FIFTH ANNUAL REPORT

Fiscal Year 1971

DEPARTMENT OF TRANSPORTATION

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U.S. DEPARTMENT OF TRANSPORTATION

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CHAPTER 1

INTRODUCTION

During its 5-year history, the Department of Transportation's accomplishments have amply justified the confidence that the Congress displayed by enacting the Department of Transportation Act in October 1966.

The legislation charged the Department with several comprehensive functions, including: a) Assuring the coordinated, effective administration of the transportation programs of the Federal Government, b) facilitating the development of coordinated transportation service, c) encouraging cooperation for transportation objectives among governments at all levels, labor, carriers, and others who share in or have a stake in the transportation industry, d) stimulation of technological advances in the industry, e) taking leadership within the Government in identifying and solving transportation problems, and f) developing and recommending to the President and to the Congress suitable transportation policies for the United States.

A brief review of its achievements over the past 5 years will demonstrate the degree to which the Department has accomplished the objectives thus laid out for it. Each year the Department has undertaken and successfully completed numerous complex tasks which could not have been attempted by any Government agency in earlier years.

During the fiscal year ended June 30, 1971 the Department counted among its achievements:

1. Provision of systems to protect civil aviation security and cause a major reduction in the incidence of aircraft hijacking.
2. Acquisition and employment of a major transportation research center.
3. Great strides toward ending discrimination of all types, not only in the Department but also in some of the transportation related industries.
4. Cooperation with the President's plans to relate the Government's program performance more intimately to the needs of citizens throughout the country, particularly through the Secretarial Representatives in the several Regional Councils.
5. Continued improvement of an Office of the Secretary to design, coordinate and facilitate billions of dollars worth of Government programs planned to make it easier, safer and pleasanter for citizens to travel and to ship their goods from place to place.

6. Initiation of Amtrak* and the start of a process of rationalizing surface transportation across the country.
7. Continued reduction in accident rates and numbers of deaths from transportation accidents in all modes of transit.
8. Safety design efforts for new highways and new automobile models.
9. Meticulous certification of new aircraft models and improvements in the airways system.
10. Boating safety rules.
11. New techniques for combating the hazards of transporting natural gas under pressure and other potentially dangerous commodities.
12. Significant numbers of other improvements in safety for all elements of the national transportation system.

A most significant innovation—one that will ultimately have perhaps the largest payoff—was the beginning of careful and scientific planning for all modes of transportation; during the year the Department's first major area comprehensive transportation study was completed—the Northeast Corridor Report. A series of biennial studies of transportation needs within the country was initiated. Techniques for assembling and analyzing the relevant data had to be devised. Much of this effort required novel procedures.

This Department has been literally in the forefront among Government agencies in its dedication to the principle of equal opportunity for all citizens and particularly for all aspirants to positions within the Department, or applicants for its many grants, trainee positions or monetary awards. Similarly, the Department has been able to employ, either directly or on projects which it sponsors, thousands of young people who need both work experience and the income from the jobs they hold during summer months.

Although major breakthroughs are made infrequently and significant improvements in transportation devices and systems come with discouraging slowness, the Department has sponsored research and the development of large numbers of technical innovations and improvements which contribute to the ease and effectiveness of transportation of all sorts. Thus, the Department has been able to upgrade the quality of urban transportation in numerous cases by sponsoring new buses and railcars and by assisting the cities to design better systems for employing them. Special improvements have been devised for urban highways to begin to alleviate the continual crush of traffic which threatens to strangle practically all medium- or larged-sized cities. Grants have been made for improvement of railcars for subways, for perfecting low-pollution engines for buses and automobiles, and for designing vehicles embodying new or modified concepts for moving people or things. These range from a people-mover, which carries large numbers of individuals for short distances on a form

*American Travel and Track, the identifying name of the National Railroad Passenger Corporation.

of endless belt, to new types of STOL aircraft. Under DOT grants, progress is being generated in those engineering sciences required to excavate subway tunnels rapidly with minimum disturbance of cities and their people. Improved designs have been developed for urban highways, such that noise and air pollution may be minimized and construction of housing or other amenities may utilize formerly unused air space above the highways.

New concepts of transportation that the Department has encouraged range from jet-propelled overhead suspension cars to automated highways, to dual mode systems which permit operations of vehicles either on a track or on roads with control being exercised by electronic sensing devices to speed the vehicle or stop it as the situation demands. In addition to those projects that are technically immediately feasible, some experimental work is being conducted on air-cushion vehicles that operate on a guideway either on the surface or in a tunnel from which air has been evacuated to reduce friction. Various types of magnetic suspension are also being tried. New vehicles are often to be powered by exotic engines that will operate on a wide variety of energy sources. Though these innovations are not yet in general use, some will soon become familiar to large numbers of citizens.

It is most encouraging that many of the innovations required carefully coordinated efforts on the part of people from many disciplines and several parts of the Department. Success of such projects is a tribute to the wisdom of entrusting to a single mangement as many Government-sponsored transportation concerns as possible.

The assignment of helping and facilitating transportation wherever feasible has urged the Department into a great variety of programs and operations. Thus the Department has initiated many elements of consumer protection, ranging from the massive automobile accident liability insurance investigation to the automobile recall campaigns which help eliminate mechanical causes of automobile accidents. In the same category are efforts to make sure that transportation is available as widely as possible; elderly people, physically handicapped people, and the urban poor have all benefited from Department programs and will increasingly enjoy more benefits as the new programs become better established. But transportation may not be supplied in such a way as to threaten environmental values; section 4(f) of the DOT Act and other recent enactments limit both the Department and its grantees in their use of land, air and water in harmful or unaesthetic ways. The Department must review literally hundreds of proposals for action each year to prevent abuse of resources that belong to everyone.

Problems of transportation do not afflict inhabitants of only one part of the world, nor of only highly developed countries, but characteristically transport problems are troublesome and expensive for all peoples of the world. For this reason the Department has consistently sought liaison and exchange of information agreements with numerous other countries,

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hoping by exchange of information and research techniques both to receive benefits and to extend benefits to others. In increasing numbers of ways, these benefits are becoming apparent. Thus many countries have begun development efforts for experimental safety vehicles, especially automobiles. Most maritime nations experiment with cargo handling techniques and devices. Design and fabrication of needed equipment may be done effectively in many countries. From all of this, Americans may benefit because of the information exchange programs and other international agreements fostered by the Department; in some cases a suitable division of labor is agreed upon; e.g., other countries encourage design of small safety automobiles while U.S. industry concentrates on designing and fabricating American standard-size vehicles.

Many of the innovations that have just been described will be displayed for the public in a very extensive international exhibition of transportation progress which the Department has planned for 1972 at Dulles International Airport. Inventors, developers, and manufacturers of transport-related materials from many countries have promised to show the results of their creative efforts so that greater numbers of people may know of their work and benefit from it.

The pages that follow contain a detailed record of the efforts of the Department during FY 1971. The report is organized by function performed, combining efforts of the Office of the Secretary with those of the Administrations. Thus all of the Department's efforts to improve safety or to enhance the environment are reported together as are research and development programs.

Because the National Transportation Safety Board and the Saint Lawrence Seaway Development Corporation are required by statute to submit individual annual reports, their activities are not discussed in this report.

CHAPTER II

LEGISLATION

During FY 1971 Congress bolstered the authority and the functional assignments of the Department of Transportation by an unusually wide-ranging series of laws. Having only just expanded the authority of the Department to improve and modernize airports and airways, financing the improvements with a user tax, in the Airport and Airways Development/ Revenue Act of 1970 during the previous fiscal year, Congress during FY 1971 enacted legislation under which the Department is charged to promote and subsidize urban mass transportation, rail passenger service, railroad safety and Federal-aid highways. Additional legislation eliminated the requirement for the St. Lawrence Seaway to continue payment of interest on its bonds owned by the Treasury; provided for emergency loans to transportation companies in financial difficulties; extended the High-Speed Ground Transportation research and development of high-speed ground vehicles; provided war risk insurance for the domestic airline industry; and provided for implementation of the Tokyo Convention clarifying jurisdiction over crimes committed aboard aircraft anywhere in the world.

HIGHWAY LEGISLATION

Under the Federal-Aid Highway Act of 1970, the Department was authorized to establish the urban highway system—a new program with important ramifications. Over a period of years it had become increasingly apparent that the Federal-aid program heretofore largely confined to extension of Interstate and intercity routes, would have to be expanded to help solve highly complex urban transportation problems. In creating the urban system, Congress provided that urban route selections were to be made by local officials and State highway departments, subject to approval by the Secretary of Transportation. Local jurisdictions will take the lead in picking both routes and projects and will act through area-wide planning agencies.

