, the Airport and Airway Development Act permits the use of airport-aid funds for land acquisition (to ensure use compatible with airport noise) and for noise-suppressing equipment and barriers.

The emphasis in airport planning and development is being placed on maintaining the ability of existing airports to accommodate the projected increases in aviation activity. A critical issue affecting the existing airport system is the annoyance caused by the noise of aircraft taking off and landing. The airport owner is primarily responsible for planning



## Progress Reports/Federal Aviation Administration

and implementing action designed to reduce the effect of aircraft noise on the community. To assist airport owners in carrying out this responsibility, the Department issued an aviation noise abatement policy statement. The statement encouraged airport noise control and land use planning. During fiscal year 1977, four airports (San Francisco International, Salt Lake City International, Rochester-Monroe County, and Oklahoma City's Wiley Post) were provided with grants totaling \$775,996 to participate in a land-use planning program.

In other environmental actions, FAA—

- Issued a new rule requiring the next generation of transport aircraft to meet more stringent noise standards than those applied in the certification of such aircraft as the L-1011 and DC-10.
- Required all commercial jet aircraft to meet, by January 1, 1985, the noise levels specified in Part 36 of the Federal Aviation Regulations. (The levels range from 93 to 108 EPNdB, depending on the weight of the aircraft.) The new rule, which affects 76 percent of the nation's current jet fleet, was issued in response to a Presidential directive of October 21, 1976. Airline and other commercial operators of jet aircraft have the option of modifying or replacing jets that generate noise levels exceeding those specified in Part 36.

### International Aviation Affairs

FAA personnel served on U.S. delegations to a number of meetings of the International Civil Aviation Organization (ICAO). During the 22nd Session of the ICAO Assembly, the U.S. was reelected to another three-year term on the ICAO Council, the governing body of that organization. ICAO activities in which FAA was a major participant included establishing a continuing group to resolve complex problems affecting flight operations, reviewing the need for multilaterally financed air navigation facilities and services in Iceland and Greenland, and developing stringent navigation accuracy standards to permit safer and more efficient use of North Atlantic airspace.

FAA expanded its foreign technical assistance and training programs by establishing new technical advisory groups to assist the civil aviation authorities of Spain, Venezuela, and Iran in the development of their national airspace systems. In each case, major expenditures were programed by these countries for system improvements and for the cost of FAA assistance. Shorter-term assistance was provided to numerous countries, notably in the application of civil aviation security measures and flight inspection

of air navigation aids. FAA specialists conducted a study of Jordan's civil aviation safety programs, recommended a safety surveillance program, and developed a set of abbreviated civil air regulations based on FAA regulations. The same regulations are expected to have application in countries with similar needs.

### Administration

*Personnel Activities.* In January 1977, the Civil Service Commission issued a new position classification standard for the air traffic control occupation, covering center and terminal options only. The new standard provided a GS-14 grade level in both options at high activity facilities. Grade levels at 57 air traffic control facilities were raised, resulting in the promotion of 3,592 employees.

The Civil Service Commission also began work on the flight service station portion of the air traffic controller standard. The Commission was expected to have a draft standard ready for Departmental comment by the end of calendar year 1977.

*Labor Relations.* In fiscal year 1977, FAA recognized 10 unions (four at the national level) as exclusive representatives of over 37,000 of its nonsupervisory employees. Nearly 20,000 of these employees had their union dues withheld from their pay; and over 28,000 were covered by labor agreements. At the end of the fiscal year, 45 labor agreements were in effect and five were pending. The number of bargaining units dropped during the year from 82 to 77, as smaller units were absorbed into national units.

The Professional Airways Systems Specialists, a new organization affiliated with the Professional Air Traffic Controller Organization (PATCO), was attempting to obtain the right to represent the airway facilities employees now represented by the Federal Aviation Science and Technological Association (FASTA), an arm of the National Association of Government Employees. The Association of Academy Instructors, a union at FAA's aeronautical center, affiliated with PATCO early in the year; and there were indications that PATCO had taken the first step toward organizing FAA's flight standards employees.

FAA was engaged in intense labor negotiations throughout the reporting period. A national labor agreement was signed with FASTA, in September, after prolonged and difficult negotiations. Negotiations between PATCO and FAA, which began in mid-May, were continuing, with the assistance of a mediator, at the end of the year.



## Progress Reports/Federal Aviation Administration

### Civil Rights

Included among the significant fiscal year 1977 activities in civil rights and equal employment opportunity were—

- Strengthening the equal employment opportunity counseling system, by increasing the number of courses in counselor effectiveness training at the FAA Management Training School.
- Filling a total of 60 administrative upward-mobility positions with members of minority groups or women.
- Increasing the number of minority business concessions at airports to 54.
- Awarding contracts totaling \$26,337,000 under the minority business enterprise program.

At the end of the fiscal year, a total of 6,030 (10.8%) of FAA's 56,000 employees were minority and 7,719 (13.8%) were female.

### Litigation and Legislation

During the year, claims against the agency and litigation involving those claims continued at a high level. FAA received 220 tort claims during the year and closed 446 claims. More than \$479 million was demanded of the agency in administrative claims, of which just under \$1.3 million was paid. A total of \$448 million was demanded of the agency in litigation; \$9.2 was paid in settlement out of court and

another \$2.8 million was paid following adjudication.

During the year, FAA prepared several important legislative proposals, two of which were of particular significance. One proposal was to renew the authority of the Secretary of Transportation to provide war risk insurance to U.S. air carriers when the carriers cannot obtain such coverage on reasonable terms in the commercial insurance market. The proposal also extended the Secretary's authority to issue insurance for hijackings, terrorism, and other civil disorders that occur outside the context of war, but for which commercial insurance is unavailable. The other proposal was to prohibit air traffic controllers who had been separated from their positions because of medical or technical proficiency reasons and who were eligible for immediate retirement from receiving second career training.

### Aircraft Loan Guaranty Program

Under the Aircraft Loan Act of 1957 and a delegation of authority from the Secretary of Transportation, FAA guaranteed loans for the purchase of aircraft and related spare parts for small certificated carriers which were unable to obtain conventional loans on reasonable terms. During fiscal year 1977, FAA guaranteed 12 loans totaling \$91,921,000. At year's end, there were 20 loans outstanding with a balance of \$182,245,456.



# Federal Highway Administration

The federal-aid highway program provides about \$7.5 billion annually to the states to assist in the construction and improvement of roads and streets and to assist in a large number of activities related to the construction and management of major highway systems. The assistance is provided through a number of categorical programs, each designed either to improve designated systems or to encourage particular types of highway improvements. In addition to its basic programs of financial assistance, the federal-aid highway program also includes a variety of administrative and support activities which contribute to improved program performance.

Several major changes were initiated in the highway program during fiscal year 1977, both in the assistance program itself and in the management of the program. The objective of accelerated completion of the interstate highway system was given increased emphasis. At the direction of Congress, two studies were conducted—one identifying the essential gaps in the intercity portions of the system, and one investigating financing alternatives for accelerating system completion. Under the existing program, an additional 805 miles of interstate were put into service during the year, including 370 miles identified as essential gaps.

As of September 30, 1977, 38,674 miles or 91 percent of the 42,500-mile interstate system was open to traffic. In addition, 1,592 miles were under construction.

During the year, the emphasis on federal-aid highway construction shifted from new locations to the so-called 3R program. This program authorizes the resurfacing, restoring, and rehabilitating of older pavement, shoulders, and bridges which have deteriorated due to age or use but which either do not re-

quire complete reconstruction for restoration of service or for which complete reconstruction is too expensive. The 3R program enables highway agencies to improve riding quality and structural capacity without substantial investment in additional rights-of-way or disruption of natural resources and with minimal environmental disruption. Fiscal year 1977 was the first year that special federal assistance was available for 3R work on the interstate system. Over \$111 million was obligated, with most going for projects for pavement overlays and bridge deck repairs. A report was made to Congress on the overall need for federal assistance to the states for work needed to maintain the high standards of the interstate system.

A series of individual programs and activities constitute a third area of special emphasis for the highway program—energy conservation. The largest single potential energy conservation item in highway construction and maintenance is the recycling of existing worn-out and deteriorated pavements. In fiscal year 1977, the Federal Highway Administration (FHWA) initiated a national experimental program to evaluate various techniques for recycling both bituminous and portland cement concrete pavements.

Considerable effort is going into promoting and financing activities which will improve the energy efficiency of highway users. Better management of the existing highway systems is being achieved through traffic engineering improvements and through measures to encourage higher vehicle occupancy. Almost \$450 million was obligated for measures to improve traffic flow, such as new traffic control devices and turning lanes. Under newly expanded eligibility criteria, vanpool acquisition and promotion projects were added to the activities to promote ridesharing.

Two major achievements during fiscal year 1977 improved the overall management of the federal-aid highway program. A *Report on the Status of the Nation's Highways: Conditions and Performance* was submitted to Congress in September 1977. It analyzed recent and estimated future changes in highway conditions, travel, and obligations, laying the groundwork for a measure of overall system performance. The information will be especially useful in the development of legislative recommendations for future levels of investment in the highway program.

In June 1977, a task force completed a comprehensive review of the federal-aid highway regulations. The review produced 33 recommendations which would significantly simplify the delivery of federal aid for highways and eliminate federal requirements not essential to effective program administration. Major aspects of this regulatory reform effort include



## Progress Reports/Federal Highway Administration

—early involvement of state and local governments and the general public in the development of regulations, and a detailed review of the impact and necessity of every directive and requirement imposed on the states.

### Regular Highway Construction Programs

The financial assistance provided through the federal-aid highway program in fiscal year 1977 amounted to more than \$7.3 billion. The funds were used for a wide range of projects to plan, design, and construct highway improvements, for the acquisition of right-of-way, and for numerous related activities which support the basic grant program. More than 45 percent, approximately \$3.3 billion, of the total went toward improvements on the interstate system. Roughly \$4.0 billion was obligated for projects not on the interstate system.

About \$1.6 billion of the non-interstate total was obligated for special projects in urban areas, and \$1.8 billion was obligated for special rural projects. Over \$94 million was obligated for financial assistance to state and local agencies for statewide and urban transportation planning. More than \$195 million was obligated in the special bridge replacement program, which was established to assist the states in financing the replacement of deficient bridges that could not normally be replaced using regular federal-aid highway funds. Since its initiation in 1971, 450 bridges have been replaced, with a total of 1,456 bridges authorized for such assistance. In addition, \$90 million in emergency relief assistance was made available to cover the cost of repairing road damage or catastrophic failures.

### Safety Programs

The highway safety activities of the federal-aid highway program include special categories of assistance for safety construction and program oriented toward development of state processes for safety problem identification and solution. Federal funds obligated by states for rail-highway, high hazard, roadside obstacle, and pavement marking improvements totaled about \$350 million, most of which was obligated for small projects costing about \$50,000 and yielding a high return in the number and severity of accidents reduced.

FHWA, in cooperation with the National Highway Traffic Safety Administration, submitted to Congress a report on the adequacy and appropriateness of the highway safety standards established under 23 USC 402. Mandated by the Highway Safety Act of

1976, the report provided Congress with proposals for revising the uniform safety standards. FHWA also continued to work closely with states to improve highway safety project selection procedures. Other aspects of highway safety which were emphasized during the year included better problem identification and the safe handling of traffic through construction and maintenance zones.

FHWA continued its efforts to reduce highway accidents involving commercial trucks and buses, through its motor carrier safety program. During 1977, emphasis was placed on making surveys of motor carriers who had not been previously surveyed. A key objective of the motor carrier safety programs is willing participation and voluntary compliance on the part of those being regulated. The safety surveys improve the industry's knowledge of the federal motor carrier safety regulations and increase the industry's safety awareness.

Special attention also was given to the length of truck runs to determine whether drivers have exceeded the national 55 mph speed limit or the provisions of the hours-of-service regulations. During August and September, roadside inspections of drivers, vehicles, and equipment were conducted. State, local, and federal agencies participated in the program, and the inspections were conducted at a number of selected strategic state and federal ports of entry and ocean ports, in addition to state weighing stations.

### Special Programs

In addition to its basic system improvement and safety construction programs, the federal-aid highway program includes a number of separate authorizations of financial and technical assistance for specific purposes.

- The rural highway public transportation demonstration program is intended to demonstrate methods of providing service to transportation disadvantaged persons in rural areas. By the end of the year, final approval was nearly completed for the 104 projects selected, with almost \$23 million allotted for project use. Fifty projects were actually in operation. Workshops were held to exchange information on project experience, and quarterly performance statistics were being collected and disseminated among project sponsors.

- During the year, \$18.7 million was obligated by the states for outdoor advertising control; and 27,632 signs were removed, bringing the total removed since 1965 to 463,724. The states also obligated \$2.9



## Progress Reports/Federal Highway Administration

million for the control of junkyards.

- On February 11, 1977, the United States and Canada reached a formal agreement to cooperate in the reconstruction of the Haines Cutoff Road between Haines, Alaska, and Haines Junction, Yukon Territory, and of the Alaska Highway from Haines Junction north to the Alaska border. In the agreement, which was negotiated under provisions of the Federal-Aid Highway Act of 1973, Canada agreed to provide the right-of-way and to maintain the roads after completion.

- The Territories of Virgin Islands, Guam, and American Samoa obligated approximately \$5 million for highway construction in fiscal year 1977. Approximately \$282,000 of this was for safety projects.

- FHWA continued to provide technical assistance to Argentina, Colombia, Costa Rica, Iran, Kuwait, and Panama. A 6-year technical assistance agreement was signed with Saudi Arabia.

- Fifty-three and one-half million dollars was provided for construction of the 250-mile Darien Gap Highway in Panama and Colombia. By the end of the year, initial construction of an all-weather surface was completed for 83 miles in Panama and construction of an additional 45 miles was nearing completion.

- FHWA directly administers several major highway programs, including forest highways and public lands highways. In addition, highway engineering and construction services are performed by FHWA for other federal agencies, including the Department of Agriculture and the Department of the Interior. During fiscal year 1977, 103 contracts were awarded totaling \$79 million.

- Forty-one bikeway demonstration projects were selected to be financed from the \$6 million made available to demonstrate, among other things, various means for bikeways to connect with and serve other public transportation modes.

- FHWA has a program to functionally replace publicly owned facilities which are required for federal-aid highways. Since 1972, this program has resulted in FHWA replacement of 19 schools; 21 park, recreation, or wildlife facilities; 5 police facilities; 5 fire facilities; and 16 miscellaneous public facilities, including a state motor vehicle registry, an animal shelter, public housing, a filtration plant, several maintenance shops, a weighing station, an agricultural inspection station, and a city hall.

### Equal Opportunity

Although not a financial assistance program, FHWA's external equal employment opportunity program is

an important part of overall administration of the federal-aid highway program. It includes three primary areas in which grantees' progress and compliance are measured—minority business enterprise contract awards, minority employment, and contractor and state highway agency employment practices.

Moderate gains were made in the awarding of contracts and subcontracts to minority business firms in fiscal year 1977, with federal and federal-aid contracts of approximately \$77 million awarded to such firms.

The annual survey of all federal-aid highway projects, conducted in July 1977, indicated that minority employment had reached 23 percent. This is an increase of 2 percent, despite a decrease in total employment of 1,576 persons. During the same period, the number of women employees increased by 4.4 percent, including a slight increase in the participation of women in the skilled crafts. In a special program, about 4,400 persons, including 2,500 minorities and 120 females, received skills training on selected federal-aid construction contracts.

In the contract compliance program, 1,563 construction compliance reviews and 206 home office reviews were conducted by FHWA and state compliance personnel.

As of September 30, 1977, FHWA's own employees totaled 4,649. A total of 1,274 (27.4%) were female and 791 (17.0%) were minority.