Another innovation is the authorization for a National Highway Institute whose prime mission will be to develop and administer, in cooperation with State highway departments, training programs for employees of the Federal Highway Administration and State and local highway departments. The Institute will concentrate on providing skills and knowledge needed to cope with the rapid growth of technology, and with the growing social and environmental involvement of highway transportation.

The Highway Beautification Commission was originally created to: (1) Review existing law and policies related to control of outdoor advertising and junkyards; (2) study problems relating to the control of on-premise outdoor advertising signs, promotional signs, directional signs, and signs providing information essential to the motoring public; (3) study methods of financing the program so that an effective beautification program can be achieved; (4) compile data on the Nation's highway beautification needs and make recommendations in a report scheduled to be submitted within a year. Last year the highway beautification program itself was given a welcome assist by authorization of substantially increased funds and redirected emphasis on control of outdoor advertising.

Another of the new programs—Economic Growth Center Development Highways—is expected to demonstrate that highways can assist in revitalizing the economies of rural areas and small urban communities, enhance and disperse industrial growth, and help reverse current migratory trends to larger and more congested metropolitan areas. The highways must be on the Federal-aid primary system, and must be related to potential growth centers of 100,000 population or less. Projects will be financed on approximately a 70–30 basis.

The Act established the Territorial Highway Programs in the Virgin Islands, Guam, and American Samoa and the Darien Gap Highway Project. The Territorial Highway Program will provide technical assistance for the development of a highway organization to plan, design, and administer construction and maintenance, and to develop and improve a system of arterial and collector highways, including necessary inter-island connectors to serve the needs of the islands. FHWA will cooperatively administer the Darien Gap Highway project consisting of the construction of approximately 250 miles of highway in Panama and Colombia connecting the Inter-American Highway in Central America with the Pan American Highway System of South America. Panama and Colombia will finance at least one-third of the cost of the project.

Other important elements of the Act were:

(a) Extended authorization for the Interstate Highway Program through FY 1976 with the understanding that additional time will be needed to complete the System.

(b) Requirements for the Secretary to report to Congress with his recommendations for the functional realignment of the Federal-aid systems and for a continuing Federal-aid highway program for the period 1976–90.

(c) Expanded emergency relief provisions to provide for replacement of bridges which have been closed for safety reasons.

(d) The permanent authorization in the Federal-aid highway program for the construction of exclusive or preferential bus lanes, traffic control devices, and bus passenger loading areas and facilities.

(e) The establishment as a continuing activity of the fringe parking program originally provided for in the 1968 Act as a demonstration activity.

(f) The promulgation of guidelines to assure that possible injurious displacement of people, businesses and farms, destruction or disruption of man-made and natural resources, esthetic values, and special attention to noise and air pollution have been fully considered on any proposed project on any Federal-aid system. Noise level standards must be adopted; and new highways must conform to air pollution guidelines consistent with air quality control plans promulgated pursuant to the Clean Air Act.

(g) As a result of a new bridge replacement program, bridges that are found to be unsafe because of structural deficiencies, physical deterioration, or functional obsolesence will be replaced on a 75–25 funding ratio up to $250 million over fiscal years 1972 and 1973. The groundwork for implementing this program is contained in the on-going National Bridge Inspection Program and the Bridge Inspector Training Program, which were developed in accordance with the 1968 Act.

(h) An inventory of all ground level rail-highway crossings was initiated by State highway departments during FY 1971 at the request of FHWA. A report with recommendations of a feasible program to eliminate the crossings, including cost estimates, will be submitted to Congress by July 1, 1972.

HIGHWAY AND MOTOR VEHICLE SAFETY

The Highway Safety Act of 1970 also contained several provisions important to the continued national highway and motor vehicle safety effort:

(1) It confirmed the separation of the National Highway Safety Bureau from the Federal Highway Administration, (FHWA) and its establishment as an operating administration within the Department of Transportation, called the National Highway Traffic Safety Administration, (NHTSA).

(2) NHTSA is responsible for carrying out provisions of the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966, except the programs, research and development relating to highway design, construction and maintenance, traffic control devices, identification and surveillance of accident locations, and highway- related aspects of pedestrian safety—all of which remain the responsibility of FHWA.

(3) Federal funds to support State and community highway safety programs are to be apportioned 75 percent by population and 25 percent by public road mileage.

(4) Two-thirds of all funds authorized and expended by the NHTSA under Sec. 402 and 403 of Title 23, U.S.C. (highway safety research and development) will be appropriated from the Highway Trust Fund.

(5) State highway safety programs are to be carried out through a State agency "which shall have adequate power and be suitably equipped and organized. . . ."

(6) New highway safety standards will be submitted to Congress 90 prior to their effective date.

MASS TRANSPORTATION LEGISLATION

The Urban Mass Transportation Assistance Act of 1970 provides for a 12-year program to strengthen public transportation and allocates ten billion dollars for that purpose. Aid will be provided to long-term projects such as rail extensions and subways over a period of years, but in addition, assistance will enable local jurisdictions to purchase buses and related equipment to allow them to refurbish and extend their lines. It is believed that these actions will help reverse the downward trend in total transit riders and profits for transit operators.

RAIL PASSENGER SERVICE ACT OF 1970

Because the number of passengers on inter-city trains had declined so markedly in recent years, and concurrently the quality of service offered had declined precipitously, this legislation attempted to improve both the quality of service and the opportunity to meet the nation's inter-city passenger transportation requirements. The legislation established the passenger service corporation called Amtrak and a new basic route structure for passenger trains. Additionally, the act authorized the Secretary of Transportation to provide grants up to $40 million in cash and to guarantee loans up to $100 million. The Secretary was authorized also to guarantee loans up to $200 million to permit railroads to enter into contracts with the passenger service corporation.

HAZARDOUS MATERIALS CONTROL ACT OF 1970

Among other things, this legislation authorized establishment of facilities and staff to evaluate the problems surrounding shipments of hazardous materials and the establishment of a central reporting system for personnel involved in hazardous materials accidents. The Act encourages improving protection at grade crossings.

AVIATION LEGISLATION

Legislation Implementing the Tokyo Convention. One of two important pieces of aviation legislation enacted during FY 1971 is P.L. 91–449, October 14, 1970, which carries out the obligation of the United States, as a signatory of the Convention on Offenses and and Certain Other Acts Committed on Board Aircraft (Tokyo Convention), to establish jurisdiction over offenses committed on board U.S.-registered aircraft. The Tokyo Convention went into effect among contracting states on December 4, 1969. P.L. 91–449 accomplishes three objectives: (1) It closes certain minor

gaps in U.S. criminal jurisdiction over acts committed on U.S.-registered aircraft; (2) it clarifies the existing "air commerce" jurisdiction, which otherwise could have created serious constitutional and international-relations problems; and (3) at the request of the Department of Defense, it brings aircraft of the national defense forces under the "special aircraft jurisdiction of the United States."

AVIATION WAR RISK INSURANCE PROGRAM EXTENDED. The other aviation legislation enacted is P.L. 91–399, September 8, 1970, which extends until September 8, 1975 the Secretary's authority under Title XIII of the Federal Aviation Act of 1958 to conduct an aviation war risk insurance program. Further information on this program and an account of its operations in FY 1971 will be found below in chapter X on emergency and national defense transportation.

PROPOSED AIR TRAFFIC CONTROLLER CAREER LEGISLATION. Of major importance in legislation proposed to the Congress during FY 1971 was that designed to implement one of the recommendations of the Air Traffic Controller Career Committee—a committee of experts appointed by the Secretary in August 1969 to study the work and career conditions of air traffic controllers. The committee submitted a report and recommendations in January 1970. The proposed legislation is further discussed under FAA administrative developments in chapter XI.

CHAPTER III

SAFETY AND ACCIDENT PREVENTION

HIGHWAYS

THE PROBLEM. All forms of transportation claimed the lives of 59,230 Americans during 1970; of these 93 percent or 54,800 lives were lost violently on the highways. Aviation, boating, railroads and pipelines together accounted for the remaining 7 percent—3,930. A further analysis of traffic deaths shows that 1,460 people were killed at rail-highway crossings; 9,800 were pedestrians; and 44,040 were drivers or occupants of motor vehicles.

Horrifying as these statistics are, however, they reflect substantial improvement in the death and injury totals when compared with earlier years. 1970 was the first year since 1958 in which there was a substantial decline in the total number of fatalities; the mileage death rate of 4.9 was the lowest ever recorded, and the only time the rate has ever been below 5.0.

A major reason for the establishment of the Department of Transportation was the desire to reduce the incidence of death and injury due to transportation accidents. Within the Department, two elements have programs designed to help prevent fatalities from automobile accidents—the Federal Highway Administration, and the National Highway Traffic Safety Administration. As their names imply, the Highway Administration designs and operates safety programs relating to the construction and maintenance of highways while the NHTSA designs programs related to the driver and the vehicle and the interaction of the two. This section will therefore discuss the Department's programs for improvement of highway safety in two segments, corresponding to the division of labor between the two elements.

HIGHWAY SAFETY PROJECTS. A guidebook on continuing surveillance of traffic operations was developed during the year and a project was initiated to test the use of video tape in a time-lapse camera for traffic data gathering purposes. Three States used Federal aid to study intersection operations by recording traffic "conflicts" (non-accidents, but potential accident situations). Surveillance of critical highway locations has resulted in the installation of new devices which in turn have been credited with major safety benefits.

New ideas in graphic guide signing for freeway drivers have been developed and are being tested. Initial results of these efforts indicate the potential for a significant reduction of motorist confusion and hence erratic

maneuvers at some types of freeway interchanges. Planning was initiated for a FY 1972 program that would yield firm criteria for the design and use of diagrammatic signing.

An active program was initiated by the FHWA about 3 years ago to protect motorists in single vehicle accidents from unyielding structures adjacent to the traveled way. Several types of energy absorbing devices, or impact attenuators, have been developed and tested; they proved effective in reducing the severity of a crash when one did occur. Over 350 such devices have been installed in 32 States, the District of Columbia, and Puerto Rico. During the past 2 years, about 150 vehicles crashed into these devices. While in all cases there was physical evidence of a crash, in more than one-third of the cases the vehicle left the scene under its own power and no accident report was received. In all but one of the other crashes, injury to vehicle occupants was minor and vehicle damage was minor to moderate. A single fatality did occur.

During FY 1971, approximately 560 safety construction projects using Federal funds were approved at a total estimated cost of $101 million. The FHWA continued to encourage the States to develop and implement, on a continuing basis, a logical and comprehensive procedure for the selection and programing of highway safety improvement projects. Each State is expected to establish and maintain: (1) A field reference system; (2) an accident records system; (3) a procedure for identifying and reporting hazardous locations and elements based on accident analysis; (4) a system of ranking proposed safety projects based on potential benefits; (5) a regularly scheduled review and updating; and (6) a system for program evaluation. A review of each State's program showed that 32 States, Puerto Rico, and the District of Columbia meet all six requirements except for minor refinements, and that all had a safety program underway. There are 13 States which had a highway safety improvement program but needed to develop or implement one or two basic requirements. Programs in the remaining five States needed considerable improvement before being able to comply with these six requirements.

As an example of what can result from the safety improvement program, 46 projects were analyzed for their effect on the accident experience. Based on a 1-year "before and after" sample, it was found that:

(1) Fatalities were reduced 25 percent.

(2) Injuries were reduced 24 per cent.

(3) Total accidents were reduced by nearly 20 percent.

New standards for traffic control devices were issued during calendar year 1970. Publication of the revised "Manual on Uniform Traffic Control Devices for Streets and Highways" is expected during September 1971. Basic changes in the standards involve more use of international symbols and yellow pavement markings to indicate two-way traffic. Two new colors were approved for use—*orange* for warning signs in construction and maintenance areas and *brown* for signs marking recreation facilities.

TOPICS. The Traffic Operations Program to Increase Capacity and Safety (TOPICS) on urban street systems is gaining momentum. Improvements include improved signal systems, channelization, pavement markings, signing, turning lanes at intersections, installation of reversible lanes with control systems, provision of bus turnouts, elimination of short bottlenecks, and construction of pedestrian or highway grade separations at heavily congested intersections. Some direct benefits that can be realized from this program are reduction in vehicular operating costs, reduction in personal travel time, reduction in the number of accidents, and reduction in the number of personal injuries. Some indirect, more intangible benefits include increased comfort, less tension, improved convenience, reduction in auto insurance premiums, and effects on the environment such as lower emission of pollutants by vehicles because of their more efficient level of operation. Steps were taken during the year to simplify the Federal-aid administration of TOPICS and eliminate unnecessary program procedures.

The use of TOPICS funds accelerated during FY 1971. At the start of the year, $13 million had been obligated to finance TOPICS programs, and there were 29 construction projects underway or completed in 18 States. As of June 30, 1971, $63 million had been obligated, and 325 construction projects were underway or completed in 44 States and Puerto Rico, leaving only six States and the District of Columbia not having an active construction project.

Information on accidents occuring on Interstate Highways collected by 20 States has been analyzed by FHWA. This study indicates that paving all freeway shoulders and making speed-change lanes on the interstate System a minimum of 700 feet long are significant safety improvements.

MOTOR CARRIER SAFETY

During FY 1971 increased emphasis was given to arranging written agreements between each of the States and the FHWA in accordance with Public Law 89–670 (49 U.S.C. 1651) and Public Law 89–170 (49 U.S.C. 305) which authorize cooperative agreements to enforce the motor carrier and hazardous materials laws and regulations concerning highway transportation. At the close of this fiscal year, agreements had been negotiated with 49 States. Table 25 contains a list of these States and the extent to which they have adopted the Federal safety regulations.

By the end of FY 1971, nearly 8,700 Safety Fitness Reports and replies to petitioners by carriers for reconsideration were transmitted to the ICC in accordance with the Interstate Commerce Act and DOT Act. Discussions were held with the ICC and several actions taken to improve and strengthen the process by which these Safety Fitness Reports were considered by the ICC. Additionally, 15 Special Safety Fitness reports were transmitted to the Department of Defense regarding carriers which transport explosives or other dangerous articles for that Department. These reports were transmitted pursuant to a working agreement with the DOD.

REGULATIONS. During FY 1971 FHWA initiated or completed a number of significant revisions of the Motor Carrier Safety Regulations and shared in revision of other regulations:

- A major revision pertaining to driving and parking vehicles transporting hazardous materials. This revision requires precautions to insure that the vehicle is under observation so emergency action can be taken if the need arises; that tires be inspected periodically to guard against tire fire; that drivers be furnished with instructions and documents relative to the actions to be taken in an emergency situation; and that parking such vehicles near congested areas and on public highways be prohibited.
- Refinements to the driver qualification rules to clarify certain interpretations to provide certain exemptions for drivers of specified farm vehicles, and to waive the requirement for new drivers to pass a written examination pending validation of the examination. This latter action was taken at the request of the Equal Employment Opportunity Commission to conform with that Commission's authority to insure that examinations are not used as a device for racial discrimination in violation of the Civil Rights Act of 1964.
- A rule requiring commercial motor vehicles to have seat belts installed for the use of drivers and, and in the case of trucks, for other occupants.
- Revisions to equipment regulations covering fire-extinguisher requirements and coupling devices on articulated vehicles.
- Amendments to the driver physical qualifications to permit the use of contact lenses and hearing aids in meeting the eyesight and hearing requirements respectively.
- An advance Notice of Proposed Rule Making on noise levels generated by commercial vehicles, soliciting comments on a proposal to regulate noise pollution resulting from the operation of those vehicles.
- Denial of a petition, after public hearing, to prohibit the operation of buses while occupants are smoking, since there was no evidence of any hazard to safety created by smoking.
- Participation in a proposal to adopt the United Nations' hazardous materials labeling and classification system, which, if adopted, would result in a uniform system serving both domestic and international transportation.
- Participation in a new hazardous materials accident reporting system involving uniform reporting criteria for all modes of transportation. The system's objective is collection of consistent data for evaluating the effectiveness of existing regulations.
- Participation in issuing an amendment prescribing requirements for bonding and grouping cargo tanks before and during transfer of flammable liquids as a safeguard against ignition by static electricity.

- Participation in reissuing special permits authorizing bulk shipments of hydrogen sulfide in cargo tank vehicles after determining additional safety requirements.
- Participation in a proposal to authorize the performance, outside the limits of the United States, of chemical analysis and tests prescribed for DOT specification compressed gas cylinders under conditions approved by the Department. Industry desire to import foreign made cylinders for industrial and medical gas service, as well as new Motor Vehicle Safety Standards for occupant crash protection, have indicated a need to re-evaluate the present regulations.
- Development of specifications for cargo tanks designed for the transportation of cryogenic commodities. Because of the lack of specifications for vehicles to transport these extremely cold commodities, numerous special permits have been issued. Development of these new specifications will reduce the need for special permits, provide uniformity of containers for the channels of commerce, and assure adequate safety precautions for the general public.

SAFETY EDUCATION. In any regulatory program, a key desired objective is willing participation and voluntary compliance on the part of those who are regulated. Accordingly, the Bureau of Motor Carrier Safety BMCS engages in activities designed to inform concerned parties of the intent and benefits of the safe practices required by regulation. During the year such activities as the following are regularly undertaken to acquaint all concerned with new developments:

- Each known interstate motor carrier is served with a copy of the regulations. "Service" of the Motor Carrier Safety Regulations is a fundamental step in obtaining voluntary compliance by the carriers. In FY 1971 over 7,400 carriers were provided with this "service".
- Approximately 700 driver clinics were conducted throughout the country, attended by over 45,000 drivers and other carrier personnel, at which the new driver qualifications regulation was explained.
- Individual responses were provided to over 47,000 inquiries about motor carrier safety and 13,600 inquiries about the highway transportation of hazardous materials.