### Program Support Activities

The financial assistance delivered to the states through highway construction and related programs is made more effective through a number of activities which provide information and technical assistance to grantees as well as to those responsible for administering the programs.

FHWA has been conducting an organized program of technology transfer for several years. The purpose of technology transfer is to stimulate the application of new technology. The program is concerned with promoting change, with offering new technology in usable form, and with stimulating the delivery of new technology.

The technology transfer program has two aspects. One is development and implementation; the other is transfer and promotion. Most elements of FHWA are involved in transfer and promotion, particularly the operating offices and field offices. The products of the transfer program, prepared specially for the user, range from packages, manuals, and user kits to demonstrations, training courses, and computer programs.



## Progress Reports/Federal Highway Administration

An important example of technical assistance is in the area of urban transportation planning. In recent years, transportation planning had made significant improvements in the state of the art for planning multimodal urban transportation systems. In order to exploit these advances, FHWA and the Urban Mass Transportation Administration now jointly support the development and distribution of the urban transportation planning system, a package of manuals, computer software, and other analytical aids for local use in planning and operating transportation resources.

The objective of the urban transportation planning system is to provide readily available, easy-to-use, and fully tested planning tools to transportation planners for application to a wide variety of problems. It is an evolving system and new or refined methods are incorporated periodically.

Training programs, either in the form of financial assistance or as courses provided directly through agency resources, are an important part of the technology transfer program. During fiscal year 1977, FHWA awarded approximately 150 education grants, totaling \$470,000, for undergraduate and graduate study by employees of federal, state, and local transportation agencies. In addition, 250 courses (attended by over 7,000 transportation agency employees) were conducted in such subjects as highway safety, environmental protection, traffic operations, engineering, civil rights, and construction.

Training courses in matters dealing with environmental protection are a good example of the year's

activities. Over 2,100 persons attended courses such as the following: esthetics and visual resource management for highways; historic and archeological preservation; preparation of environmental impact statements; air quality; and ecological impacts of proposed highway improvements.

During the year, there also was a broad effort to improve quality assurance. Some 270 industry representatives and nearly 1,000 federal, state, and local engineers received specialized training in statistical quality control in highway construction and in quality assurance procedures.

Finally, FHWA has embarked on a major program of cooperation with the states and with Canadian jurisdictions in an effort to apply computer technology to the easing of complex barriers to truck commerce. The basis of the program is the use of an international registration plan. The plan is a creation of the American Association of Motor Vehicle Administrators. It would permit a trucker to register in his base state for all the states and provinces in which he wishes to do business. The base state would be responsible for issuing the appropriate registration documents as well as calculating and collecting the fees to be apportioned to all the jurisdictions concerned. There are 23 jurisdictions presently enrolled in the plan, with more scheduled to join. To ease the paperwork burden, FHWA designed an international registration information system and a computerized administrative support system which handles the preparation of documents, calculation of fees, and accounting of revenue.



# Federal Railroad Administration

The Federal Railroad Administration (FRA) has continued its efforts to plan, develop, and administer an effective and comprehensive program to achieve safe operating and mechanical practices in the railroad industry. The program includes enforcement of the federal laws and regulations which are designed to promote the safety of railroads, the general public, travelers, and railroad employees.

During fiscal year 1977, FRA continued the analysis of train accident causes which it has performed for the past several years. The areas analyzed were human factors, equipment defects, track defects, and miscellaneous causes.

A summary of the results of the analysis of the cause of train accidents in calendar year 1976 follows:

Track defects	41.6%
Human factors	23.0%
Equipment defects	21.2%
Miscellaneous causes	14.2%

A general summary of train accidents and railroad accident and casualty data during calendar year 1976 may be found in the Appendix of this report.

*Track Safety.* The automated track geometry inspection program, which had been under way for the past two years, was expanded by the addition of a second inspection vehicle at the end of fiscal year 1977. A third inspection vehicle, with both track geometry and rail flaw detection capabilities, also began pre-operational testing during the year.

The program has proven to be a valuable tool for checking rail carrier compliance with track maintenance standards. The information generated by the track inspection vehicles is used by federal and state inspectors to locate potential problem areas and to monitor track maintenance activities.

*Regulations.* During fiscal year 1977, several amendments and new requirements relative to regulations for railroad operating practices were developed and published. FRA also worked closely with the Materials Transportation Bureau in rewriting the Hazardous Materials Regulations (49 CFR 174) as they apply to rail transportation.

*State Safety Programs.* Section 206 of the Federal Railroad Safety Act of 1970 provides for state participation in carrying out investigative and surveillance activities in connection with regulations and standards promulgated under the authority of the Act. As of September 30, 1977, 19 states were participating in enforcement of the federal track safety standards or the freight car safety standards. The states included: Alabama, Arizona, Connecticut, Indiana, Illinois, Iowa, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, Ohio, Oregon, Pennsylvania, Vermont, Washington, and West Virginia. A number of other states were either in the process of applying to participate in the program or were planning to do so in fiscal year 1978.

*Railroad Classification.* Final standards were developed for the classification and designation of rail lines in the U.S. This effort, carried out pursuant to Section 503 of the Railroad Revitalization and Regulatory Reform Act, was based on a comprehensive evaluation of the total U.S. rail system. Classification of the rail system according to the standards which were developed provided a common base of information for use by government, the rail industry, and others in analyzing the rail system.

*Financial Analysis.* Fiscal year 1977 also saw the initial steps in the creation of a rail industry financial analysis system. The purpose of the financial analysis system was to pull together diverse sources of information to provide a current analysis of the major Class I railroad companies and systems in the U.S., thus providing the information needed to identify and react to worsening financial trends before a crisis occurs. The system's development was to be completed in 1978. To complement the financial analysis, FRA was also developing a research program to determine the cost of performing the various activities that comprise the operation of a railroad. By the end of 1977, a literature search and a state-of-the-art investigation were completed. These steps were to serve as the basis for development of improved procedures and methodologies which were to be demonstrated in 1978.

Perhaps the most challenging and difficult task of 1977 was that of carrying out the analyses man-



## Progress Reports/Federal Railroad Administration

dated by Sections 504 and 901 of the Railroad Revitalization and Regulatory Reform Act. The analysis required by Section 504 addressed rail industry capital needs for the period 1976-85; the analysis required by Section 901 encompassed a comprehensive study of the U.S. railway system. In addition to drawing upon numerous existing sources, FRA also carried out an extensive program of original research to develop new information.

### Enforcement Activities

FRA's efforts to increase the safety of rail operations were reflected in its enforcement activities. During fiscal year 1977, FRA negotiated settlements of 20,670 alleged violations of various railroad safety statutes and regulations. The settlements resulted in the assessment of \$3,410,527 in penalties. In addition, the government was awarded a total of \$55,100 in judgments in cases involving violations of the hazardous materials regulations and of the Hours of Service Act.

### Policy and Program Development

*Modernizing Work Practices.* The railroads have been operating within a long-standing framework of labor agreements, management practices, and government regulations. The resulting lack of flexibility has reduced the industry's ability to adjust to changing market conditions. To help the railroads cope with this problem, FRA developed an experimental program to improve productivity.

The concept was tested at the St. Louis terminal of the Missouri Pacific Railroad, where individual freight cars took an average of 18 hours to clear the terminal in 1974. The time was reduced to 14 hours per car by early 1976 and to 12 hours by the end of 1976. Subsequently, labor and management productivity teams were created in Chicago and Houston. Together, these three terminal areas account for 76,000 daily car movements. FRA has tried to capitalize upon the industry-wide attention given to this successful program by seeking applications in other geographic areas.

*Rail Economics.* FRA recently examined the feasibility of an hourly freight car rental system (to replace a 24 hour rental system). FRA believed that an hourly system would provide greater incentive to move cars out quickly (to save hourly charges) and would help reduce the terminal congestion which results when many cars have to be processed within a short time to avoid the charge for an additional full day. An FRA study indicated that hourly car

hire would reduce the load-to-load car cycle time and generate annual savings of \$19 million to \$33 million for the railroad industry. As a result, hourly car hire was to be implemented in January 1978.

The freight car clearinghouse, an accounting mechanism whereby "debits" and "credits" are exchanged rather than actual empty freight cars, was expanded in 1977 to cover 40 percent of the nation's car fleet and carloadings. Annual mileage and car day savings worth approximately \$3.4 million were being realized by the railroads.

A freight car scheduling system was being designed for the Missouri Pacific Railroad. A demonstration of the Missouri Pacific system was to be conducted during 1979. FRA was promoting the system for possible nationwide adoption.

*Grade Crossings.* FRA has been concerned with improving grade crossing safety. A nationwide grade crossing inventory has been developed and is updated regularly. Analytic efforts have been underway at the Transportation Systems Center to study accident and grade crossing data in order to determine the best means of correction. Under current analysis were: fluctuations in grade crossing accident rates, proposed improvement programs, signal failures, reflector and strobe light effectiveness, and traffic projection impacts.

### Federal Assistance

Under its state assistance program, FRA made grants to 47 of the 49 eligible states under Title VIII of the Railroad Revitalization and Regulatory Reform Act of 1976. The grants were for planning, operating subsidies, and rehabilitation of eligible local rail freight services. Regulations were published to provide overall instruction to applicants under the program. Also, the initial volume of a rail planning manual was produced. The manual provided more detailed technical advice to state participants.

Title V of the Railroad Revitalization and Regulatory Reform Act of 1976, as amended, established a new and active financial assistance role for the federal government in helping railroads meet the cost of renewing facilities and equipment and, in the longer term, achieve economic self-sufficiency. Through September 30, 1977, eight railroads had submitted an aggregate of 14 applications for the two types of assistance offered. The applications requested a total of \$386.5 million for preference share financing and \$134 million for obligation guarantees.

The preference share applications included \$362.3 million for facilities projects and \$24.2 mil-



## Progress Reports/Federal Railroad Administration

lion for equipment projects. During the year, \$57.8 million of railroad preference shares were purchased and a \$12 million loan was guaranteed. Loan guarantee applications totaled \$134 million. A major goal of FRA in fiscal year 1978 was to stimulate more extensive use of obligation guarantee financing, particularly in energy related projects.

### Civil Rights

FRA's external civil rights responsibilities have increased significantly as a result of the Railroad Revitalization and Regulatory Reform Act. FRA now has direct enforcement responsibilities with respect to equal employment opportunity compliance on the part of states applying for federal assistance. Reviews of the railroads, to check conformity with Departmental civil rights directives and guidelines, was in progress during the year. FRA's monitoring activities emphasized two areas—FRA contract awards of \$50,000 or more, and affirmative action plans which were submitted with loan applications from the railroads. (The General Services Administration retains the formal compliance responsibility for affirmative action plans; however, FRA maintains close liaison with the General Services Administration.)

As of September 30, 1977, a total of 155 (20.2%) of FRA's own employees were minority and 266 (34.6%) were female.

### Northeast Corridor Improvement Project

Fiscal year 1977 was the first year of actual track rehabilitation under the northeast corridor improvement project (NECIP). During the year, work began on the track and roadbed rebuilding program. Detailed engineering and design work and procurement of long lead time materials and equipment continued, laying the groundwork for major construction efforts that were to start during the latter part of 1978 and continue in subsequent years.

Most of the activities which began in fiscal year 1976 and which were directed toward planning, designing, and establishing contractual relationships and management structures continued during fiscal year 1977. Interim track and station rehabilitation work was also continued, using funds from the emergency improvement program and the job opportunities program.

During fiscal year 1977, FRA produced a series of important engineering control documents, including—the system performance specifications, the program requirements, the implementation master plan, and the engineering and architectural design stand-

ards. System simulation models were used to perform the engineering tradeoff analyses.

Accomplishments during the year were substantial—approximately 100 miles of roadbed and track improvement, organization of an effective supervisory force, and development of a trained work force.

Track work is at the heart of the NECIP and is performed almost exclusively by Amtrak employees. A significant portion of this labor force was recruited from the ranks of the unemployed. Using NECIP funds, Amtrak conducted a \$1.4 million training program to qualify these individuals and to bring them into the work force.

To ensure passenger safety and to eliminate excessive numbers of slow orders, the bridge program was accorded high priority. Funds were obligated for the first replacement bridge, the Woonasquatucket Bridge in Providence, Rhode Island. The amount committed for the overall bridge program during the year, including construction, design, painting, rehabilitation, and training, was approximately \$8.7 million. At year's end, 20 bridges were being improved.

Two other programs helped generate employment throughout the corridor—signaling and communications improvements, and right-of-way cleanup. Because the training effort required for the cleanup program was minimal, it was possible to employ fairly large amounts of labor on this activity without excessive delay. An extensive effort was made to encourage minority businesses to participate.

A project of the magnitude of the NECIP requires that large amounts of material be purchased. Of particular significance during fiscal year 1977 was the decision to install both concrete and wooden ties in the corridor. It was concluded that 1.1 million concrete ties should be installed on 400 miles of mainline passenger track. Approximately 900,000 wooden ties were to be installed along an additional 600 miles of track. During the year, purchase orders were placed for 400,000 wooden ties and bids were received for another 350,000.

Of particular importance during the period were the strides made in the project's minority participation program. The goal established for minority business participation in the NECIP was 15 percent of the total value of all contracts. The goal was based upon estimates of the number of minority firms that would be available and the nature and location of the work to be done. The project was planned at a level of \$1.8 billion, including anticipated state participation of \$75.5 million in connection with revenue-producing



## Progress Reports/Federal Railroad Administration

structures such as parking garages. Minority business participation would, therefore, be at least \$273 million.

Construction contracts awarded to minority businesses through fiscal year 1977 amounted to \$1.35 million. In addition, \$20.3 million worth of design subcontracts were being negotiated at the end of the fiscal year, with approximately 40 percent of this amount, \$8.1 million, to be committed to minority architectural and engineering firms. Awards to minority firms for engineering work totaled \$14.8 million. Procurement and delivery of the 1.1 million concrete ties was also expected to result in substantial minority business involvement.

The NECIP, in conjunction with its architectural and engineering contractor, Deleuw, Cather/Parsons Associates, established a minority employment goal of 26 percent of the work force to be employed in the engineering, design, and management aspects of the program. At the end of fiscal year 1977, Deleuw, Cather/Parsons Associates had 821 employees on the project, of whom 43 percent were minority members, plus 323 subcontractor employees, of whom 49 percent were minority. Amtrak had 1,630 employees on the project, of whom 39 percent were minority.

During the year, an extensive program was launched to coordinate the NECIP efforts with those of state, local, and regional groups and to provide for public participation in the planning process. Regional field offices were established, meetings were held with representatives of government agencies and interested organizations, and public hearings were conducted. These efforts were aimed at communicating with and obtaining comments from concerned groups and persons and at ensuring responsiveness to local needs and legal requirements. In addition, NECIP activities were closely coordinated with Amtrak; and Amtrak was directly involved in the planning and review process.

Another milestone reached during the year was completion of the draft environmental impact statement for the project. The draft statement was distributed, and public hearings were to be held in November to obtain reaction to the project and to the draft statement.

The need to improve the Northeast Corridor rail system is reflected in the operations of Amtrak during fiscal year 1977. Early in calendar year 1976, Amtrak had ordered speed restrictions, for safety reasons, over major track segments between Washington and New York. In most instances, speeds were limited to 80 mph, not a significant constraint on

conventional trains, which rarely exceed that speed, but a severe restriction on Metroliners, capable of 120 mph. As a consequence, Metroliner performance plunged and ridership fell off immediately.

### Research and Development

FRA's research and development activities during fiscal year 1977 focused on finding technological solutions to the most pressing problems facing the rail industry. Attention centered on three distinct areas of research—freight systems, passenger systems, and rail safety.

#### *Freight Systems Research.*

- Laboratory work on the optical automatic car identification system demonstrated the potential for improved scanners and car labels which would provide much higher reliability at significantly lower costs. The industry was expected to make a final decision on adoption of the improvements sometime during 1978.
- FRA published a report called *Railroad Classification Yard Technology: A Survey and Assessment*, which identified technical improvements to yards that would result in greater efficiency and reduced operating costs.
- Several projects in support of the energy efficiency program were undertaken. The most significant one resulted in a report called *Fuel Efficiency Improvements in Rail Freight Transportation*. The research and field tests conducted under this program indicated that significant fuel savings could be realized through improved multiple unit throttle controls for locomotives.

#### *Passenger Systems Research.*

- Tests were completed on the linear induction motor research vehicle's linear motor in its double-sided configuration. At the end of the year, the information acquired was being processed to gain a better understanding of the linear motor's characteristics. The vehicle and the motor were then to be modified to permit its operation in a single-sided configuration, so that it would be compatible with conventional railroad tracks.
- Considerable progress was made in the effort to improve the ride quality of existing passenger train equipment. Tests were carried out on improved Metroliner trucks at speeds up to 130 mph. The information collected in the tests was being evaluated before recommending modifications to the existing Metroliner equipment.

#### *Rail Safety Research.*

- FRA carried out extensive track geometry meas-



## Progress Reports/Federal Railroad Administration

urements, using its test cars T-1 and T-3. The test cars were also used in support of research on Amtrak's SDP-40F locomotive, in maintenance-of-way evaluations, and in track surveys. A total of 20,112 miles of track was surveyed on 15 railroads during the year, and data on 17,183 miles of track were processed to check railroad compliance with FRA track safety standards.

- Work was completed on the development of a more functional design for a freight locomotive cab. The design incorporated improvements in crash-worthiness, controls and displays, and visibility. A final performance specification on the new design was to be issued in 1978.
- FRA, working with the industry, sponsored a series of impact tests for evaluating the effectiveness of various glazing materials in providing occupant protection from bullets, rocks, and other objects directed at train windows. At the end of the year, performance specifications for glazing materials were being developed.
- FRA continued its participation in the joint track-train dynamics study. Two accomplishments in this study were completion of the life cycle analysis program (for predicting the useful life of critical vehicle components) and the "Comet" program (which predicts stresses in vehicle components under various load conditions). The aim of the track-train dynamics study is to develop performance specifications for vehicle and track components.

### Transportation Test Center

Transportation Test Center activities during the year emphasized projects designed to solve immediate problems faced by conventional rail and rapid transit facilities.

The most critical activities during the year related to railroad safety. They emphasized methods to make hazardous material tank cars safer and resulted in a regulation requiring modification of hazardous material tank cars.

Tests were conducted to evaluate the heat resistant and fire retardant capabilities of various thermal insulation materials. The tests indicated that thermal insulation effectively reduced the explosion potential if the insulated tank car was exposed to a fire. At the end of the year, the insulation materials were being evaluated for their weather resistant characteristics. One-hundred-ton tank cars with various thermal insulations were being periodically exposed to a strong salt water spray while being operated for 160,000 miles under simulated revenue service conditions.

Other activities involved railroad safety devices. One program concentrated on development of a wheel flaw detecting device and another on equipment designed to evaluate abnormal train braking performance. The wheel flaw detecting equipment, after undergoing exhaustive laboratory testing, was installed on the facility for accelerated service testing, where it was to be used for inspecting wheel components.

The first series of tests in the aerodynamic trailer-on-flat-car project was completed, and a second series of tests got underway. The second series was to use measuring devices which would record high-speed performance results more accurately.

Rail passenger equipment testing included a series of tests on Amtrak's new Pullman-built bilevel coaches. The tests began in May 1977 with one car and by late summer three more cars were added. The tests, which were completed in October 1977, were performed to determine ride quality and roadworthiness in simulated revenue runs. Other tests involved mass transportation equipment belonging to the Washington Metropolitan Area Transit Authority. Four Washington Metro cars were run over twenty thousand miles to evaluate their operational characteristics and reliability in simulated revenue service.

During the year over 130 million gross tons were moved over the facility for accelerated service testing. Although mileage had not been sufficient to assess the comparative wear rates and performance of some of the components under evaluation, others had developed definite wear and performance characteristics. The components requiring replacement or showing major wear were rail and wheels. Wheel flange wear was excessive, due to the numerous curves in the loop. After 40-45,000 miles, a number of wheels cracked across the flange. At the end of the year, this problem was under investigation. Meanwhile, the component study produced valuable information on the performance of steel ties, concrete ties, and rail metallurgy.

The test center's rail dynamics laboratory was in the final stage of its activation period, with test operations scheduled to begin in mid-1978. Dynamic testing was to be performed for a wide variety of users—the Federal Railroad Administration, the Urban Mass Transportation Administration, other federal agencies, the Association of American Railroads, railroads, and rail equipment suppliers. Once in operation, the facility was expected to enable researchers to perform much needed analytical and



## Progress Reports/Federal Railroad Administration

experimental tests of full-scale rail vehicles, mass transit vehicles, and advanced track systems. The testing was expected to be instrumental in solving some of the problems plaguing rail operations throughout the nation. Since the laboratory was to be available to both government and private users, it was expected to provide many benefits to rail transportation.

### The Alaska Railroad

For the Alaska Railroad, fiscal year 1977 was an adjustment period, following two record-setting years resulting from the construction of the trans-Alaska oil pipeline. Throughout the year, the Railroad concentrated on controlling expenses, as traffic revenues declined. As a result, the Railroad ended fiscal year 1977 with a positive cash flow of \$2.2 million.

The Alaska Railroad operates 526 miles of single track main line from the Ports of Seward and Whittier through Anchorage to Fairbanks and Eielson. Interline freight from the lower 48 states and Canada comes to the Port of Whittier in railcars via trainship and rail barge. Until fiscal year 1975, freight traffic through the Port of Seward had been very light. However, during fiscal years 1975 and 1976, Seward served as a receiving port for pipeline freight. Carloadings jumped from 150 in 1974 to 5,317 in 1975 and 10,313 in 1976. During 1977, Seward handled a total of 1,040 carloads of freight, most of which consisted of material moving south into Seward in support of oil exploration in the Gulf of Alaska.

Passenger service is operated from Whittier to Portage and Anchorage and from Anchorage to Fairbanks, a total of 419 road miles. The Whittier-Portage-Anchorage run is operated daily during the summer and three times a week during the winter. Consisting of passenger coaches and flatcars for auto, truck, bus, and motorhome haulage, the train serves the auto ferry which runs between the Ports of Whittier and Valdez. The main passenger service is between Anchorage and Fairbanks; it operates daily May to September and twice weekly during the winter. The most important intermediate stop is McKinley Station, location of the McKinley Park Hotel and gateway to McKinley National Park. Approximately 75 percent of the tourist passengers make a stop at McKinley Park. Overall, passenger traffic increased significantly in fiscal year 1977. The 103,632 passengers carried represented a 23 percent increase over fiscal

year 1976. Revenue passengers to Whittier doubled, but there was a decline in passenger traffic between Anchorage and Fairbanks. Passenger revenues increased three percent.

The Alaska Railroad is under mandate from Congress to operate within its revenues. Prior to fiscal year 1975, it had experienced a number of approximate break-even years, including some which produced negative cash flows. The resulting lack of funds contributed to a buildup of deferred maintenance and an inadequate and worn-out locomotive and car fleet. In fiscal year 1975, the Department and Congress recognized the Railroad's plight, and an appropriation of \$6 million was granted. An additional \$9 million appropriation was provided in fiscal year 1976, and \$6 million in fiscal year 1977. These funds, coupled with Railroad earnings during the two pipeline construction years, enabled the Railroad to acquire some locomotives, rolling stock, and support equipment and to perform some roadbed and track maintenance and improvement. This three-year capital and major maintenance program, totaling \$33 million, placed the Railroad in a much improved condition; but a continuation of the program, with emphasis on track and roadbed maintenance, was needed to enable the Railroad to meet customer requirements and maintain the government's investment.

Fiscal year 1977 revenues of \$35 million represented a 35 percent drop from the previous year. In contrast to an operating surplus of \$5.8 million in fiscal year 1976, fiscal year 1977 produced an operating deficit of \$960 thousand. While a breakeven financial posture was not achieved in fiscal year 1977, the Railroad did produce a positive cash flow of \$2.2 million, which was an improvement over fiscal year 1976's positive cash flow of \$1.8 million. To counter the 35 percent drop in revenues, the Railroad instituted strict management and budget controls. Expenses were reduced from \$49.6 million in fiscal year 1976 to \$36 million in fiscal year 1977, a reduction of over 27 percent.

During fiscal year 1977, the Railroad moved 2.3 million tons of freight (a 10 percent increase) a total of 404 million ton miles (a 24 percent decrease). As these figures indicate, the loss of long-haul pipeline support traffic was partially offset by an increase in short-haul traffic. Fiscal year 1978 was expected to produce a moderate further decline in traffic ton miles.



# National Highway Traffic Safety Administration

A major mission of the National Highway Traffic Safety Administration (NHTSA) is to reduce the number of deaths and injuries on the highways.

A second mission of NHTSA is to reduce motor vehicle fuel consumption. NHTSA is responsible for setting annual average fleet miles per gallon standards for automobiles, light trucks, and vans, so that the Congressional mandate of 27.5 miles per gallon by 1985 can be met.

A third mission of NHTSA is to decrease unnecessary repair expenses to vehicle owners, to furnish consumer safety and repair information, and to prevent odometer tampering.

## Basic Problems

- In calendar year 1976, there were approximately 45,500 deaths from automobile accidents; and the number of deaths in 1977 was running slightly higher. Highway fatalities continued to be one of the major causes of death in the United States.
- The dominant causes of traffic fatalities have been driver related, and speed has been a significant factor. Although the national 55 mph speed limit reduced the death rate (deaths per 100 million vehicle miles) by about 11 percent, efforts to enforce the speed limit were not as successful as hoped. Increased federal assistance was apparently needed.
- In recent years alcohol has been involved to some degree in over 50 percent of fatal accidents. Most states had programs to counter this problem, but changes in public and court tolerance of drunken drivers were required if the problem was to be reduced significantly.

- Safety belts were clearly effective in reducing deaths and injuries, but only 6 to 10 percent of those killed in traffic accidents were wearing them. Studies indicated that safety belts were used only 20 percent of the time by front seat occupants. As a result, one expected effect of requiring passive restraints (such as air bags or passive safety belts) was a reduction in deaths and injuries.

## Passive Restraints

Two basic approaches have been available to save lives and reduce injuries by occupant restraint systems. One approach is the enactment of mandatory seat belt laws. More than 20 nations and two provinces of Canada have enacted mandatory seat belt laws to increase the effectiveness of seat belt systems. The other approach is the installation of automatic restraints in place of or in conjunction with ordinary belt systems. Passive restraint systems are passive in the sense that no action by the occupant is required. Passive restraint systems automatically provide a high level of crash protection to front seat occupants.

Two forms of passive restraints are inflatable restraints (commonly known as air bags) and passive belts. Air bags are fabric cushions that can be filled with a gas (usually nitrogen). When a crash occurs, a sensing device is triggered and the bags inflate to provide a cushion between the occupant and the vehicle interior. Passive belt systems are similar to ordinary belt systems, but are automatically fastened around the occupants when they enter the vehicle and close the doors.

As a result of a departmental decision issued in fiscal year 1977, every automobile sold in the United States was to have automatic crash protection (air bags or passive safety belts) by model year 1984. Crash protection for front seat occupants would be required for luxury and standard cars in model year 1982; for intermediate and compact cars in model year 1983; and for subcompact and mini cars in model year 1984. It was estimated that nearly 9,000 lives would be saved annually when passive restraints were present in the entire U.S. automobile fleet. The decision to require passive restraints was the culmination of federal interest in passive restraints dating back to 1969, when an advance notice of proposed rulemaking was first issued on air cushion restraints.

## 55 mph Speed Limit

At the President's request, the Department prepared and submitted a report to the President on compliance with the 55 mph speed limit. The report indi-



## Progress Reports/National Highway Traffic Safety Administration

cated that highway speeds had dropped significantly in 1974, but were gradually increasing, and that a significant proportion of motorists were violating the speed limit. The report recommended actions to improve compliance with the speed limit, such as: implementing an expanded long-term public information program; allocating \$30 to \$50 million per year to assist state enforcement programs; and requesting authority from Congress to establish state performance criteria. In addition, the agency conveyed to the public a high degree of federal commitment to 55 mph and provided technical assistance in the development of state enforcement programs.

### Fuel Economy Standards

The Energy Policy and Conservation Act of 1975 stipulated that each manufacturer's fleet of passenger cars must meet an average fuel economy of 18 mpg in model year 1978, steadily increasing to 27.5 mpg for 1985 models. NHTSA was given responsibility for determining the required fuel economy levels for model years 1981-84. After extensive analysis, including consideration of such criteria as technological feasibility, economic practicability, the effect of other motor vehicle standards, and the nation's energy needs, NHTSA set levels of 22 mpg for model year 1981, 24 mpg for 1982, 26 mpg for 1983, and 27 mpg for 1984. It also issued fuel economy standards for non-passenger automobiles applicable to model year 1979.

### Traffic Safety Statistics

Each year, NHTSA collects and analyzes a nationally representative sample of accident data. These data are used by safety experts to study the causes of accidents and injuries and to determine the vehicle, driver, and environmental characteristics associated with crashes. The data provide valuable support to NHTSA's safety programs and research activities, by helping identify specific problems and remedies and by providing a basis for evaluation and modification of proposed or existing standards.

### The Highway Safety Program

NHTSA's state and community highway safety program provides \$150 million annually in grants to the states. The funds can be used for a wide range of highway safety activities, but not for highway construction. In fiscal year 1977, NHTSA submitted a report to Congress on the highway safety program, as required by the 1976 Highway Safety Act. The report, as submitted, tried to balance the need for state

flexibility in the management of the program with the need for a nationally consistent highway safety effort. The major recommendations of the report were:

- That state compliance with federal standards be required only in areas where national uniformity is essential;
- That state agencies pinpoint their most pressing problems and apply federal funds to those problems;
- That responsibility for managing the grant program be retained by state highway safety agencies; and
- That more attention be given to local safety programs.

### Improving Motor Vehicles

*Compliance Testing.* During fiscal year 1977, NHTSA tested 140 vehicles against 219 performance requirements of the safety standards. In addition, 3,002 tires and 3,842 other items of motor vehicle equipment, including seat belts, lighting equipment, brakes, child restraints, and motorcycle helmets were subjected to performance tests. More than 343 compliance investigations were completed, and 17 civil penalties were imposed totaling \$73,000. NHTSA also continued its testing to facilitate eventual implementation of uniform tire quality grading regulations.

*Defect Investigations.* The backlog of pending defect investigations was reduced from 67 to 21, twelve of which were less than six months old. Between September 1966 and September 1977, 58.3 million vehicles were recalled in 2,314 campaigns. A total of 7.5 million vehicles were recalled in 220 campaigns during fiscal year 1977.

*Crash Avoidance.* School bus standards were amended to require dual master cylinders on buses equipped with hydraulic brakes (to decrease the risk of brake failure). The brake fluid standard was amended to require color coding (to decrease the risk of replacing the fluids incorrectly). Passenger car tire standards were amended to include metric-unit tires (to conform with world-wide standardization) and space-saver spare tires.

### Vehicle Research Projects

Three major vehicle research projects were in progress during the year. They included:

- A four-passenger safety vehicle, which was being developed by Minicars;
- A five-passenger safety vehicle, which was being developed by Calspan and Chrysler; and
- A four-passenger fuel economy vehicle, which was



## Progress Reports/National Highway Traffic Safety Administration

being developed by Volkswagen.