INSPECTION. Several activities are conducted continuously throughout the year to determine how well the safety regulations are being carried out. Information obtained from these activities is used to assist in evaluating the effect of the motor carrier safety program and, when unsafe equipment or operating conditions are found, to take remedial action. During the year the Bureau conducted the following activities:

Safety Surveys of Carriers	4,556
Roadside Inspections	48,851
Vehicles Placed Out of Service	10,221
Drivers Placed Out of Service	473

Hazardous Materials Surveys of Carriers and Shippers	1,221
Complaint Investigation Reviews	555
Violation Reports	425

- In the summer of 1970, following a number of severe accidents involving buses in the interstate operation, the BMCS sharply increased its bus inspection activities. A total of 5,902 buses engaged in interstate passenger service had been inspected by the end of 1970, and an individual detailed report summarized each of these inspections. A report covering all bus inspections made during 1970 was issued and publicly distributed in April 1971.

ACCIDENT INVESTIGATIONS. The objective of the FHWA safety mission is to reduce accidents. The motor carrier safety program, therefore, through its accident notification, investigation and reporting continuously evaluates the accident experience of commercial motor vehicles engaged in interstate operations. Carrier accidents and hazardous materials container accidents were investigated and reported on as follows:

General Investigations	708
Indepth Investigations	305
Hazardous Materials Container Accidents	170

The accident investigation activities of the FHWA bring it into direct working relationship with the National Transportation Safety Board which has statutory responsibilities in this area. In FY 1971, the NTSB was provided with 286 such notifications and on seven occasions chose to assume control of the investigation.

At the present time the Motor Carrier Safety Regulations exempt from the requirement to report accidents the class of motor carriers designated as private carriers of which there are about 90,000. At year's end, a Notice of Proposed Rule Making was under consideration to require private carriers to report accidents, and to change the definition of an accident by increasing the minimum amount of property damage which makes a nonfatal accident reportable.

TECHNICAL ASSISTANCE AND SAFETY PROMOTION. In addition to the educational efforts to acquaint carrier personnel with the regulations and the efforts to prevent accidents, BMCS safety specialists gave technical safety presentations at meetings of trade associations, trade unions, professional societies, instructional seminars, and training conferences to motivate participants in the motor carrier transportation industry to make optimum safety investment in their operations. In the last fiscal year more than 1,600 such meetings were conducted by or participated in by the BMCS.

ENFORCEMENT. In the event the Motor Carrier Safety Regulations are put aside, disregarded or otherwise violated by motor carriers or their drivers, BMCS takes enforcement action. In FY 1971 there were 425 enforcement investigations undertaken; 365 criminal prosecutions were

completed; and 81 civil forfeiture cases were completed for which settlements of over $100,000 were made by carriers.

Other Motor Carrier Highlights. A contract was let for an analytical research study of driver reaction to present day operating conditions and work environment and the effect of time on his ability to operate safely a heavy commercial vehicle. Accident statistics revealed an increasing number of run-off-the-roadway and rear-end collision accidents. Because of the long distances required of present day commercial drivers, it is suspected that a large proportion of their accidents are caused by excessive fatigue. The present hours of service regulations are based on a study performed in 1940. Obviously, the traffic, highways, noise, congestion, stress, and other factors have changed significantly since that study was conducted. The regulations apply to approximately 5 million professional full-time or part-time drivers and because of the potential economic impact of a revision to these regulations, they must be based on a sound, scientifically established body of knowledge.

VEHICLE-DRIVER SAFETY PROJECTS

Highway fatalities passed the 50,000 mark in 1966, the year when Congress enacted legislation which initiated a national effort to reduce traffic deaths and injuries through a variety of highway and motor vehicle safety measures. However, motor vehicle safety standards affect only 10 percent of the vehicle population in a year since they apply only to newly built vehicles and highway safety programs generally are long-term because they deal with a complex of human and physical factors that require action and funding at every level of government. In addition, numbers of vehicles and drivers increase each year:

	1966 (in millions)	*1970 (in millions)*	*Percent change*
Number of registered motor vehicles	96	111	+15
Number of licensed drivers	101	111	+10
Number of miles traveled (100 million)	930	1,125	+20

One of the principal contributors to tragedy on the highways is excessive consumption of alcohol by people who continue to drive. Alcohol is involved in approximately 50 percent of traffic fatalities. Per capita consumption has risen 70 percent in twenty years and nearly 17 percent between 1965 and 1969. Added speed increases the severity of highway crashes. Average automobile speed rises nearly a mile an hour, or 1½ percent, each year.

Remedial Measures. Systems instituted in response to the 1966 legislation could not immediately counter these pressures and traffic deaths continued to rise from 53,041 in 1966 to a peak of 56,000 in 1969. One encouraging statistic was evident early in the program; the *rate* of fatalities per 100 million miles driven began to drop. In 1966 it stood at 5.70 and

it declined gradually to 5.32 in the peak year of 1969 when there were 56,000 fatalities.

For FY 1971, it is estimated that 54,480 people died on the highways as contrasted with 55,610 in Fiscal Year 1970, a saving of 1,130 lives. The rate also dropped to 4.74.

A truer perspective of lives saved in FY 1971 may be derived by multiplying the estimated number of miles driven by the former death rate—the fatality figure would have been 58,203. Thus it is statistically probable that 3,483 persons owe their continued survival in the last fiscal year to the post-1966 safety measures. If data for the years since 1966 are cumulated, the figures are even more impressive—19,500 people are alive today who might otherwise have died in motor vehicle crashes.

The saving of lives may be credited in part to the expanding interstate highway system on which deaths are less than half as frequent on a mileage basis as on the rest of the nation's roadways.

Incorporation of the motor vehicle safety standards in newly manufactured vehicles and equipment is paying off. At the end of FY 1971, approximately 48 percent of the automobiles had been manufactured with the basic safety devices, and since new cars are driven more miles than older ones, they accounted for 59 percent of the mileage. Improvement in State and community highway safety programs in accordance with the highway safety standards also is proving advantageous. Two examples may be cited as illustrations:

- Most trucks on the roads today do not have the basic motor vehicle safety features present in passenger cars built since 1967. Between 1965 and 1969, the truck occupant death rate rose 5 percent while the passenger car occupant death rate declined 5 percent.
- Between 1967 and 1970, motorcycle registrations rose 43 percent while motorcycle fatalities declined 5 percent. In the State of Illinois, motorcycle fatalities fell 27 percent in 1968 when a motorcycle helmet law was in effect. The law was overruled by the Illinois Supreme Court in 1969 and deaths rose 44 percent.

Although the number of highway crashes remains high, the national motor vehicle traffic safety program appears to be influencing the severity of injuries, particularly in view of the upward trend of other traffic factors. During the years 1967 through 1969, time lost due to motor vehicle injuries declined approximately 20 percent while numbers of vehicles and mileage driven increased by nearly as great a percentage.

PRIORITY PROGRAMS

In order to achieve the maximum saving of lives and reduction of injuries with the resources available, the Department established priorities for concentration of funds and effort:

ALCOHOL COUNTERMEASURES PROGRAM. Excessive or problem drinking by people who continue to drive is a factor in at least half of all traffic

fatalities. Accordingly, among the highest priorities in NHTSA are: the Alcohol Countermeasures Program, the redesign of an Experimental Safety Vehicle and other proposals to make it possible for passengers to survive a crash, which are collectively known as Crash-survivability. The alcohol problem has been separated into its three principal components:

- To identify the problem drinker who drives.
- To determine a course of action for his rehabilitation.
- To prevent him from driving until he is rehabilitated.

The problem of the intoxicated driver is being attacked in a number of ways:

- Through research to develop effective detection devices and other countermeasures for use in the States and communities.
- Through full implementation of the alcohol programs standard.
- Through establishment of close working relationships with law enforcement and judiciary officials.
- Through a national educational campaign to inform the public about alcohol and the gravity of its effect on highway safety.
- Through Alcohol Safety Action Projects (ASAPs) which are the heart of the effort.

Twenty-nine jurisdictions are now under contract with NHTSA to carry out ASAPs, nine of which were chosen in FY 1970 and the balance selected during the current reporting period. Eight of the nine programs reported last year became operational in the third quarter of FY 1971. The first reports received are encouraging:

- In Seattle, Washington, arrests for driving while intoxicated (DWI) have risen 250 percent.
- In Denver, Colorado, DWI arrests have tripled and highway fatalities have decreased 25 percent.
- In Portland, Oregon, DWI arrests have doubled and traffic deaths are down 40 percent.
- In Marathon County, Wisconsin, DWI arrests have doubled and 95% of those prosecuted have been convicted. In Sheboygan County, Wisconsin, DWI arrests have tripled.
- In Albuquerque-Bernalillo County, New Mexico, DWI arrests have doubled in the city and tripled in the County.
- In Washtenaw County, Michigan, the program is emphasizing disulfiram treatment to control the problem drinker-driver. Those under treatment have increased from 60 in February to 181 in June, and there have been few probation violations.
- In Charlotte-Mecklenburg County, North Carolina, an intensive "saturation" public education program is underway with TV spots, radio announcements, speakers for all occasions, full page newspaper ads,

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bumper stickers, brochures, even paper bags in liquor stores with charts on numbers of drinks and drunkness, and breath testers.

NHTSA research in this field emphasizes ways of assisting the courts in handling and treating problem drinker-drivers; various kinds of treatment programs; better methods of enforcement and detection; positive means of preventing an intoxicated person from driving; and the influence of alcohol (and certain drugs) on driving performance at various levels and conditions.

CRASH-SURVIVABILITY. "Crash-survivability" is the term used to designate all of the measures designed or under development that will enable motor vehicle occupants or pedestrians to live safely through a collision which might otherwise result in death or serious injury. It encompasses engineering research and testing to demonstrate new structures and techniques and to provide supportive data for regulatory actions (rulemaking). During the remainder of the 1970's, NHTSA expects to develop techniques that will permit cars of the 1980's to offer passive injury-free protection in crashes at or near the legal speed limits. This goal is being approached in three ways:

- Protection of motor vehicle occupants through restraints, padding, modifying components of autos (windshields, steering columns, door locks) to distribute the forces of a crash impact in a manner tolerable to the human body and to minimize secondary dangers such as fire.
- Improvement of the "crashworthiness" of vehicles so that the components will collapse in a controlled manner and absorb the impact forces. These include energy-absorbing bumpers that employ the hydraulic piston or water principle, and the plastic hinge which crushes at a controlled rate and frame modifications that deflect the engine downward before it can penetrate the passenger compartment.
- The Experimental Safety Vehicle Program (ESV) through which prototype vehicles are being designed and manufactured as total units with safety the primary objective. This program is more adequately described in the next section.

During FY 1971, research and testing reached a point where two important standards could be issued—one on passive restraints, and the other on exterior protection (bumpers)—which are described in the section on Motor Vehicle Safety (below).

NHTSA's research program is investigating new and improved restraint systems, and tests using human volunteers have been conducted. Developments in the energy management of collapsing automobile structures have progressed to the point where survival may be both feasible and practical in a head-on rigid barrier crash at 60 m.p.h. Work is underway to isolate damage to the forward part of the vehicle in less severe crashes, and to improve side, rear, and rollover safety performance. The sources of pedestrian injuries are being investigated as well as techniques for their prevention.

EXPERIMENTAL SAFETY VEHICLE. Developments during the past year in the ESV program show great promise. Each of the major contractors is on schedule in producing his vehicle and is confident of meeting or exceeding performance specifications. Final designs have been approved for models submitted by Fairchild Industries and AMF Industries, and the prototype models are expected to be delivered by the end of 1971. Final design of the General Motors ESV will be reviewed soon. Delivery of the prototype is scheduled for the fall of 1972.

The proposed designs and early testing of sub-systems shown encouraging results particularly of the energy-managing bumpers. Other features, such as padding for occupant protection as well as the passive restraint systems and improved visibility all show real progress in the state-of-the-art. Upon delivery to NHTSA, the prototype vehicles will be subjected to extensive non-destructive testing and evaluation.

The Ford Motor Company has offered to enter the ESV program with a contract similar to GM's under which the Government will purchase the prototype safety car for $1.00. The contract is expected to be signed shortly after the close of the fiscal year.

This is the first time that vehicles have been designed as total units with safety primarily in mind. Heretofore, safety features have been alterations, add-ons, or substitutions for various vehicle components and equipment. With the technology that is developing, new and improved motor vehicle safety standards may be defined.

AVIATION SAFETY

U.S. airlines achieved during calendar year 1970, in the words of the National Transportation Safety Board, "the safest year in U.S. commercial aviation history." The Board, charged with investigating all aviation accidents (among others) and determining for each the probable cause, keeps its statistics on a calendar-year basis. Among items contributing to the 1970 record of the airlines:

- No passenger or crew fatalities occurred in scheduled domestic service—a development unprecedented in the Board's records of more than 30 years. (One person, however, was killed in a propeller accident on the ground).
- Only two passenger fatalities occurred in scheduled international passenger service of U.S.—certificated route air carriers—and both of these were at the virtual end of the year (on December 28).
- No fatal accident occurred involving the Boeing 747, the first of the wide-body (jumbo) jet airlines, which made its debut in scheduled passenger service on January 21, 1970.

General aviation (nonairline civil aviation), though not fatality-free, also set a new record. While more general aviation miles were being flown than in 1969, fatal accidents decreased in absolute number—the

result being a record low fatal-accident rate, whether measured in hours or miles flown (2.44 accidents for each 100,000 aircraft hours flown; 0.158 accidents for each million aircraft miles flown).

Accident statistics covering both air carrier and general aviation operations from 1960 through 1970 are shown in Tables 4, 5 and 6.

AIRCRAFT PIRACY. The number of incidents of aircraft piracy experienced by U.S.-registered aircraft rose slightly in FY 1971, to 30. This was four above the preceding year's count, but still well below FY 1969's record of 42. (See table of worldwide hijacking statistics, 1930–71, Table 1). Much more significant was the sharply declining ratio of successful to unsuccessful airliner hijackings, during the second half of the fiscal year. From July 1 to December 31, 1970, there were 11 successful and five unsuccessful aircraft hijackings, but from January 1 to June 30, 1971, this had changed to seven successful and six unsuccessful. This development reflects the growing effectiveness of efforts set in motion by the President's personal intervention in the late summer of 1970, when aircraft piracy suddenly became an acutely serious menace to international aviation.

The New Threat: Organized International Blackmail. On September 6, 1970, specially trained members of an Arab organization, self-styled the Popular Front for the Liberation of Palestine, executed a plan calling for the hijacking of four airliners over Europe—originally, two of Israeli registry and one each of U.S. and Swiss registry. The plan was to take the hijacked airliners and their occupants to a level stretch of desert northeast of Amman, Jordan, which the Popular Front had named Revolution Airstrips, and hold them there for ransom.

So far as the two Israeli aircraft were concerned, the plan failed. The would-be hijackers were refused admittance to one of them, whereupon they hastily chose a U.S. flight instead, successfully hijacked it, but then learned that the plane was a jumbo-jet—too large to land on Revolution Airstrip. The jumbo jet was ordered to Cairo, where it was blown up immediately upon landing, but after emergency evacuation of passengers and crew. Aboard the other Israeli airliner, an in-flight hijacking attempt by a man-and-woman-team was foiled, the man being killed in the air and the woman arrested by British authorities when the plane landed in London for emergency medical treatment of a wounded Israeli guard.

The part of the original plan involving the U.S. and Swiss airliners succeeded, and these aircraft landed September 6, 1970, with all passengers still aboard, on the desert sands of Revolution Airstrip. To gain bargaining power for release of its woman member in London, the Front hijacked a British airliner and forced it to land at Revolution airstrip on September 9. On September 12, the Front blew up the three empty airliners at Revolution Airstrip. At length, on September 27 all the hostages were freed but six, and those six 2 days later, in return for release of the six Front members held by the Swiss and West Germans and the woman member

held in London. The involvement of the Department through its administration of Aviation War Risk Insurance is discussed in Chapter X below.

The President's Antihijacking Program. Responding to the threat just described, President Nixon announced on September 11, 1970, a comprehensive set of measures to combat hijacking in all its forms, declaring that piracy would be effectively dealt with, even as piracy on the high seas had been dealt with by the United States and other countries a century and a half ago. The President called for:

- Armed U.S. Government guards on flights on U.S. commercial airlines.
- Extension, under the aegis of the Department of Transportation, of use of electronic surveillance equipment and other surveillance techniques by American-flag carriers to all gateway airports and other appropriate airports in the United States, and in other countries wherever possible.
- Accelerated Federal Government efforts to develop security measures, including new methods for detecting weapons and explosive devices.
- Full consultation with foreign governments and foreign air carriers on antihijacking techniques.
- More effective international antihijacking arrangements.

The President announced that the Secretary of Transportation would direct this program and take responsibility for further proposals, working closely in this capacity with the Secretaries of State, Treasury, and Defense and the Attorney General.