The Minicars vehicle utilized a foam-filled structure to reduce weight and improve crashworthiness. It was expected to provide over 50 mph barrier crash protection, with passive restraints, and nearly 35 mph fuel economy.

The Calspan and Chrysler vehicle utilized advanced materials but conventional production processes and was expected to have slightly poorer crashworthiness and fuel economy than the Minicars vehicle.

The objective of the Volkswagen project was to develop a data base for lightweight automotive diesel power plants for passenger vehicles under 3,000 pounds. Major results of the project included: high fuel economy (nearly 60 mpg); reduced exhaust emissions; good acceleration and drivability; and verification of the compatibility of diesel engines with advanced crashworthiness capabilities. The study also provided fuel economy data on 4-, 5-, and 6-cylinder prototype diesel engines with and without turbocharging.

### Motor Vehicle Inspection Programs

During the year, New Mexico and Wyoming repealed their periodic motor vehicle inspection laws. However, thirty states still had periodic inspection programs and North Dakota and Washington were in the process of establishing inspection programs. In addition, several states had experimented with substitute programs.

### Engineering Test Facility

Fiscal year 1977 was the start-up year for NHTSA's engineering test facility, located at the Transportation Research Center of Ohio. Most of the testing done at the facility during the year was in support of NHTSA's safety defect investigations. The balance was validation of test procedures for new and amended safety standards. In the future, the facility was also expected to do some compliance testing.

### Human Factors

*Alcohol Abuse.* No matter how the overall highway fatality rate changed, crashes involving drinking drivers remained a stubborn problem. Alcohol was a contributing factor to nearly 24,000 highway fatalities every year. Social drinkers appeared to be responsible for roughly 8,000 of the alcohol related fatalities, while problem drinkers accounted for twice that, or 16,000 alcohol-related highway deaths. However, problem drinkers represented only

about 7 percent of the driving population.

During fiscal year 1977, NHTSA continued its efforts to develop more effective alcohol countermeasures. Activities during the year included demonstration programs in increased enforcement against driving under the influence (Stockton, California), probation followup of driving under the influence convictions (Memphis, Tennessee, and the State of Mississippi), comprehensive treatment of driving under the influence offenders (Sacramento, California), and youth enforcement (Lansing, Michigan).

*Safety Education.* NHTSA's emphasis in traffic safety education continued to be on evaluation. Projects underway in fiscal year 1978, for example, included:

- The safe performance curriculum demonstration project in DeKalb County, Georgia. In this project, a model driver education curriculum and a minimal curriculum (the pre-licensing course) were being evaluated against a no-education control group.
- The distribution of a model secondary school education curriculum entitled, "Youth... Alcohol and Driving," which was designed to reduce crashes among young drivers.
- The Texas young problem driver improvement demonstration project, which was designed to determine whether or not re-education programs can reduce crashes and violations among young problem drivers.
- The comprehensive driving under the influence offender treatment project in Sacramento, California, which was an attempt to evaluate a variety of educational and rehabilitation alternatives for first and multiple offenders.

### Motorcycle Safety

The Highway Safety Act of 1976 forbade the Secretary to withhold funds from any state failing to require helmet use by motorcyclists 18 years of age or older. Between May 1976 and September 1977, 22 states either fully repealed (8 states) or substantially weakened (14 states) their helmet laws. In those states which repealed their laws, motorcycle fatalities increased by 18.9 percent.

Mopeds (motorized bicycles) are an emerging highway safety problem. During the year, an attempt to develop a 10 year forecast of moped use and accidents began, as well as a study of the handling and stability characteristics of the vehicles. Detailed investigations of moped crashes occurring in Los Angeles were to be used to develop a data base on moped accidents.



## Progress Reports/National Highway Traffic Safety Administration

### Pedestrians and Bicyclists

Pedestrian safety efforts continued to concentrate on urban areas, since 85 percent of all pedestrian accidents and two-thirds of all pedestrian fatalities occurred on urban streets. During the year, the states concentrated on identifying significant local pedestrian safety problems and one city (Denver) began the first systematic pedestrian safety project using the urban pedestrian accident data developed by NHTSA.

In May 1977, the Department and the Consumer Product Safety Commission sponsored the first national conference on bicycle safety education. The conference was attended by more than 200 federal, state, and local officials involved in bicycle safety.

### Traffic Safety Services

*Emergency Medical Services.* As the emergency medical services system grew, problems emerged that required a nationally coordinated effort. The need for better citizen access to the emergency medical services response system was an example. To meet this need, a program was developed to standardize the use of citizens band radio for highway safety. Another example was the need for better accident location information. During the year, a study was underway of the possible adaptation of Loran C, a marine and military navigation system, to highway safety, to provide accident site location data and to aid in dispatching emergency vehicles. A third example was the need for better training of the 287,000 ambulance personnel in the U.S. By the end of the year, eighty percent of them had completed NHTSA-developed courses.

The military assistance to traffic and safety program utilizes military helicopters and military paramedical personnel to respond to civilian medical emergencies, particularly to highway accidents. At the end of the year, 23 Army and Air Force sites were participating in the program. A successful pilot program was conducted to determine if reserve military units could participate. At the end of the year, planning was underway to add as many as 11 reserve sites and 22 National Guard sites.

*Police Services.* Research has indicated that driver error is a contributing cause in 90 percent of motor vehicle accidents. Recognition of this, plus the impact that the 55 mph national speed limit has had on reducing fatalities, has given enforcement activities an added significance. At the end of the year, programs were underway to provide the states

and communities with the best guidelines and techniques available for improving the quality of their traffic enforcement efforts—with emphasis on 55 mph compliance.

The programs included:

- Studying the possible use of civilian personnel for some traffic enforcement duties.
- Developing standards for speed measuring devices and developing product lists to assist states and communities in their equipment selection.
- Conducting regional workshops for legislators and for enforcement, court, and safety personnel to improve 55 mph compliance.

*Licensing and Registration.* In view of the large percentage of accidents in which human error is a contributing cause, it is important that only qualified persons be licensed to drive. During fiscal year 1977, NHTSA emphasized improved driver testing, the use of driving simulators, and driver license classification.

The state vehicle registration systems are the source of vehicle and owner identification data for law enforcement and are critical to the recovery of stolen vehicles.

During the year, NHTSA approved a plan to place its driver register on a computerized "real-time" basis, which would give the states rapid access to information which is essential in evaluating driver license applications. The project should be in the demonstration phase by 1980.

*Traffic Record Systems.* The states must have adequate traffic records in order to identify their traffic problems and effectively carry out their highway safety planning. To this end, NHTSA was examining the traffic record systems of each state and recommending improvements. Attention was focused on information on alcohol and driving, the use of safety equipment (seat belts, motorcycle helmets, etc.), adherence to the 55 mph speed limit, and vehicle defects contributing to accidents. NHTSA was also supporting a project for the formulation of a standard for traffic record systems.

*Adjudication of Infractions.* In response to the Highway Safety Act of 1973, NHTSA funded a project in Seattle, Washington, to demonstrate the effectiveness of administrative adjudication of traffic infractions. Federal support for the project ended in June 1977, but it was being continued with state funds. The project had a dramatic effect on the state court system, with a 17 percent reduction in the backlog of cases, reduced cost of hearings, and time saved by the police departments and police prosecutors. The project was also well received by the local citizens.



## Progress Reports/National Highway Traffic Safety Administration

### Consumer Assistance

A major education and demonstration program was carried out to publicize the Secretary's decision to require passive restraint systems in future passenger cars. The program used passenger cars which were specially modified for demonstrating air bags. The vehicles were displayed at state and county fairs, shopping centers, and conventions and at gatherings of state and local officials. Brochures, fact sheets, and films were prepared for use by NHTSA staff members.

The auto safety hotline proved so successful in aiding consumers in resolving their automotive difficulties and in accumulating valuable information on possible safety defects that it was made a permanent operation. Two popular booklets were published—"Safe Driving in Winter," and a Spanish language version of "Tips on Car Care and Safety for Deaf Drivers" (which had been published in an English version earlier). Two fact sheets were issued which dealt with problems of engine stalling and vehicle exhaust systems and the existing fact sheet on brake fluid standards was revised.

### Traffic Safety Litigation

Several judicial actions affecting traffic safety were taken during the year. They included the following:

- *B.F. Goodrich et al. v. DOT; Uniroyal et al. v. DOT*. The Supreme Court denied the petition of eight domestic tire manufacturers for a writ of certiorari on March 21, 1977. On December 13, 1976, Justice Potter Stewart had denied the tire manufacturers' application to recall and stay a mandate of the Sixth Circuit Court of Appeals with respect to the uniform tire quality grading standard.
- *Truck Equipment and Body Distributors Association (TEBDA) v. NHTSA*. On September 13, 1976, TEBDA filed a petition for review of Federal Motor Vehicle Safety Standard 301-75 (Fuel System Integrity) in the Sixth Circuit Court of Appeals. Successive motions of TEBDA to stay the September 1, 1976, effective date of the standard were denied by the court on October 15, 1976, and November 30, 1976. On February 7, 1977, the court granted NHTSA's motion to dismiss on the ground that the court lacked jurisdiction because TEBDA's petition for review was untimely. The court rejected TEBDA's contention that the 60-day period prescribed in the National Traffic and Motor Vehicle Safety Act of 1966 for filing the petition commences on the effective date of the standard rather than its date of issuance.

- *United States v. General Motors Corp. (GM)*. On June 28, 1977, the Sixth Circuit Court of Appeals reversed an earlier ruling by the United States District Court for the District of Columbia and ordered that steps be taken to require GM to notify the owners of 1959 and 1960 model year Cadillacs that a defect existed in their steering pitman arms. Failure of the pitman arm could result in loss of steering control.

- *United States v. Ford Motor Co. (Ford)*. On October 20, 1976, the United States District Court for the District of Columbia ordered Ford to notify owners of and to remedy defective 1968-69 Mustangs and Cougars. Failure of the defective component, a seat bracket, could result in accidents or injuries. Ford, in March 1977, agreed to obey the order but simultaneously pressed forward with an appeal of the merits of the case in the Court of Appeals. At the same time, NHTSA appealed the court's ruling with respect to the letter Ford used to notify the owners of the defect. NHTSA sought stronger wording in the letter.

### Administration

During the year, an office was established within NHTSA to analyze existing and proposed standards, regulations, grants, and other agency actions from the marketing, social, environmental, and inflationary points of view. In addition, the responsibilities of the Chief Counsel were expanded to include the legal services required in the prevention of consumer fraud resulting from odometer tampering. The services include—the development of enforcement programs in cooperation with the Department of Justice, state attorneys general, and other law enforcement officials; and the investigation and prosecution of cases of actual or suspected violations of the law or regulations.

### Civil Rights

Notable civil rights accomplishments during the fiscal year included the following:

- A cooperative educational program which provides on-the-job training in the emergency medical services program as part of the requirements for a two-year college course of study. The program also provides alternating work-study assignments in such categories as mechanical engineering and statistics for candidates for the bachelor degree. Forty-two percent of the students included in the program in fiscal year 1977 were minority and 57 percent were female.
- At the end of fiscal year 1977, NHTSA had 854 employees, including 189 minority and 286 female.
- Minority representation in professional positions



## Progress Reports/National Highway Traffic Safety Administration

increased from 9.8 percent to 10.4 percent.

- With a total representation in the work force of

33.4 percent, women received 41 percent of the promotions.



# Urban Mass Transportation Administration

Two years of uncertainty were ended in May 1977 when the Secretary decided to require all new transit buses purchased with Urban Mass Transportation Administration (UMTA) assistance to be fully accessible to all persons, including elderly and handicapped riders. The Transbus, developed under an UMTA research and development program, was the basis for the new bus performance specification. All UMTA-funded buses purchased after September 30, 1979 were required to meet the new specifications.

By the end of the fiscal year, significant progress had been made in organizing a consortium of transit operators for an initial purchase of several hundred of the buses.

## Grant Procedures

To increase the efficiency and timeliness of UMTA grant deliveries, the agency began planning the decentralization of most grant-related activities to UMTA's 10 regional offices. Led by a task force of UMTA personnel, the agency was preparing to delegate to the field offices responsibility for most planning, capital, and operating grant programs.

Plans called for the transferring of 80 percent of grant-making responsibility to the 10 regions when full regional staffing was achieved. The San Francisco, Chicago, and New York regional offices were expected to join the Philadelphia office as fully-functioning regional offices early in fiscal year 1978. Boston and Atlanta were in line for full decentralization at a later date and the remaining five regions were to receive limited staffing additions as a first step toward full project authority.

## People Movers

Four cities were selected in December 1976 to participate in UMTA's downtown people mover program. Cleveland, Houston, St. Paul, and Los Angeles were given approval to develop plans for people mover systems—fully automated circulation systems which would link major activity centers within their downtown areas. UMTA pledged \$220 million in federal funding for the program's initial stage.

In addition, Baltimore, Detroit, and Miami were given approval to reprogram existing capital commitments to include people mover projects; and Jacksonville, Indianapolis, Norfolk, and St. Louis were authorized to begin people mover planning.

## Policy and Program Decisions

Several policy and program decisions were made during the year that were expected to significantly affect UMTA programs.

Passage of the Rail Transportation Improvement Act of 1976 made deferred maintenance costs eligible for commuter rail emergency assistance provided under the Urban Mass Transportation Act.

Revised procedures for UMTA's formula assistance program were established as part of the overhaul of UMTA's grant management operations. The new procedures were intended to reduce the paperwork required for formula grant applications and to enable applicants to submit complete applications earlier in the fiscal year. The new procedures eliminated all duplicate material and several unnecessary exhibits. Moreover, the new procedures enabled recipients to submit their applications prior to the beginning of the project year, enabling them to avoid cash flow problems later on.

In October 1976, UMTA published a proposed policy for federal participation in paratransit (non-fixed route transit) projects. The proposed policy would encourage each urban area to consider public paratransit whenever such services would be more effective and economical than conventional transit service. The proposed policy also would require assurance that private transit providers have ample opportunity to plan and to participate in such service.

## Capital Assistance Grants

During fiscal year 1977, a total of \$1.7 billion in capital assistance grants was approved by UMTA. Approval was given to 221 new projects and 93 ongoing projects received additional funding.

As of September 30, 1977, the cumulative total for all capital grant funding since the beginning of the



## Progress Reports/Urban Mass Transportation Administration

UMTA program (early in 1965) amounted to \$8.3 billion for 1,060 separate projects.

*Discretionary Grants.* Discretionary capital grants comprised the largest percentage of UMTA funding for the year. A total of \$1.2 billion was approved for 137 new and 79 amended projects. Included in these totals were \$10.6 million in 32 separate grants for capital equipment and facilities for use by private non-profit organizations in providing transportation for elderly and handicapped persons. As of September 30, 1977, the cumulative total of discretionary grants since 1965 was \$7 billion for 900 separate projects.

Under provisions of the Federal-Aid Highway Act of 1973, interstate highway segments could be deleted (by state and local decision) and funds equal to the cost of the deleted segment could be made available for mass transit projects. In fiscal year 1977, \$392 million in interstate fund transfers was approved. The Washington Metropolitan Area Transit Authority in Washington, D.C., received \$328 million, and the Massachusetts Bay Transportation Authority received \$64 million. As of September 30, 1977, a cumulative total of \$1.1 billion in interstate funds had been transferred.

Under the federal aid to urban systems program, \$42 million was approved for transit capital improvement projects, bringing the cumulative total provided under this program to \$115.7 million by year's end.

*Formula Grants.* Under UMTA's formula grant assistance program, there were 76 capital grant approvals during the year for new projects and 11 amendments to ongoing projects, for a total funding of \$39.4 million. Cumulatively, UMTA had funded 127 formula grant capital projects for a total of \$80.8 million.

### Capital Grant Management

Large urbanized areas of one million population and over continued to receive the majority of federal mass transit funds. In fiscal year 1977, 92 percent of the discretionary capital grant funds went to these areas, and *all* interstate substitution and urban system funds went to large urbanized areas. However, the formula capital funds went primarily to smaller communities, with only 20.7 percent going to urbanized areas of more than one million population.

UMTA capital funds continued to be used largely for rail improvements, either rapid, light, or commuter rail. In fiscal year 1977, total rail commitments were \$1.2 billion, or 71.6 percent of the total capital

grant commitments. The first of UMTA's new standard light rail vehicles, developed under an UMTA research and development project and funded by UMTA capital funds, went into service in Boston late in December 1976. These light rail cars were the first new "streetcars" to be produced in the U.S. since 1952; they will replace the 1930's style PCC cars in a number of cities.

Bus transit improvement commitments in fiscal year 1977 amounted to \$482.6 million, or 28 percent of the total commitments, while grants to improve ferry boats and other non-conventional modes of transit totaled \$7 million, or 0.4 percent of the capital funds.

*Rail Transit Grants.* There were several especially significant grants in the rail sector during the year:

- UMTA provided \$185.4 million to the Metropolitan Atlanta Rapid Transit Authority. In January 1977, UMTA entered into an experimental management agreement under which UMTA's review and approval of individual grant actions was eliminated or drastically reduced. This agreement resulted in a streamlined working relationship between the two agencies and enabled the Metropolitan Atlanta Rapid Transit Authority to reduce the manpower needed to meet federal paperwork requirements. By the end of the year, UMTA's grants to the Atlanta project totaled \$692 million.
- Baltimore's Mass Transit Administration received \$100 million to continue its ongoing rapid transit project. By the end of the year, UMTA's grants to this project totaled \$348.8 million.
- Major interstate fund substitutions were made in Boston, with \$22.3 million going to the Red Line extensions between Quincy Center and South Braintree and from Harvard Square to Alewife Brook Parkway (at the Cambridge-Belmont-Arlington boundary).
- In New York City, three major construction projects continued to receive UMTA funds. The 63rd Street subway link to the existing subway system received \$15.5 million, the Archer Avenue subway in Queens \$24.9 million, and the 63rd Street subway link to the Long Island Rail Road \$87.6 million.
- Washington's subway construction project received its third interstate system transfer grant of \$328 million, bringing total interstate transfer funding to \$727.1 million.
- Chicago received a "commitment in principle" for \$110 million in capital funds to extend the Chicago Transit Authority's rapid transit line to O'Hare International Airport. The eight-mile extension would run in the existing median of the Kennedy Expressway.



## Progress Reports/Urban Mass Transportation Administration

- Detroit received a "commitment in principle" of \$600 million for a comprehensive program of transportation improvements in the community. The federal funding was contingent on the provision of \$220 million in state matching funds and \$600 million in urban residential and commercial development from the Detroit business community. Determination of modes and routes had not yet been made at the end of the year.

- During the fiscal year, funds for 420 new rail cars were approved, including 320 rapid transit, 48 light rail, and 52 commuter rail vehicles.

*Bus Transit Grants.* Bus transit improvement projects also continued to receive funds, including funds for 3,800 new buses and for construction of 22 new maintenance and operations facilities. Among the significant bus transit improvement grants during the year were the following:

- The Denver Regional Transportation District received \$30.2 million to purchase 160 new buses and to fund other improvements.

- The newly established Greater Cleveland Regional Transit Authority received a grant of \$55.1 million for bus and rail improvements, including the purchase of 180 new buses, 20 rapid rail cars, and 48 light rail cars.

- The Southern California Rapid Transit District, serving the Los Angeles area, received a grant of \$33.3 million for new buses and other equipment.

*People Mover Grants.* In September 1977, UMTA awarded \$968,400 to St. Paul, the first city to submit a formal application for funding for a people mover system. The money was to be used for performing preliminary engineering and design work.

A new program management technique called the "controlled capital grant" was devised to deal with the deployment of downtown people movers. In most UMTA capital projects, the local sponsor provides full project management, with UMTA serving as an administrative and advisory resource. In the downtown people mover program, however, UMTA assigned management responsibility to its own Office of Automated Guideway Transit Applications.

### Operating Assistance Grants

Commitments in fiscal year 1977 under the formula grant program for operating assistance amounted to \$574 million for 386 projects. This was nearly a 35 percent increase over the previous year's commitments. At the end of the year, a cumulative total of \$939 million in operating assistance grants had been awarded.

Cities with major rail transit systems, such as New York and Chicago, received a majority of the operating funds. Although federal assistance provides less than 20 percent of the total national transit operating expense, the assistance does enable transit operations to continue in cities with critical financial problems.

### Regulatory Activities

During fiscal year 1977, UMTA prepared and implemented a number of regulations, guidelines, and procedures:

- On January 19, 1977, UMTA published final regulations that require recipients of formula assistance grants to adhere to a uniform system of accounts and records and to participate in a reporting system to facilitate the collection of information required by the Mass Transit Act of 1964.

- On September 20, 1977, the Federal Highway Administration published final regulations concerning the use of federal-aid highway funds for mass transit and transit-related facilities, for special use highways, and for non-highway public mass transit projects.

### Transportation Planning

UMTA's technical studies program continued to provide funds for states, metropolitan planning organizations, and transit agencies. A total of \$43.2 million went to approximately 285 grantees to support transit-related research and planning studies and to develop integrated transportation improvement programs at the local level.

During the year, \$41.2 million was awarded for planning, engineering, designing, and evaluating urban mass transportation projects. An additional \$2 million was set aside to fund special studies in transportation systems.

Special emphasis was given to improving alternatives analyses (for major new mass transit investments), environmental impact statements, transportation system management plans, and elderly and handicapped planning, and to development of improved evaluation techniques.

Other technical studies program activities during the year included providing planning support for the downtown people mover program, improving planning for energy conservation, and encouraging a limited number of joint public and private urban development projects around fixed guideway transit stations.



## Progress Reports/Urban Mass Transportation Administration

### Policy Research

During fiscal year 1977, the emphasis in UMTA's policy research was on the energy conservation potential of mass transit, the land use effects of rail investments, transportation system management, and paratransit.

Transit performance and its improvement received considerable attention during the year, and UMTA performed a major evaluation of the transit operating assistance program, developed case studies of factors contributing to increased ridership in seven cities, and conducted its first conference on transit performance.

### Transit Management

Better training for mass transit personnel was promoted through several UMTA projects. Training for bus operators and mechanics, for instance, was examined in a study initiated during the year. A series of tests designed to predict an applicant's potential as a successful bus operator was validated for white, black, and Spanish-speaking males; and validation of the tests for female applicants was begun.

A public transportation course was developed under a joint UMTA and Federal Highway Administration training agreement and was offered to participants from highway and transit agencies at the federal, state, and local levels. Additional courses were being developed.

A new program—the national transit internship project—was developed to encourage college and graduate students to consider employment in the transit industry. Participants received a first-hand look at transit management and operations at the 19 transit agencies participating in the first year of the two-year program.

UMTA's program of marketing assistance was influenced by the results of a one-year demonstration project in Nashville, Tennessee, designed to validate a basic methodology for transit marketing. The demonstration resulted in development of simplified techniques for conducting consumer research on a market-wide basis and in development of a curriculum for an applied transit marketing course to be offered in fiscal year 1978.

UMTA also made progress during the year in implementing the first operational demonstrations of pricing policy. The pricing demonstrations included the first fare-free demonstration, authorized under the National Mass Transportation Assistance Act of 1974, and several demonstrations of fare prepayment systems.

In the area of conventional transit service innovations, there is now general acceptance of the validity of using priority techniques for high occupancy vehicles. However, the efficiency of same-direction reserved freeway lanes which are not separated by physical barriers remains in doubt. Demonstrations of this technique in Los Angeles, Miami, and Portland all revealed problems with safety, enforcement, and public acceptance.

Increased attention was given to techniques to improve central business district bus operations, such as transit malls and auto restricted zones. Preliminary studies were completed, and four cities (Providence; Memphis; Boston; and Burlington, Vermont) were selected as sites for auto restricted zone demonstrations. A transit mall was being developed at Times Square in New York City.

Three UMTA projects, intended to promote improved productivity of transit system manpower, reached the demonstration phase during the year:

- In Rochester, New York, communication between the demand-responsive vehicle and the computerized dispatching equipment was fully automated, eliminating the need for human participation in dispatching, except in emergencies. A special mobile printer is used to speed up communication and to reduce the demand for scarce radio frequencies.
- Final preparation was underway for a full-scale demonstration of an advanced automatic vehicle monitoring system in Los Angeles. This demonstration was based on successful field testing in Philadelphia the previous year.
- Final preparations were being made in Washington, D.C., for a demonstration of an automated transit information system that would enable telephone operators to provide quick answers to queries about using the combined bus and rail system.

During the year, UMTA increased its efforts to solve the problems of cost and performance of new rail transit systems and equipment. Phase I of the rail-car standardization project was completed, resulting in an eight-step program for achieving standardization, which was to be pursued in Phase II. The American Public Transit Association, representing transit operators, and the Railway Progress Institute, representing the supply industry, collaborated with UMTA on the standardization project as well as on another project designed to clarify and equalize the terms and conditions under which rail transit equipment is procured by UMTA grantees.

The largest single cost component in UMTA's capital assistance program continued to be fixed rail



## Progress Reports/Urban Mass Transportation Administration

construction, particularly tunneling. UMTA's tunneling program, coordinated with related efforts by the Federal Highway Administration, emphasized reducing costs and inducing American contractors and operators to accept and use technological advances made abroad. Demonstration test sections of actual subways under construction in Atlanta, Baltimore, and Washington used advanced techniques for tunnel lining and ground stabilization, resulting in impressive savings, even in the demonstration projects.

Technology delivery and technical information exchange continued to be important items of concern during the year and were explored in depth at UMTA's second research and development priorities conference in December 1976.

### Civil Rights

UMTA continued its tradition of leading the Department of Transportation in equal employment opportunity. At the end of fiscal year 1977, minorities constituted 36 percent of UMTA's total workforce—160 of 441 persons. In the professional ranks, 75 of 318 persons, or 24 percent, were minorities.

In addition, there were 195 women employees,

or 44 percent of the total workforce. Women held 70 professional slots, or 22 percent of that category. One of every three women employed by UMTA was a professional.

UMTA monitors its grant program for compliance with civil rights precepts and provides technical services and conciliation support. During fiscal year 1977, UMTA found 52 grant recipients to be in non-compliance with civil rights laws and regulations. Forty-eight of them were brought into compliance by the end of the fiscal year.

UMTA's review of contractors working for UMTA grantees indicated that 12 were not in compliance, but all were brought into compliance by year's end.

UMTA continued to enhance minority and female business enterprise opportunities through its general procurement program and through monitoring of the procurement activities of UMTA grantees. During the year, UMTA awarded or was negotiating the awarding of 53 contracts worth more than \$4.4 million to minority enterprises. Grantees reported the awarding of 184 contracts and subcontracts, totaling nearly \$28 million, to minority enterprises.



# **Saint Lawrence Seaway Development Corporation**

The Saint Lawrence Seaway Development Corporation (SLSDC) was created in 1954 to construct the U.S. portion of the Saint Lawrence Seaway. Since 1959, when the seaway opened to navigation by ocean-going ships, the SLSDC has been responsible for operation and maintenance of that part of the seaway between Montreal and Lake Erie which lies on the U.S.-Canadian boundary.

Tonnage through the Montreal-Lake Ontario section of the seaway during 1977 rose 16 percent, to 63.3 million tons. This was the highest annual

volume in the seaway's 19 year history. Seaway tonnage records also were set in five individual cargo categories—bulk, all grains, wheat, iron ore, and container cargo. Bulk cargo climbed 13 percent in 1977, compared to the previous year, while general cargo rose 50 percent. Within the general cargo class, shipments of iron and steel products were up 73 percent.

SLSDC revenues increased 17.8 percent over the previous year, to a record \$8.6 million. Of that total, \$1 million was returned to the U.S. Treasury for payment of the bonded debt incurred in constructing the seaway, reducing that debt to \$115.5 million.

During 1977, the SLSDC and the Seaway Authority of Canada reached an agreement on a revised joint tariff that was to be phased in over a three year period beginning in 1978. The new tariff includes an expanded list of commodity classes, the conversion of short tons to metric tons, a higher share of revenues for the SLSDC, and the first cargo toll increases since the seaway was constructed.

The SLSDC expected its increased revenues from higher tolls to enable it to meet all costs for operation, maintenance, and depreciation for 1978 and to retire a portion of its outstanding construction debt. The Treasury Department agreed to a rearrangement of the debt retirement schedule to accommodate the three-year toll phase-in.

According to the Seaway Act of 1954, the SLSDC is required to submit to the President, for transmission to Congress, a separate annual report. The most recent report may be obtained at no charge from: The Office of Communications, Saint Lawrence Seaway Development Corporation, P.O. Box 520, Massena, New York 13662.



# Materials Transportation Bureau

The Materials Transportation Bureau (MTB) is responsible for protecting the public against potential risks to life and property posed by the transportation of hazardous materials and for developing and administering a national program for the safe transportation of gases and hazardous liquids by pipeline. MTB administers a hazardous materials regulatory program and is also responsible for enforcement of the regulations, insofar as they apply to container manufacturers and multimodal shippers. The 1.5 million mile U.S. gas and liquid pipeline system is regulated to assure the safety of the public and to prevent damage to the environment. The pipeline safety standards which are issued by MTB cover the design, construction, testing, inspection, operation, and maintenance of pipeline facilities.

## Hazardous Materials Regulation

A hazardous materials regulatory program, initiated in fiscal year 1977, provided for the conversion of certain exemptions to general regulations. During the year, 140 exemptions were eliminated through this procedure.

The most pressing hazardous materials safety problem during the year was the transportation of flammable gases and anhydrous ammonia in uninsulated pressurized railroad tank cars. As a result, the regulations covering Department of Transportation Specification 112 and 114 tank cars were revised. The new regulations required thermal protection, tank car head puncture resistance (such as head shields), and special couplers to be retrofitted to existing cars and to be installed on all new cars built

after December 31, 1977.

MTB issued 16 other amendments to the hazardous materials regulations and 27 notices of proposed rulemaking during 1977. The notice with the greatest potential impact requested comments regarding the need to expand the hazardous materials regulatory base to include "non-acute" hazards, such as environmental, occupational, and health hazards. With the exception of radioactive materials and disease causing agents, the Department's hazardous materials regulations had been concerned primarily with materials which posed acute hazards. Although the proposed change would require significant modification of hazard classification criteria, MTB felt that the change might be necessary because of increasing knowledge of the non-acute effects of many materials.

## Pipeline Safety Regulation

During the year, MTB amended the federal pipeline safety standards to allow markers to display the name of the gas being transported in a pipeline and to clarify the maximum allowable operating pressure for offshore gas gathering lines. The amendments also permitted the use of metal fittings in plastic pipelines without requiring coating, cathodic protection, or monitoring, if adequate corrosion control is provided by the use of corrosion resistant metals.

*Trans-Alaska Crude Oil Pipeline.* A major concern of the Department during fiscal year 1977 related to the integrity of the girth welds on the trans-Alaska crude oil pipeline. Several actions were taken during the year to assure that the completed pipeline met the federal liquid pipeline safety standards.

The Department also participated in the startup and initial filling of the pipeline, investigated the explosion and fire which occurred at Pump Station No. 8 during the startup operations, and participated in a critique on the construction of the pipeline. Environmental, technical, socio-economic, and administrative aspects of the project were discussed in depth by participants from government, industry, and environmental organizations during this critique.