Implementing the President's Program. To help him carry out his responsibilities in the President's antihijacking program, the Secretary of Transportation announced on September 21, 1970, that he had appointed a Director of Civil Aviation Security in his Department. Significant developments thereafter in implementing the President's program follow in the order of the President's points as listed above.

Armed Guards. An interim force of armed guards to serve on commercial aircraft flights was organized from over 800 Armed Forces personnel and some 300 agents available from the Department of the Treasury and other Federal agencies, including FAA. The interim guard force served while an all-civilian "sky marshal" force was being prepared for duty. This latter force, members of which are officially designated customs security officers, was recruited by the U.S. Treasury Department's Bureau of Customs and trained by it, starting in November 1970, at Fort Belvoir, Va. While on antihijacking duty, the customs security officers are under FAA operational control. A ceiling of 1,500 of these officers has been approved by the Office of Management and Budget.

Extension of Surveillance at Airports. As FY 1971 began, several trunk airlines were using the Department's antihijacking detection system on selected flights for the preboarding screening of passengers, and on July 17,

New Orleans' Moisant International Airport became the first airport to institute such screening of all passengers going through its gates. Key components of the complete antihijacking system are an electronic device called a magnetometer, which detects weapon-sized amounts of metal going through it on a passenger's person or in hand luggage, and a hijacker behavioral profile based on traits common to known hijackers of the past, which airline personnel can watch for. If a person identified by the system as a possible risk cannot satisfactorily resolve the question with airline personnel, he is further investigated by a U.S. marshal or deputy marshal. Since the September 1970 Mideast hijackings and the President's intervention, use of the system in some form has greatly increased. The following are notable items:

- FAA has developed three variants for screening domestic flights—the gate plan, which subjects all passengers using that gate to the full system; the airport plan, as mentioned for New Orleans above; and the profile-only plan, where magnetometers are not available. This makes screening possible in some form, though it does not assure it, at all air carrier airports (some 531). International flights make more use of the magnetometer than domestic flights, proportionately.
- FAA security personnel have been placed at the Nation's 33 key airports.
- The Department of Justice is increasing from 100 to 230 the number of U.S. marshals or deputy marshals assigned to the preboarding screening of airline passengers.
- At year's end, FAA had launched a test program calling for use of specially selected and trained local police at Richmond and Norfolk, Va., and at Oklahoma City, Okla., in the antihijacking detection system.

Improved or New Detection Devices. Hijacking incidents of the year were studied for further insights into hijacker motivations and psychological types for updating of screening materials. A considerably more sophisticated magnetometer than the model initially put in service was being tested at year's end by the Department at Washington's Dulles International Airport—a model aided by a computer and capable of detecting nonferrous as well as ferrous objects and of distinguishing guns from other metal objects.

Through combined efforts of Government and industry, a baseline of the state of the art was established including weapon detection, bomb detection, behavioral screening, nonlethal weapons, communication systems, and electronic security. A fast neutron activation analysis system for detecting concealed explosives has been given a tentative health and welfare clearance, and design of an operational version for the Los Angeles Airport is underway. FAA has initiated plans for an operational test of a

pulse X-ray system at the Oklahoma City Airport for detection of explosives in baggage. The Transportation Systems Center has initiated plans for evaluation of an economized version employing a new image intensifier screen. The system, with higher light output and resolution than present screens, has potential for significantly improving detection of bombs and contraband in baggage and cargo. A successful demonstration of detection of explosives by D.C. Metropolitan Police K–9 Corp dogs was coordinated by FAA, leading to plans to have a set of dogs trained to handle bomb threats at the Washington National Airport. In-flight security was enhanced by the design and development by FAA of a prototype armored cockpit and by NAFEC of a cockpit area microphone to be used during progress of a hijacking. Several communications and signaling devices and weapons for use in flight have been investigated in an ongoing effort.

Consultations on Foreign Antihijacking Techniques. During approximately the last 10 days of September 1970, the Secretary of Transportation, acting as the President's personal emissary, conferred with top civil aviation officials at Amsterdam, Frankfurt, Paris, London, and Zurich concerning aircraft piracy and countermeasures. After returning to the U.S., the Secretary, assisted by the Federal Aviation Administrator, arranged for the Washington Meeting on International Air Transportation Security to exchange information on measures to combat aircraft hijacking and sabotage. The meeting took place in January 1971. Designed to undergird the ongoing efforts of the International Civil Aviation Organization (ICAO), it was attended by representatives of 76 governments and eight international organizations.

Improved International Antihijacking Arrangements. Significant steps carrying out this effort in FY 1971 included:

- U.S. implementing of the Tokyo Convention by a law dated October 14, 1970. The Tokyo Convention clarifies jurisdiction over crimes committed aboard aircraft on international flights—a basic requirement for further progress in this area.
- Signing of the Convention for the Suppression of Unlawful Seizure of Aircraft (Antihijacking Convention). The United States was an active participant in developing this convention, which was prepared by a Diplomatic Conference on Air Law under the auspices of the International Civil Aviation Organization and signed at The Hague, Netherlands, on December 16, 1970, by 50 of the 77 states that participated in the conference. The convention insures that contracting states will subject hijackers to severe punishment, regardless of where the act of hijacking takes place. No final action had been taken either on the Convention or its implementing legislation at year's end.
- Preparing of the Draft Convention Regarding the Safety and Security of International Civil Air Transport Services (Draft Convention on Sanctions). The Department actively participated in preparing this

draft convention, designed to establish procedures for international consultation and joint action against states that condone hijacking for international blackmail and certain other kinds of unlawful interference with aircraft. At year's end, the draft was scheduled for further consideration within ICAO.

Department's Antihijacking Detection System Found Constitutional. The Department's antihijacking detection system passed its first test in court during FY 1971. On May 7, 1971, in *United States* v. *Lopez*, the United States District Court for the Eastern District of New York, although it acquitted the defendant, indicated that the detection system provided the "reasonable suspicion" constitutionally required to justify a personal search. On another key point, the Court said that careful adherence to the absolute objectivity and neutrality of the system as designed would avoid discrimination against any person or group on the basis of race, origin, political views, or religion, thus meeting Constitutional equal-protection standards.

Legal Status of Hijackers. Approximately a week after the close of FY 1971, FAA released the following figures on the legal status of hijackers involved in incidents since May 1, 1961, against U.S.-registered aircraft and one foreign aircraft engaged in U.S. air commerce: Fugitives, 92 (including one fugitive suicide); convictions, 29 (including 26 in the United States and three foreign); acquittals, three (including the defendant in the incident involving the foreign aircraft in U.S. air commerce); dismissals, 10 (including seven on mental grounds, and among the three others one suicide); pending, 16 (including four awaiting mental report, and among the 12 others one in Egyptian and two in Argentine custody).

Other Notable Aircraft Piracy Developments. Among these in FY 1971 were the following:

- The first hijacking of a jumbo jet. A Boeing 747 on a flight from New York to San Juan, P.R., carring 388 passengers, was diverted on August 2, 1970, to Havana.
- The first passenger death in a domestic hijacking incident, June 12, 1971. (Previously—on March 17, 1970—the copilot of a hijacked domestic flight had been killed). The hijacker forced his way aboard an Albuquerque-New York flight during a scheduled stop at Chicago's O'Hare International Airport, seized a stewardess, and demanded to be flown to Vietnam. The passenger was killed when he attempted to aid the stewardess. After the medium-range aircraft had landed at New York's John F. Kennedy International Airport for substitution of a long-range aircraft, the hijacker was wounded and arrested by FBI agents.
- Assignment (August 3, 1970) to FAA's Office of Investigations and Security, which was renamed at the same time the Office of Air Trans-

portation Security, of broad responsibility for combating criminal acts against air transportation, and establishment within the office, to help carry out its expanded functions, of an Air Operations Security Division, which replaced the Task Force on the Deterrence of Air Piracy appointed in February 1969.

Air Charter Operations with Large Airplanes. The Department moved in FY 1971 toward important changes in the safety regulations governing operation of large aircraft (over 12,500 pounds) in private carriage for compensation or hire (carriage other than that by the scheduled and supplemental air carriers, which engage in common carriage). In October 1970, after the crash of a large aircraft in private carriage on October 2 near Silver Plume, Colo., in which members of the Wichita (Kans.) State University football team were among the 31 fatalities, the Secretary directed the Assistant Secretary for Safety and Consumer Affairs to conduct a detailed investigation of charter operations using large aircraft. The investigation was carried out during the next 4 months by a task force which completed its report in February 1971; on March 5, the Secretary released its findings and recommendations to the public.