*Alaska Natural Gas Pipeline.* The Alaska Natural Gas Transportation Act of 1976 required government agencies to carry out a number of actions directed toward expedited construction of a transportation system to deliver Alaska natural gas to other states. During fiscal year 1977, the Department initiated and participated in a number of significant activities aimed at implementing the provisions of this legislation. The Department was also designated the lead agency in the preparation of the recommendations



## Progress Reports/Materials Transportation Bureau

concerning safety, design, and cost overruns in the report which the President was to submit to Congress in fiscal year 1978 on the selection of an Alaska natural gas transportation system.

The Department cooperated with other federal agencies in preparing the pipeline construction terms and conditions, assisted in the development of a proposed system for the federal government to use to monitor the design and construction of the pipeline, and performed related technical reviews. The Department expected to serve as a member of a federal executive policy board which would provide policy guidance to a federal inspector, appointed by the President, who would have overall responsibility for ensuring that the federal terms and conditions were met during pipeline construction. The Department also expected to have an agency official on-site to perform pipeline safety inspections.

*Pipeline Safety Committee.* The Department's Technical Pipeline Safety Standards Committee was established, under Section 4(b) of the Natural Gas Pipeline Safety Act, to review and to report on the technical feasibility, reasonableness, and practicability of proposed pipeline safety standards and amendments. During fiscal year 1977, the committee considered proposed standards for corrosion control of small metal fittings in plastic pipelines, for longitudinal seams in pipe bends, for the design of plastic pipelines, and for the conversion of liquid pipelines to gas service. The Department also conducted a review of the functions of this committee during the year and determined that the benefits derived could be obtained through other mechanisms, including public conferences, seminars, and the standard public rulemaking process. Legislation to abolish the committee was introduced in Congress.

### Operations

*Safety Performance.* Carriers have been required to report all incidents involving unintentional release of a hazardous material in transportation. The reports provide information about the material itself and the quantity involved, in addition to details of the packaging or storage of the cargo. Analysis of the reports has indicated that the primary cause of material release has been the failure of shippers and carriers to properly load and stow (block and brace) the hazardous cargo.

A study of 1,500 reports of unintentional releases of hazardous materials from tank trucks and trailers revealed that 84 percent of the incidents in this category were the result of human error, including errors that caused vehicular accidents, and that

only 16 percent of the incidents were caused by equipment failure. However, this attribution of causes does not preclude the possibility of noncompliance with the regulations, which often can be determined only through on scene investigations.

Of nearly 12,000 incident reports received in 1976, 57 percent revealed no apparent violations, 24 percent indicated possible or probable violations by the carrier, and 14 percent indicated possible or probable violations by the shipper. The remaining 5 percent indicated possible violations by both the shipper and carrier or by the container manufacturer. All reports are referred to the appropriate administration within the Department for follow-up investigations.

During fiscal year 1977, gas pipeline operators reported 39 fatalities and 447 injuries resulting from 2,113 gas pipeline failures. Two deaths and 13 injuries resulted from 228 reported liquid pipeline accidents. MTB participated in investigations of 22 of the incidents, in cooperation with state agencies and the National Transportation Safety Board.

Damage to buried pipelines from outside forces, particularly from excavation work and other underground construction, continued to be the cause of the majority of gas and liquid pipeline accidents. The Department has safety jurisdiction only over the pipeline operators, who seldom are the cause of the damage. For several years, the Department has encouraged state and local governments to take action to reduce the number of accidents caused by outside forces damaging gas pipelines. During fiscal year 1977, the Department drafted a model "Underground Utility Damage Prevention Act," which was sent to the Council of State Governments for publication.

*Compliance and Enforcement.* During the year, MTB implemented the preemption and enforcement provisions of the Hazardous Materials Transportation Act. The preemption procedures were expected to improve the ability of MTB to deal with violations of the federal regulations.

The hazardous materials enforcement program involves checking the facilities and operating practices of container manufacturers and shippers, as well as hazardous materials carriers. Subjects for investigation are determined primarily on the basis of information in hazardous material incident reports. However, some investigations are the result of National Transportation Safety Board requests, public complaints, information obtained in the hazardous materials exemptions programs or the hazardous materials registration program, or requests by other agencies within the Department.

MTB has found, in general, that in highly tech-



## Progress Reports/Materials Transportation Bureau

nical areas (such as the transportation of nuclear materials), where the regulated industry is comparatively sophisticated, compliance with the regulations is high. However, a large segment of the regulated community consists of firms whose involvement with hazardous materials transportation is only a small portion of their business, and compliance by these firms is likely to be rather low.

During fiscal year 1977, MTB conducted 139 safety evaluations of interstate and intrastate gas pipeline operators, conducted 38 monitoring inspections of liquid pipeline carriers, and devoted 339 inspection days to monitoring the construction and startup of the trans-Alaska crude oil pipeline. MTB also conducted 51 evaluations of 43 state pipeline safety programs and monitored 70 safety inspections conducted by state personnel in 40 states. These evaluations were made to ensure that the compliance programs executed by state agencies are effective. During the year, MTB initiated a total of 139 enforcement actions against pipeline operators.

*Training.* MTB tries to balance its enforcement efforts with a program to educate part-time and incidental handlers and transporters of hazardous materials regarding the provisions of the federal regulations, particularly those covering packaging and giving notification of hazards. During the year, MTB conducted 24 two-day hazardous materials seminars and distributed over 750,000 pieces of training material, to increase industry awareness of the regulations. In addition, MTB supported and provided instructors for the hazardous materials training course conducted by the Department's Transportation Safety Institute.

*State Programs.* During calendar year 1977, the states (including the District of Columbia and Puerto Rico) received \$2,300,000 in federal assistance for their gas pipeline safety programs. The states continued to improve their programs, with the addition of full-time engineers or inspectors to their pipeline safety staffs and the participation of their staff members in MTB sponsored training.

### Research and Development

To provide the technical information needed to support its hazardous materials programs, MTB utilizes the services of both private and federal research and

development facilities. Research projects underway in fiscal year 1977 were aimed at improving the classification and classification testing criteria for hazardous materials and at development of performance-oriented packaging criteria. Other research efforts focused on plastic packaging performance; metallurgical evaluation and fracture analysis of compressed gas cylinders; and classification of blasting agents, flammable solids, and oxidizing, thermally unstable, and spontaneously combustible materials.

Pipeline safety research and development activities focused on areas where field experience, investigations, and monitoring activity had indicated a potential for improving pipeline safety technology. The testing of pipeline specimens and components to determine causes of pipeline failures continued. Attention was given to maintenance of offshore pipelines, critical elements in storing and handling liquefied natural gas, problems of environmentally caused cracking in pipelines, and state and industry programs for the prevention of damage to pipelines by outside forces.

### Intergovernmental and International Programs

To ensure a unified and consistent approach to the safe transportation of hazardous materials, MTB participates in international standards development and coordinates its programs with other federal agencies. During the year, MTB employees participated in five international meetings. The meetings addressed such topics as classifying new substances, setting standards for packaging, defining and listing new explosives, and establishing criteria for hazard grouping.

MTB established a closer relationship with the Environmental Protection Agency (EPA) during the year as a result of two new pieces of legislation—the Toxic Substances Control Act, and the Resource Conservation and Recovery Act. Both acts affected the Department's hazardous materials control program. The Department has statutory authority which can be used to assist the EPA in administering and achieving the goals of these Acts, while the information obtained from EPA is useful to the Department in evaluating the transportation hazards of various toxic substances and hazardous wastes.







# Appendix



## NATIONAL RAILROAD PASSENGER CORPORATION

As the result of a Congressional mandate, the Department of Transportation, in cooperation with the National Railroad Passenger Corporation (Amtrak), undertook a comprehensive reexamination of Amtrak's route structure. The study was expected to provide the information needed to develop recommendations for a route structure which would provide an optimal railroad passenger system based on the nation's current and future market and population requirements. Departmental views, comments, and reactions to Amtrak, which are normally included in the Department's annual report, were to be included in a special Secretarial report to Congress on March 1, 1978.

## CONSOLIDATED RAIL CORPORATION

The Regional Rail Reorganization Act of 1973 (RRRA) requires the Secretary of Transportation, as part of his annual report to Congress, to submit a report on the effectiveness of the United States Railway Association (USRA) and the Consolidated Rail Corporation (Conrail) in implementing the purposes of the RRRA.

During fiscal year 1977, Conrail continued to make progress toward the goal of providing adequate and efficient rail service to the region and to the

national transportation system. During the year, however, problems appeared, such as equipment condition, which seemed likely to require additional government funding and to result in a longer time before Conrail could achieve profitability. Through its first 18 months of operation, Conrail was very close to the financial results projected in the final system plan; however, adverse events in 1977, such as the severe winter and the Johnstown flood, increased Conrail's losses and their need for federal financing. At the end of the year, USRA and the Department were evaluating Conrail's potential need for federal financing in excess of the \$2.1 billion already authorized.

In order to meet the financial needs of Conrail and other railroads, USRA continued to provide funds under the financial assistance provisions of the RRRA. During the year, USRA provided \$722 million in federal funds to Conrail, bringing the total federal investment in the railroad to \$1,031 million.

Under the provisions of the RRRA, which authorized loans to solvent carriers connecting with RRRA carriers in reorganization, USRA continued to provide assistance to the Delaware and Hudson Railway Company. The Delaware and Hudson drew down \$4.5 million during the year, for a total of \$26 million of the \$28 million loan authorized. Katy Industries, Inc., parent of the Missouri-Kansas-Texas Railroad Company, repaid \$2 million of its \$19 million loan.



**TABLE I. U.S. Department of Transportation Program Levels, Budget Authority, Obligations, and Outlays, Fiscal Year 1977.**

(dollars in millions)

<i>Organization</i>	<i>Program Levels<sup>1</sup></i>	<i>Budget Authority</i>	<i>Obligations</i>	<i>Outlays</i>
Office of the Secretary . . . . .	64	64.2	55.4	62.4
United States Coast Guard . . . . .	1,294	1,307.6	1,265.1	1,158.8
Federal Aviation Administration . . . . .	2,572	2,564.2	2,560.6	2,368.9
Federal Highway Administration . . . . .	7,523	3,760.3	7,249.6	6,145.0
National Highway Traffic Safety Administration . . . . .	205	91.3	209.4	168.6
Federal Railroad Administration . . . . .	491	491.1	382.8	210.9
National Railroad Passenger Corporation . . . . .	601	600.7	727.6	730.1
Urban Mass Transportation Administration . . . . .	2,471	455.0	2,470.8	1,708.9
Saint Lawrence Seaway Development Corporation . . . . .	—	—	6.4	(1.3)
Materials Transportation Bureau . . . . .	2 <sup>2</sup>	2.2 <sup>3</sup>	3.7 <sup>4</sup>	0.4 <sup>5</sup>
Subtotals . . . . .	15,224	9,336.7	14,931.5	12,552.7
Deduct Proprietary Receipts from the Public . . . . .	—	(38.7)	—	(38.7)
TOTALS . . . . .	15,244	9,298.0	14,931.5	12,514.0

<sup>1</sup> A combination of budget authority, obligations, and administrative reservations which is the best budgetary indicator of the Department's activities.

<sup>2</sup> Excludes \$11 million which is included under the Office of the Secretary.

<sup>3</sup> Excludes \$5.5 million which is included under the Office of the Secretary.

<sup>4</sup> Excludes \$5.5 million which is included under the Office of the Secretary.

<sup>5</sup> Excludes \$5.2 million which is included under the Office of the Secretary.

**TABLE II. U.S. Department of Transportation Authorized Full-Time Permanent Positions, Fiscal Year 1977.**

<i>Organization</i>	<i>Positions</i>
Office of the Secretary . . . . .	1,455
United States Coast Guard <sup>1</sup> . . . . .	45,053
Federal Aviation Administration . . . . .	57,994
Federal Highway Administration . . . . .	4,883
National Highway Traffic Safety Administration . . . . .	918
Federal Railroad Administration . . . . .	1,602
Urban Mass Transportation Administration . . . . .	505
Saint Lawrence Seaway Development Corporation . . . . .	193
Materials Transportation Bureau <sup>2</sup> . . . . .	691
TOTAL . . . . .	113,294

<sup>1</sup> Includes 6,853 civilians and 38,200 military.

<sup>2</sup> Excludes 215 positions which were included under the Office of the Secretary.



**TABLE III. U.S. Department of Transportation Full-Time Minority and Female Employment, 1968-77.**

<i>Year</i>	<i>Total</i>	<i>Minority</i>	<i>%</i>	<i>Total</i>	<i>Female</i>	<i>%</i>
1968	58,556	5,032	8.6	50,773	9,354	18.4
1969	58,726	4,586	7.8	52,400	8,856	16.9
1970	62,278	5,216	8.4	56,805	9,979	17.6
1971	66,918	6,063	9.1	60,047	10,411	17.3
1972	66,219	6,372	9.6	61,368	10,773	17.6
1973	65,227	6,248	9.6	61,851	10,316	16.7
1974	65,098	6,773	10.4	62,723	10,898	17.4
1975	68,241	7,647	11.2	64,588	11,373	17.6
1976	71,679	8,989	12.5	65,758	11,745	17.8
1977	72,005	9,572	13.3	66,698	12,342	18.5

NOTES:

1. MINORITY EMPLOYMENT FIGURES AND TOTALS EXCLUDE EMPLOYEES IN HAWAII, GUAM, AND PUERTO RICO.
2. FEMALE EMPLOYMENT FIGURES AND TOTALS COVER WHITE COLLAR POSITIONS ONLY FOR THE YEARS 1972-75 AND GENERAL SCHEDULE POSITIONS ONLY FOR ALL OTHER YEARS.
3. MINORITY DATA ARE AS OF JUNE 30 FOR 1968 AND 1969 AND AS OF MAY 31 FOR ALL OTHER YEARS.
4. FEMALE DATA ARE AS OF JUNE 30 FOR 1968 AND 1969, AS OF MAY 31 FOR 1970, 1971, 1976, AND 1977, AND AS OF OCTOBER 31 FOR 1972-75.
5. THE SOURCE OF ALL DATA FOR 1972-75 IS THE CIVIL SERVICE COMMISSION.

**TABLE IV. Summary of Reported Gas Pipeline Failures and Casualties, Calendar Years 1970-76.**

<i>Calendar Year</i>	<i>Distribution</i>					<i>Transmission and Gathering</i>				
	<i>No. of Failures</i>	<i>Fatalities</i>		<i>Injuries</i>		<i>No. of Failures</i>	<i>Fatalities</i>		<i>Injuries</i>	
		<i>Employees</i>	<i>Non Employees</i>	<i>Employees</i>	<i>Non Employees</i>		<i>Employees</i>	<i>Non Employees</i>	<i>Employees</i>	<i>Non Employees</i>
1970 .....	676	1	20	32	170	343	1	0	8	8
1971 .....	875	6	36	36	329	410	2	1	14	10
1972 .....	884	2	26	32	262	409	3	3	23	13
1973 .....	893	1	32	48	285	471	1	1	3	16
1974* .....	1,017	1	19	31	283	460	1	3	7	13
1975* .....	979	0	8	29	191	394	5	1	8	9
1976* .....	1,036	3	50	66	253	543	2	8	28	19

\*Includes data from telephonic reports which were not included in data for calendar years 1970-73.



**TABLE V. Summary of Reported Gas Pipeline Failures and Casualties, by Type and Cause, Calendar Year 1976.**

	<i>Total No. of Failures</i>	<i>Fatalities</i>		<i>Injuries</i>	
		<i>Employees</i>	<i>Non Employees</i>	<i>Employees</i>	<i>Non Employees</i>
Distribution					
Total .....	1,036	3	50	66	253
Subtotal by Cause:					
Corrosion .....	118	0	1	8	33
Damage by Outside Forces .....	659	2	16	16	103
Construction Defect or Material Failure .....	115	0	27	20	81
Other Causes .....	144	1	6	22	36
Transmission and Gathering					
Total .....	543	2	8	28	19
Subtotal by Cause:					
Corrosion .....	115	0	0	0	0
Damage by Outside Forces .....	219	0	8	0	5
Construction Defect or Material Failure .....	180	1	0	6	2
Other Causes .....	29	1	0	22	12
Gas Industry Totals .....	1,579	5	58	94	272

**TABLE VI. Summary of Reported Liquid Pipeline Accidents and Casualties, Calendar Years 1968-76.**

<i>Year</i>	<i>Accidents</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Loss of Commodity (Barrels)</i>
1968	499	11	32	392,588
1969	403	5	4	343,691
1970	347	4	21	521,849
1971	308	1	8	245,057
1972	309	8	19	360,654
1973	273	7	8	379,365
1974	256	10	11	293,643
1975	255	7	15	319,423
1976	209	5	5	255,037



**TABLE VII. Abstract of Coast Guard Operations Within the Enforcement of Laws and Treaties Program, Fiscal Year 1977.**

**Resource Employment**

Cutter patrol days .....	5,869 <sup>1</sup>
Aircraft patrol hours .....	12,964 <sup>1</sup>
Person-years .....	4,795
Expenses .....	\$94,294,000

**Fisheries Law Enforcement**

Fishing vessel sightings <sup>2</sup> .....	4,379
Violations detected, pre-FCMA <sup>3</sup> .....	7 (1 vessel seized, penalty \$250,000)
Fishery operations (Mar 1-Sept 30, 1977)	
Fishing vessel boardings .....	1,531 (1,207 foreign, 324 domestic)
Citations issued .....	365 (269 foreign, 96 domestic)
Civil penalty actions .....	180 (113 foreign, 67 domestic)
Seizures affected .....	3 vessels (total penalties \$589,900) and 16 tons of illicit fish

**General Law Enforcement<sup>4</sup>**

Vessels seized .....	41
Persons arrested .....	225
Street value of contraband interdicted .....	\$281,454,000

<sup>1</sup>Cutter/aircraft employment data reflects actual patrol operations for the period October 1, 1976-June 30, 1977 (i.e., 4,402 cutter days; 9,723 aircraft hours) and an estimate of such patrol operations for the period July 1-September 30, 1977 (i.e., 1,467 cutter days; 3,241 aircraft hours).

<sup>2</sup>Number of sightings is the sum of monthly totals. Any fishing vessel sighted more than once during any calendar month is counted as one sighting; one vessel in the patrol zone continuously for 12 months equates to 12 sightings.

<sup>3</sup>Violations detected during the period October 1, 1976-February 28, 1977, prior to Fishery Conservation and Management Act of 1976 coming into effect for enforcement purposes.

<sup>4</sup>Drug trafficking, customs, illegal aliens, etc. Data reflects the results of Coast Guard operations both independent of and in conjunction with other law enforcement agencies.



**TABLE VIII. U.S. Coast Guard Financial Statement, Fiscal Year 1977.**

<i>Appropriated Funds</i>	<i>Funds Available<sup>1</sup></i>	<i>Total Obligations</i>	<i>Unobligated Balances<sup>2</sup></i>
Operating Expenses .....	\$ 838,352,540	\$ 836,272,012	\$ 2,080,528
Acquisition, Construction and Improvements .....	327,749,455	232,713,757	95,035,698
Alteration of Bridges .....	10,900,000	10,900,000	0
Retired Pay .....	140,300,000	139,181,067	1,118,933
Reserve Training .....	35,750,000	35,637,922	112,078
Research, Development, Test, and Evaluation .....	24,716,065	19,156,980	5,559,085
State Boating Safety Assistance .....	6,680,132	6,473,795	206,337
Pollution Fund .....	22,600,291	8,643,653	13,956,638
<b>TOTAL APPROPRIATED FUNDS</b>	<b>1,407,048,483</b>	<b>1,288,979,186</b>	<b>118,069,297</b>
<i>Reimbursements</i>			
Operating Expenses .....	17,346,295	17,346,295	0
Acquisition, Construction, and Improvements .....	10,040,429	6,013,893	4,026,536
Reserve Training .....	20,250	20,250	0
Research, Development, Test, and Evaluation .....	818,691	689,942	128,749
<b>TOTAL REIMBURSABLE FUNDS</b>	<b>28,225,665</b>	<b>24,070,380</b>	<b>4,155,285</b>
<i>Trust Funds</i>			
Coast Guard General Gift Fund .....	25,796	4,013	21,783
Surcharge Collection, Sale of Commissary Stores .....	294,948	155,193	139,755
Coast Guard Cadet Fund .....	6,403,788	6,403,788	0
<b>TOTAL TRUST FUNDS</b>	<b>6,724,532</b>	<b>6,562,994</b>	<b>161,538</b>
<i>Intra Governmental Revolving Funds</i>			
Coast Guard Supply Fund .....	58,309,427	58,074,908	234,519
Coast Guard Yard Fund .....	54,535,895	30,266,658	24,269,237
<b>TOTAL REVOLVING FUNDS</b>	<b>112,845,322</b>	<b>88,341,566</b>	<b>24,503,756</b>
<i>Accrued Gross Expenditures</i>	<i>Total</i>	<i>Direct</i>	<i>Reimbursable</i>
Operating Expenses .....	\$ 847,740,315	\$ 830,930,099	\$ 16,810,216
Acquisition, Construction, and Improvements .....	117,535,662	116,896,193	639,469
Alteration of Bridges .....	10,334,223	10,334,223	0
Retired Pay .....	139,019,932	139,019,932	0
Reserve Training .....	35,906,803	35,879,546	27,257
Research, Development, Test, and Evaluation .....	17,176,574	16,540,818	635,756
State Boating Safety Assistance .....	6,574,998	6,574,998	0
Pollution Fund .....	10,700,930	10,700,930	0
Coast Guard General Gift Fund .....	4,876	4,876	0
Surcharge Collections, Sale of Commissary Stores .....	155,193	0	155,193
Coast Guard Cadet Fund .....	6,403,788	0	6,403,788
Coast Guard Supply Fund .....	56,960,511	0	56,960,511
Coast Guard Yard Fund .....	31,453,501	0	31,453,501
<b>TOTAL</b>	<b>1,279,967,306</b>	<b>1,166,881,615</b>	<b>113,085,691</b>



**TABLE VIII. U.S. Coast Guard Financial Statement, Fiscal Year 1977 (continued).**

<sup>1</sup>Funds available include unobligated balances brought forward from prior year appropriation as follows:

Operating Expenses .....	\$ 166,962
Acquisition, Construction, and Improvements	
Appropriated Funds .....	91,749,454
Reimbursements .....	173,565
Research, Development, Test, and Evaluation	
Appropriated Funds .....	5,916,065
Reimbursements .....	459,356
State Boating Safety Assistance .....	890,132
Pollution Fund .....	712,142
Coast Guard General Gift Fund .....	18,307
Surcharge Collections, Sale of Commissary Stores .....	139,390
Coast Guard Supply Fund .....	1,418,577
Coast Guard Yard Fund .....	2,755,887
TOTAL .....	\$ 104,399,837

<sup>2</sup>Unobligated balances remain available for obligation in fiscal year 1978 as follows:

Acquisition, Construction, and Improvements .....	98,933,897
Research, Development, Test, and Evaluation .....	5,687,834
State Boating Safety Assistance .....	206,337
Pollution Fund* .....	3,956,638
Coast Guard General Gift Fund .....	21,783
Surcharge Collections, Sale of Commissary Stores .....	139,755
Coast Guard Supply Fund .....	234,519
Coast Guard Yard Fund .....	24,269,237
TOTAL .....	\$ 133,450,000

\*A total of \$10,000,000 was appropriated for the pollution fund in fiscal year 1977, but the Treasury did not issue a warrant in fiscal year 1977.



**TABLE IX. Summary of Active Airpeople, as of December 31, 1975 and 1976.**

Category	Year	
	1975	1976
<b>PILOT</b>		
Student	176,978	188,801
Private	305,863	309,005
Commercial	189,342	187,801
Airline Transport	42,592	45,072
Other <sup>1</sup>	13,412	13,567
TOTAL	728,187	744,246
<b>NONPILOT</b>		
Mechanic	205,436	212,303
Ground Instructor	51,365	53,464
Ground Tower Operator	23,956	24,584
Flight Engineer	26,788	27,560
Other <sup>2</sup>	16,389	16,670
TOTAL	323,934	334,611
<b>FLIGHT INSTRUCTOR</b>	44,777	46,236

<sup>1</sup>Includes helicopter only, glider only, and lighter-than-air pilot certificates.

<sup>2</sup>Includes flight navigators, parachute riggers, and dispatchers.



**TABLE X. U.S. General Aviation Accidents, Fatalities, Aircraft Hours Flown, Aircraft Miles Flown, and Accident Rates, Calendar Years 1966-76.**

Year	Accidents		Fatalities	Aircraft-Hours Flown (000)	Aircraft-Miles Flown (000)	Accident Rates			
						Per 100,000 Aircraft-Hours Flown		Per Million Aircraft-Miles Flown	
	Total	Fatal				Total	Fatal	Total	Fatal
1966	5,712	573	1,149 <sup>1</sup>	21,023	3,336,138	27.2	2.73	1.71	0.172
1967	6,115	603	1,229	22,153	3,439,964	27.6	2.72	1.78	0.175
1968	4,968 <sup>2</sup>	692 <sup>2</sup>	1,399	24,053	3,700,864	20.6	2.86	1.34	0.186
1969	4,767	647	1,413 <sup>1</sup>	25,351	3,926,461	18.8	2.55	1.21	0.164
1970	4,712 <sup>2</sup>	641 <sup>2</sup>	1,310	26,030	3,207,127	18.1	2.46	1.47	0.200
1971	4,648	661	1,355	25,512	3,143,181	18.2	2.59	1.48	0.211
1972	4,256 <sup>2</sup>	695 <sup>2</sup>	1,421 <sup>1</sup>	26,974	3,317,100	15.8	2.57	1.28	0.209
1973	4,255 <sup>2</sup>	723 <sup>2</sup>	1,412	30,048	3,728,500	14.2	2.40	1.14	0.193
1974	4,425 <sup>2</sup>	729 <sup>2</sup>	1,438	32,475	4,042,700	13.6	2.24	1.04	0.180
1975	4,237 <sup>2</sup>	675 <sup>2</sup>	1,345	34,165	4,238,400	12.4	1.97	1.00	0.159
1976	4,193	695	1,320	36,128	4,476,014	11.6	1.92	0.94	0.155

<sup>1</sup>Excludes air carrier fatalities (1966-2, 1967-104, 1969-82, 1972-5) when in collision with general aviation aircraft.

<sup>2</sup>Suicide/sabotage accidents included in all computations except rates (1968-3, 1970-1, 1972-3, 1973-2, 1974-2, 1975-2, 1976-4).

**TABLE XI. U.S. Certificated Route Air Carrier Accidents, Fatalities, Passengers Carried, Passenger Miles Flown, and Fatality Rates, in Scheduled Domestic and International Passenger Service, Calendar Years 1966-76.**

Year	Accidents		Fatalities				Passengers Carried <sup>1</sup>	Passenger-Miles Flown (000)	Passg Fatality Rate Per 100 Million Passenger-Miles Flown
	Total	Fatal	Passenger	Crew	Other	Total			
1966	53	4	59	13	0	72	109,390,556	83,142,197	0.071
1967	51	8	226	24	5	255	132,088,038	103,381,996	0.219
1968	53	13 <sup>2</sup>	305	34	6	345	150,162,701	119,612,578	0.255
1969	48	7	132	17	3	152	159,213,414	132,161,593	0.100
1970	39	2	2	0	1	3	171,697,097	139,157,806	0.001
1971	41	6 <sup>2</sup>	174	14	6	194	173,664,737	145,678,876	0.119
1972	43	7	160	13	13	186	188,938,932	159,722,015	0.100
1973	32	6	197	20	0	217	202,207,000	171,436,549	0.115
1974	42	7	420	40	0	460	207,449,006	173,349,894	0.197
1975	28	2	113	9	0	122	205,059,571	174,173,138	0.065
1976	21	2	36	2	0	38	223,313,131	190,915,721	0.019

<sup>1</sup>Beginning in 1970, carriers were required to report revenue passenger enplanements, whereas prior to 1970, revenue passenger originations were reported.

<sup>2</sup>Includes 2 midair collisions nonfatal to air carrier occupants.

NOTE:

PASSENGER DEATHS OCCURRING IN SABOTAGE ACCIDENTS ARE INCLUDED IN THE PASSENGER FATALITY COLUMN BUT EXCLUDED IN THE COMPUTATION OF PASSENGER FATALITY RATES (1974-79).



**TABLE XII. Summary of U.S. Train Accidents and Casualties, Calendar Years 1972-76.**

<i>Category</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>
Number of train accidents <sup>1</sup>					
Collisions .....	1,348	1,657	1,551	1,002	1,370
Derailments .....	5,509	7,389	8,513	6,328	7,934
Other .....	675	652	630	711	944
<b>TOTAL TRAIN ACCIDENTS</b> .....	<b>7,532</b>	<b>9,698</b>	<b>10,694</b>	<b>8,041</b>	<b>10,248</b>
Number of casualties in accidents of all types <sup>2</sup>					
Trespassers killed .....	537	578	565	524	458
Trespassers injured .....	586	614	674	703	768
Passengers killed .....	47	6	7	8	5
Passengers injured .....	680	503	574	1,307	999
Employees on duty killed .....	127	158	140	110	100
Employees on duty injured .....	12,456	13,098	15,620	47,318	57,889
All other persons killed .....	1,234	1,174	1,196	918	1,121
All other persons injured .....	4,208	4,039	3,950	4,978	5,731
<b>TOTAL NUMBER OF PERSONS KILLED</b> .....	<b>1,945</b>	<b>1,916</b>	<b>1,908</b>	<b>1,560</b>	<b>1,684</b>
<b>TOTAL NUMBER OF PERSONS INJURED</b> .....	<b>17,930</b>	<b>18,245</b>	<b>20,818</b>	<b>54,306</b>	<b>65,387</b>
Highway grade crossing accidents <sup>3</sup>	3,392	3,379	3,268	11,354	12,114
Persons killed .....	1,260	1,186	1,220	978	1,168
Persons injured .....	3,307	3,306	3,260	4,168	4,887

<sup>1</sup> Monetary reporting threshold prior to 1975 was \$750, in 1975 it was increased to \$1750.

<sup>2</sup> Includes lost time cases only, prior to 1975. Reporting requirements were changed in 1975 to be comparable to OSHA reporting requirements—includes cases with lost or restricted time; those requiring medical treatment beyond first aid; termination of employment; transfer to another job; loss of consciousness; and occupational illnesses.

<sup>3</sup> All impacts between on-track equipment and highway users reported in 1975. Prior to 1975, such impacts were reported only if they resulted in a reportable casualty, or in \$750 in damages to railroad on-track equipment, signals, track, track structure, and roadbed.