The central problem, the task force found, was the difficulty of enforcing the distinction in the safety regulations between large airplane operations in private carriage for compensation or hire and other large airplane operations in private carriage. Because safety regulations are expensive to comply with, the distinction had given rise to a serious problem of operators using various subterfuges to engage in fact in private carriage for compensation or hire when they lacked certification for such operations. These "shady" operators, having lower costs, could underbid the properly certificated operators, and the client would often be unaware of the safety risk incurred in hiring a plane in this way or of his own responsibilities under the law.

The task force made eight recommendations for dealing with the situation, and the Secretary ordered them implemented. Some of these—like the distribution (to colleges and universities and others) of an educational flier explaining the difference between leasing an aircraft and hiring a charter flight, and warning that charter services can be provided only by an operator with an appropriate safety certificate—were carried out at once. Others—such as applying the operational safety standards of a certificated commercial operator's large airplanes to all large airplanes, pressurized-cabin airplanes, and turbine-powered airplanes engaged in private carriage, but without the detailed administrative, financial, and organizational requirements for the issuance of a commercial operator certificate—will take longer.

Other General Aviation Safety. In those elements of general aviation (non-air-carrier civil aviation) other than the one discussed immediately above, an outstanding step in promoting safety during the year

was the national implementation of the general aviation accident prevention program. Having demonstrated effectiveness in a 2-year test ending June 30, 1970, in FAA's Central and Southwest Regions, the program was expanded in FY 1971 to place accident prevention specialists in 83 general aviation and flight standards district offices, supplemented by one national and seven regional accident coordinators. The premise of the program is that the number of general aviation accidents can be reduced by improving the attitude, changing the behavior where necessary, and increasing the proficiency and knowledge of the airman, and by reducing environmental hazards. It is being favorably received.

Despite the improvement in the general aviation safety record for calendar year 1970 (see "New Safety Records" above), the Secretary noted that the statistics reflected a continuing problem and an accident rate that could be reduced. Accordingly, he announced on April 17, 1971, that he had directed the Assistant Secretary of Transportation for Safety and Consumer Affairs to conduct a comprehensive, in-depth study of all elements of general aviation operations except those in the "for hire" category. At year's end, the study was nearing completion.

Preventing Midair Collisions. FAA was in the process of implementing a major new safety rule designed to reduce the midair-collision hazard when FY 1971 began. This rule, effective on June 25, 1970, had established the concept of the terminal control area (described in detail in last year's report). The concept grew out of a study of near-miss incidents reported by pilots to FAA during 1968. The major finding of the study was that the greatest midair-collision hazard occurred in congested airspace near large airports having air traffic control service, and resulted from mixing controlled traffic (which includes nearly all air carrier aircraft) with traffic under visual flight rules (which includes many small airplanes). The basic idea of the terminal control area is to insure separation between each aircraft and every other aircraft within defined airspace around and above the nation's busiest airports.

Varying local conditions make it necessary to adapt the general concept of the terminal control area (TCA) to a given location by a special rule in each case. As FY 1971 began, a TCA was already in effect at Atlanta, and less than a month later (July 23, 1970) another was placed in effect at Chicago's O'Hare International Airport. The requirements of a third TCA became mandatory at Washington, D.C., for the Washington National Airport-Andrews Air Force Base complex on February 4, 1971, after having been on a voluntary basis since October 1, 1970. Notices proposing to establish a terminal control area at the New York airport complex and another around Los Angeles International Airport were issued by FAA on May 12, 1971, and at year's end the agency was studying comments on these proposals.

Supplementing the foregoing was agreement between FAA and the military services on a joint program aimed at having more military flights

under the direct control of FAA's air traffic control facilities and fewer under visual flight rules. The lowering of the base of positive control airspace over an additional part of the United States during the year will also help to reduce the potential for midair collisions.

The air traffic control system is—and will continue to be for the foreseeable future—the primary means of separating air traffic and preventing in-flight collision. A significant portion of the Department's (especially FAA's) resources continued during FY 1971 to be devoted to general improvement of this system to promote both safe and efficient use of the airspace (see chapter VIII). In addition, engineering and development and evaluation programs continued to seek improvement in elements of the system most directly bearing on the midair-collision problem. Such programs include efforts to improve the radar detectability of aircraft, to upgrade the air traffic control radar beacon system, to provide better primary radar detection of nontransponder aircraft—particularly the smaller, general aviation aircraft.

Thus, any type of air-to-air or airborne system or device to counter the midair-collision hazard will serve primarily as a supplement to the air traffic control system. The Department's R&D efforts in this supplementary, air-to-air approach to the problem are concerned mainly with two basic concepts: the collision-avoidance system (CAS) and the pilot-warning instrument (PWI).

A CAS—much more sophisticated technologically than a PWI, and therefore much more expensive—can detect all potentially dangerous "intruders" in the airspace, evaluate the degree of danger, and, if necessary, indicate to the pilot the proper avoidance maneuver in time for its safe execution. A PWI is a system that helps the pilot visually locate any aircraft potentially posing a threat of collision with his own aircraft, after which the pilot himself must evaluate the situation and determine his proper response. Users of the CAS if it is implemented will be mainly air carrier and other large aircraft, which generally fly IFR (instrument flight rules). Users of the PWI (though also including some air carrier aircraft) will characteristically be small aircraft, which often fly VFR (visual flight rules).

During FY 1971, FAA continued cooperative R&D efforts with other organizations in both the CAS and the PWI categories. The agency has been working with the Air Transport Association (ATA) on a CAS using precise time and frequency technology, which was flight tested in fiscal year 1970. A study of the interaction between the air traffic control system and a CAS of this kind, to learn how to minimize any undesirable effects of such interaction, was initiated in fiscal year 1971. The study is being carried out through real-time simulation at FAA's National Aviation Facilities Experimental Center (NAFEC), Atlantic City, N.J. Development effort was also begun on one form of ground station necessary for this type of CAS. Other techniques than time and frequency have been proposed, and during FY 1971 FAA began a cooperative effort with the Navy to test

and evaluate preliminary subsystems of an interrogate/transpond type of CAS.

In the PWI category, FAA's plans call for development of PWI's of differing technologies; during FY 1971, in conjunction with the National Aeronautics and Space Administration and the Department's Transportation Systems Center, the agency was evaluating an infrared PWI. Various study efforts were gathering data fundamental to defining the PWI mechanism, which includes the human being in the system.

Certification Activities

Airports. One of the provisions of the Airport and Airway Development Act of 1970 is that airports serving air carriers certificated by the Civil Aeronautics Board must have an operating certificate from FAA by May 21, 1972. In May 1971, FAA published a notice of proposed rulemaking setting forth the standards proposed for the certification of airports regularly serving scheduled certificated air carriers operating large aircraft (over 12,500 pounds) other than helicopters; separate rules were being drafted at year's end for airports serving certificated air carriers using small aircraft. The deadline for commenting on the proposed rule applying to airports serving large aircraft was July 13, 1971.

The proposed rule set forth standards for 16 airport elements, conditions, equipment, and activities requiring FAA approval before an operating certificate would be issued. These items were: pavement areas; safety areas; marking and lighting runways, thresholds, and taxiways; airport firefighting and rescue equipment and service; handling and storing hazardous articles and materials; traffic and wind direction indicators; emergency plan; self-inspection program; ground vehicles; control tower visibility; obstructions; protection of navaids; public protection; bird hazard reduction; airport condition assessment and reporting; and identifying, marking, and reporting construction and other unserviceable areas.

Aircraft, Aircraft Components, and Airman Schools. Principal items in this category were as follows:

- Continued development of SST certification standards. Though development of the U.S. supersonic transport was stopped by Congress during the fiscal year, FAA must nevertheless be in a position to certificate foreign-built SST's. Meeting of Government-industry working groups concerned with SST certification standards continued as in previous years, the most notable such meeting in FY 1971 being the FAUSST VIII (eighth meeting of the French-Anglo-United States Supersonic Transport Group) in January 1971 in Washington, D.C., attended by over 100 representatives from the three countries involved. In cooperation with NASA, FAA continued applying data of the Concorde (the Franco-British SST) to the ground-based flight data simulator at NASA's Ames Research Center, Moffett Field, Calif., and

results obtained were correlated with results from a flight research program using a U.S. Air Force supersonic fighter aircraft (F–102) to provide an excellent basis for finalizing low-speed performance standards for SST's. Out of this work came a report published in May 1971 as "Supersonic Transport Airworthiness Standards: F–102 Flight Research Program."

- Issuance (June 4, 1971) of the first supplemental type certificate approving installation of a nitrogen fuel-tank-inerting system in a civil aircraft to protect against accidental ignition of fuel vapors.
- Issuance of 77 type certificates for new aircraft models. (Table 2)
- Issuance of 33 type certificates for new aircraft engine models, including 3 foreign ones.
- Issuance of five type certificates for new propeller models and 23 amendments to previously issued propeller type certificates.
- Continuation of a rising trend in certification of maintenance technician schools (formerly mechanic schools). Although the number had remained fairly stable at about 70 for some years before 1965, since then it has steadily increased, reaching 119 by January 1970 and 132 by June 30, 1971.