**TABLE XIII. Summary of U.S. Rail-Highway Grade Crossing Accidents and Casualties, Calendar Years 1972-76.**

<i>Accidents<sup>1</sup> and Casualties<sup>2</sup></i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>
<i>Accidents at highway grade crossings involving motor vehicles</i>					
<i>Total Accidents</i> .....	3,222	3,190	3,089	10,925	11,700
<i>No. of Persons Killed</i> .....	1,190	1,078	1,128	788	1,028
<i>No. of Persons Injured</i> .....	3,201	3,215	3,166	3,600	4,414
<i>Train accidents<sup>3</sup> as a result of collisions between trains and motor vehicles</i>					
<i>Total Accidents</i> .....	244	302	334	248	332
<i>No. of Persons Killed</i> .....	83	93	101	63	121
<i>No. of Persons Injured</i> .....	82	171	232	235	294
<i>Total rail-highway grade crossing accidents and resulting casualties<sup>2</sup></i>					
<i>Total Accidents</i> .....	3,379	3,379	3,278	11,354	12,114
<i>No. of Persons Killed</i> .....	1,260	1,186	1,220	978	1,168
<i>No. of Persons Injured</i> .....	3,285	3,306	3,260	4,168	4,887
<i>Railroad Casualties</i>					
<i>Passengers</i>					
<i>No. of Persons Killed</i> .....	0	0	0	1	0
<i>No. of Persons Injured</i> .....	0	35	18	96	58
<i>Employees on duty</i>					
<i>No. of Persons Killed</i> .....	1	5	3	5	5
<i>No. of Persons Injured</i> .....	68	103	102	117	195
<i>Totals</i>					
<i>No. of Persons Killed</i> .....	1	5	3	6	5
<i>No. of Persons Injured</i> .....	68	138	120	213	253

<sup>1</sup> All impacts between on-track equipment and highway users reported beginning in 1975. Prior to 1975, such impacts were reported only if they resulted in a reportable casualty, or in \$750 in damages to railroad on-track equipment, signals, track, track structures, and roadbed.

<sup>2</sup> Includes lost time cases only, prior to 1975. Reporting requirements were changed in 1975 to be comparable to OSHA reporting requirements—includes cases with lost or restricted time; those requiring medical treatment beyond first aid; termination of employment; transfer to another job; loss of consciousness; and occupational illnesses.

<sup>3</sup> Monetary reporting threshold prior to 1975 was \$750, in 1975 it was increased to \$1750.



TABLE XIV. Summary of U.S. Motor Vehicle Activities and Fatalities, Calendar Years 1967 and 1972-76.

Category	1967	1972	1973	1974	1975	1976	% Change 1975-76	% Change 1967-76
Total Registered Motor Vehicles (Thousands)	98,859	122,304	129,777	134,860	137,924	142,397	+3.2	+44.0
Automobiles (Thousands)	80,399	96,860	101,762	104,858	106,717	109,675	+2.7	+36.4
Trucks (Thousands)	16,169	21,234	23,233	24,589	25,781	27,126	+5.2	+67.6
Buses (Thousands)	338	407	426	447	462	486	+5.1	+43.7
Motorcycles and Others (Thousands)	1,953	3,798	4,356	4,966	4,964	5,110	+2.9	+161.6
Licensed Drivers (Thousands)	103,172	118,414	121,628	125,427	129,791	134,036	+3.2	+29.9
Percent under 25	20.8	—	22.3	22.5	22.6	22.4	-0.8	+7.6
Percent over 64	7.9	—	9.1	9.3	9.5	9.8	+3.1	+24.0
Vehicle Miles (Billions)	966	1,268	1,309	1,290	1,330	1,416	+6.4	+46.5
Traffic Fatalities	50,724	56,910	55,759	46,629	44,525	45,525	+2.2	-10.2
Traffic Fatalities per 100 Million Vehicle Miles	5.25	4.49	4.26	3.61	3.35	3.21	-4.1	-38.8



TABLE XV. Summary of U.S. Monthly Traffic Fatalities, Mileage, and Fatality Rates, July 1972 through June 1977.

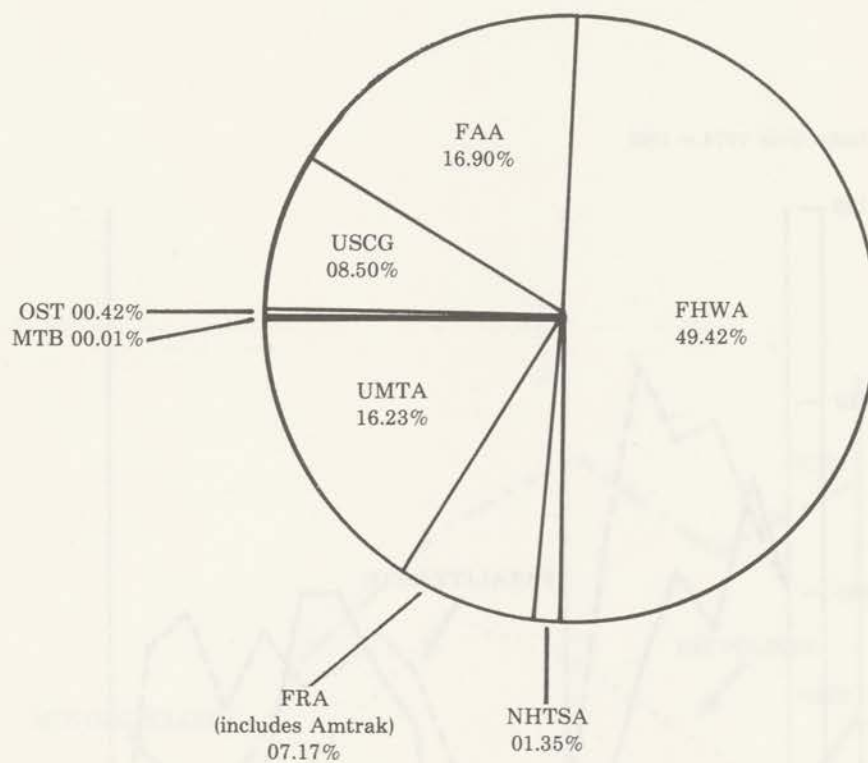
Category	July	August	September	October	November	December	January	February	March	April	May	June	TOTALS
<b>Fatalities</b>													
1972-73	5,289	5,215	4,872	5,144	4,695	4,681	3,847	3,524	4,353	4,500	4,801	5,176	56,097
1973-74	5,186	5,241	4,917	5,201	4,411	3,911	2,947	2,679	3,194	3,410	3,769	4,201	49,067
1974-75	4,337	4,616	4,252	4,363	4,163	3,848	3,119	2,865	3,399	3,463	4,025	4,142	46,592
1975-76	4,326	4,336	3,900	3,920	3,803	3,756	3,036	2,962	3,189	3,563	4,100	3,956	44,847
1976-77	4,601	4,341	3,985	4,233	3,510	3,903	2,683	2,827	3,382	3,635	3,910	4,138	45,148
% Change 1976-77 versus 1975-76	+6.3	+0.1	+2.1	+7.9	-7.8	+3.9	-11.7	-4.6	+6.0	+2.0	-4.7	+4.6	+0.6
% Change 1976-77 versus 1972-73	-13.0	-16.7	-18.2	-17.7	-25.2	-16.6	-30.2	-19.7	-22.3	-19.2	-18.5	-20.0	-19.5
<b>Mileage<sup>1</sup></b>													
1972-73	1,185.9	1,199.1	1,080.7	1,088.4	1,007.9	1,010.4	966.6	925.6	1,074.9	1,081.2	1,145.1	1,158.5	12,924.3
1973-74	1,216.8	1,244.2	1,103.3	1,130.8	1,043.8	988.5	921.6	874.6	995.0	1,033.4	1,113.6	1,129.4	12,795.0
1974-75	1,202.3	1,229.0	1,083.6	1,122.2	1,029.4	1,041.2	969.0	906.0	1,050.0	1,055.2	1,156.1	1,169.6	13,013.6
1975-76	1,242.9	1,261.5	1,109.2	1,148.7	1,058.1	1,071.0	1,019.8	993.2	1,145.7	1,174.0	1,238.2	1,265.7	13,728.0
1976-77	1,321.2	1,334.2	1,193.7	1,218.4	1,120.5	1,138.6	1,005.1	1,013.1	1,180.6	1,196.9	1,270.8	1,294.1	14,287.2
% Change 1976-77 versus 1975-76	+6.2	+5.7	+7.6	+6.0	+5.8	+6.3	-1.5	+2.0	+3.0	+1.9	+2.6	+2.2	+4.0
% Change 1976-77 versus 1972-73	+11.4	+11.2	+10.4	+11.9	+11.1	+12.6	+3.9	+9.4	+9.8	+10.7	+10.9	+11.7	+10.5
<b>Fatality Rate<sup>2</sup></b>													
1972-73	4.46	4.35	4.51	4.73	4.66	4.63	3.98	3.81	4.05	4.16	4.18	4.47	4.34
1973-74	4.26	3.02	4.46	4.60	4.23	3.96	3.20	3.16	3.21	3.30	3.38	3.72	3.83
1974-75	3.61	3.76	3.92	3.89	4.04	3.70	3.22	3.16	3.24	3.28	3.48	3.54	3.58
1975-76	3.48	3.44	3.52	3.41	3.59	3.51	2.98	2.98	2.78	3.03	3.31	3.13	3.26
1976-77	3.48	3.25	3.34	3.47	3.13	3.43	2.67	2.79	2.86	3.04	3.08	3.20	3.16
% Change 1976-77 versus 1975-76	0.0	-5.2	-5.2	+1.7	-12.9	-2.3	-10.5	-6.4	+2.8	+0.3	-7.0	+2.2	-3.1
% Change 1976-77 versus 1972-73	-21.9	-25.2	-25.9	-26.6	-32.8	-25.9	-32.9	-26.7	-29.3	-26.9	-26.3	-28.4	-27.1

<sup>1</sup>100 million miles (10<sup>8</sup>)

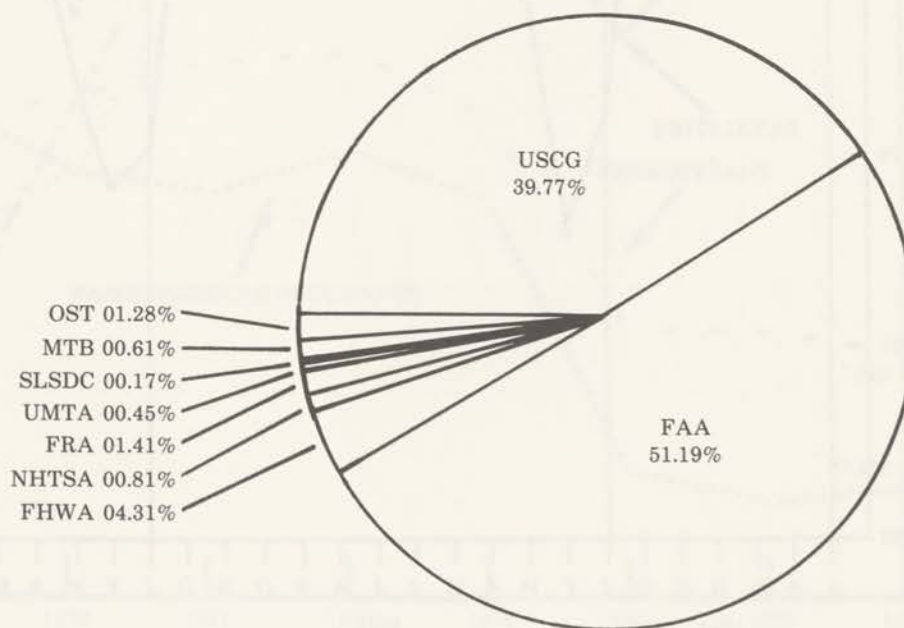
<sup>2</sup>Fatalities per 100 million vehicle miles



**FIGURE 1. U.S. Department of Transportation Program Levels, Fiscal Year 1977.**



**FIGURE 2. U.S. Department of Transportation Authorized Full-Time Permanent Positions, Fiscal Year 1977.**





**FIGURE 3. Changes in U.S. Traffic Fatalities and Fatality Rates, July 1974 through June 1977 Versus 1973.**

Index (July 1974 = 100)





**FIGURE 4. Relative Changes in Highway Fatalities by Principal Categories, Calendar Years 1967-1976.**

Index (1967=100)

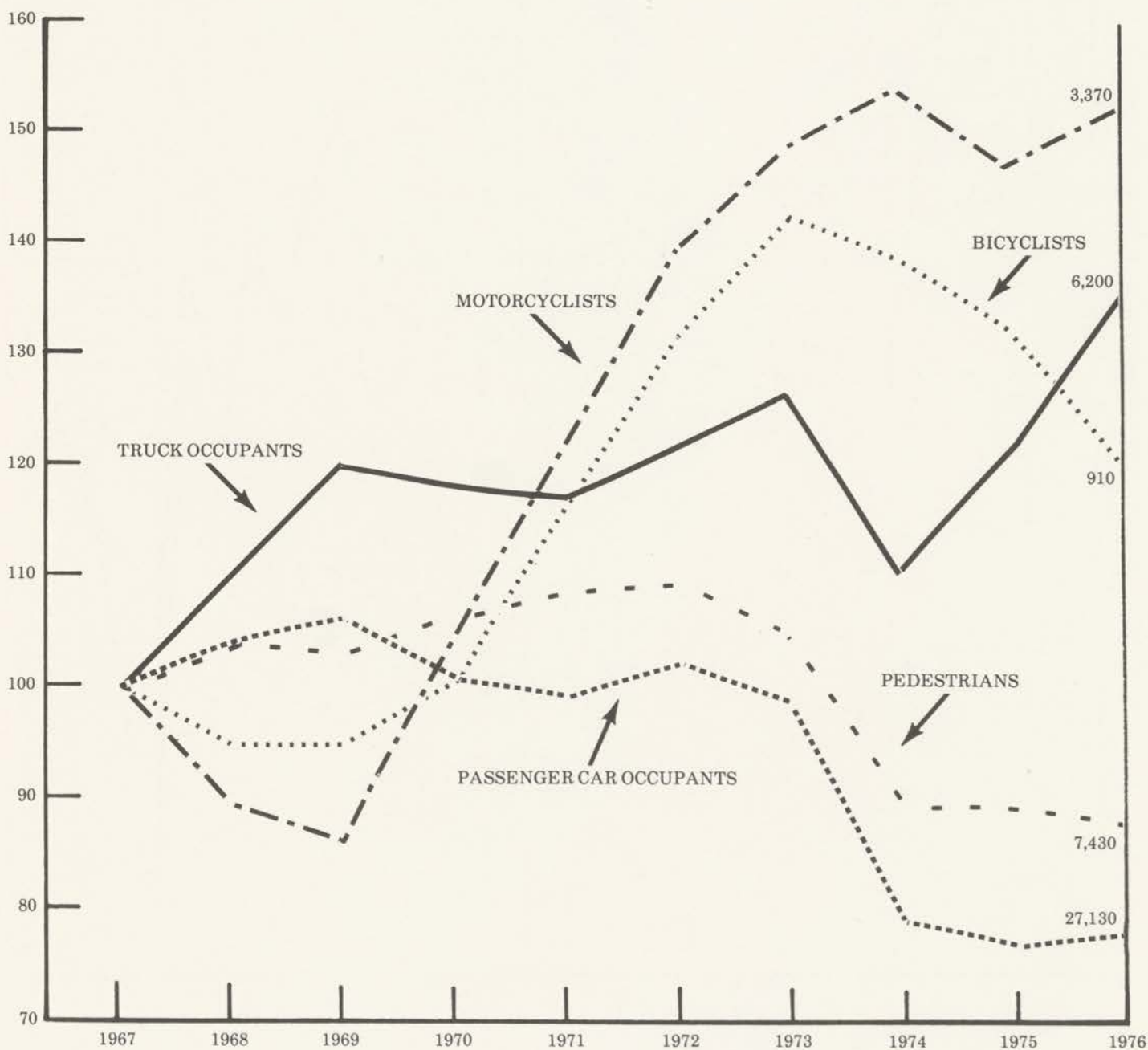




FIGURE 4. Relative Changes in the Number of Fishes in the Lake Michigan Fishery, 1967-1978