Safety Rules and Regulations

Among the more significant actions in this category during fiscal year 1971 other than those discussed elsewhere (the proposed rule for certificating airports, for example, will be found under "Certification Activities" above) were those concerned with:

- Airworthiness standards of small airplanes seating 10 or more passengers, excluding pilot seats. An amendment to the Federal Aviation Regulations (FAR's) issued February 5, 1971, and effective the following March 13 requires such small aircraft to be certificated in the transport category, regardless of weight—an upgrading of safety standards affecting, among others, the growing air taxi industry.
- Operation of aircraft after consumption of alcoholic beverages. An FAR amendment issued October 30, 1970, and effective the following December 5 prohibits any person from acting as a crewmember of a civil aircraft within 8 hours after consuming any alcoholic beverage.
- Preflight action by pilots. An FAR amendment issued January 29, 1971, and effective the following April 6 helps upgrade general operating and flight rules applying to all pilots by requiring the pilot to familiarize himself with the takeoff and landing distances appropriate to the aircraft he is using and with all available information concerning runway lengths at airports of intended use.
- Expanded flight-recorder data. An FAR amendment issued August 12, 1970, and effective the following September 18 will promote aviation safety by greatly assisting in the determination of the causes of acci-

dents affecting large (over 12,500 pounds) transport aircraft originally certificated after September 30, 1969, if they have jet engines or are certificated to operate above 25,000 feet. Under the new rule, all aircraft of this category in service must be equipped by September 18, 1973, with flight recorders providing more than three times as much information as the older recorders about what the airplane was doing and how it was behaving in flight before an accident.

Other Aviation Safety Developments

Aircraft Maintenance Programs. Notable during the year in the agency's activities concerned with insuring proper maintenance of civil aircraft airworthiness after the aircraft enter service were:

- Increased emphasis on the maintainability and reliability of aircraft even in the manufacturing stage. FAA issued instructions to the field on January 18, 1971, for administering a new requirement that all aircraft manufacturers applying for a type certificate after February 1970 must make a maintenance manual available to the owner at the time of delivery of the aircraft.
- The sixth annual FAA International Aviation Maintenance Symposium, which met at Oklahoma City, Okla., December 8–10, 1970, with the theme "The Aviation Maintenance Environment in the 70's." There were 744 attendees, including 100 foreign delegates, representing 26 countries.
- The annual National Aviation Mechanic Safety Award presentations, made by the Administrator and officials of 13 sponsoring organizations and industry at a ceremony at FAA Headquarters on June 22, 1971. This program has been successfully operated since 1963, when it was inaugurated to recognize the key role of the aviation mechanic (or maintenance technician, as he has been renamed) in aviation safety and to strengthen the partnership between him and the agency in this field. Over 400 maintenance technicians participated in the 1970 program. Prizes valued at over $4,500, provided by industry sponsors, were awarded to the two national winners (air carrier and general aviation categories); other industry-donated prizes totaling approximately $10,000 were awarded to similar winners in the regional and State phases of the competition.

Transportation Safety Institute. In February 1971, the Secretary established a Transportation Safety Institute (TSI) at FAA's Aeronautical Center, Oklahoma City, Okla. Though operated by FAA, this school will provide training in the investigation of accidents and incidents in all modes of transportation, and in related regulatory matters. The establishment of the TSI follows the dissolution of the National Aircraft Accident Investigation School, which had been operated as a joint venture at the FAA Academy (also at Oklahoma City) since FY 1964 by FAA on the one hand, and, on the other, the Civil Aeronautics Board until April 1, 1967, when the

CAB was succeeded in this as in other responsibilities having to do with investigating aircraft accidents by the National Transportation Safety Board.

RAILROAD SAFETY

Under the Accident Reports Act, the FRA's Bureau of Railroad Safety is charged with compiling and publishing railroad accident statistics. The Bureau found that the number of reportable accidents in 1970 decreased by 5.2 percent from those reported in 1969. The major factor in this decrease was the 6.0 percent drop in derailments, caused mainly by failure of equipment and defective track. The number of collisions decreased by 3.0 percent from 1969, while other train accidents decreased by 4.7 percent. The number of casualties resulting from all reportable train accidents decreased by 7.4 percent.

TRAIN ACCIDENTS. Table 12 lists the number and types of train accidents, and the resulting casualties from accidents of all types during the calendar year 1970 and the two preceding years. In 1970, 8,095 train accidents were reported—a decrease of 448 accidents or 5.2 percent under those reported in 1969, but an increase of 67 or 0.8 percent over those in 1968. There were 5,602 derailments reported—a decrease of 358 or 6.0 percent under those reported in 1969, but an increase of 115 or 2.1 percent over those in 1968.

Tables 13 and 14 list the results of field agents' activities related to enforcement under the Accident Reports Act.

RAIL-HIGHWAY GRADE-CROSSING ACCIDENTS. During 1970, some 3,559 train and train-service rail-highway grade-crossing accidents were reported—a decrease of 215 accidents or 5.7 percent compared with the previous year.* A total of 1,440 deaths and 3,336 injuries resulted from these accidents, representing a decrease of 3.4 percent in deaths and a decrease of 9.1 percent in injuries compared with 1969.

Collisions at grade crossings involving trains and motor vehicles during 1970 totaled 3,377 and resulted in 1,362 deaths and 3,237 injuries—a decrease of 195 accidents, 19 deaths and 341 injuries compared with 1969.

Included in the total number of accidents involving motor vehicles were 67 derailments and 245 miscellaneous train accidents accounting for 157 deaths and 161 injuries.

Also included in the total casualties at rail-highway grade crossings were 8 fatalities and 98 injuries to employees on duty.

Information concerning these accidents is summarized in Table 15.

INSPECTION ACTIVITIES

Locomotive Inspection. The Bureau of Railroad Safety's Locomotive Branch investigated 73 accidents during FY 1971. Failure of locomotive

* In addition, there were 12 nontrain grade-crossing accidents during 1970 which resulted in 2 fatalities and 15 injuries.

equipment contributed to 48 of these accidents and resulted in 52 injuries. There were no fatalities (see Tables 16 and 17). Predominant causes of these accidents were defective cab windows and doors; defective electrical insulation, short circuits, or electric flash; unsafe cab floors, steps, and passageways; defective cab seats; crankcase or air-box explosions in diesel engines; brakes and brake rigging; and fires due to liquid fuel or debris.

During FY 1971, the Locomotive Branch inspected 82,299 locomotives, a decrease of 12,705 under the number of units inspected in the previous fiscal year (see Table 19). Of the total units inspected, 10,069 or 12.9 percent were reported as defective. The percentage of defective locomotives increased 0.3 percent over last year.

Equipment and Operations. The percentage of defective equipment in use increased from 8.8 to 9.0 percent during the year. The operation of trains which had not been given proper train brake tests decreased from 22.2 percent observed in FY 1970 to 17.2 percent in FY 1971.

Other Inspection Activities. Tables 19 and 20 show the number of freight cars, passenger-train cars, and locomotives inspected; the number found with defective safety appliances; the percentage defective, and data for comparison with the preceding year.

Of 862,618 freight cars inspected, 78,320 or 9.1 percent had defective safety appliances, as did 7.7 percent of all rail passenger cars and 5.1 percent of locomotives inspected. In addition, another 151 special inspections of new equipment were made by field inspectors and members of the Washington staff in response to carrier, shipper and builder requests to ensure compliance with safety standards and regulations.

Investigation of Complaints—Safety Appliances. During the year, 216 complaints were investigated, compared with 223 complaints for the preceding year. Of these 52 involved power brakes, 75 safety appliances and 55 both power brakes and safety appliances. Another 34 involved miscellaneous matters. In 108 of these investigations, evidence of violation of the law was obtained and prosecution on 1,121 counts was instituted. In many other instances, FRA's investigations resulted in the correction of unsatisfactory conditions.

Hours of Service Act. During the year, hours of service reports were filed by 92 railroads reporting 6,328 instances of all classes of excess service. The reports covered 4,792 instances of excess service by operators, train dispatchers and other employees subject to the 9-hour and 12–13-hour provisions of the law. A breakdown of this total is shown in Table 21. The reports also covered 1,536 cases of excess service performed by train and engine employees subject to the 14–16-hour provision of the law (Table 22). Instances of excess service performed by employees and the railroads involved are shown in Table 23.

Effective December 26, 1970, the Hours of Service Act was amended by Public Law 91–169, reducing the hours of duty from 13 hours to 12 hours at telegraph offices where only one shift is employed. Maximum duty permitted train and engine employees was reduced from 16 hours to 14 hours.

Financial Settlements. In FY 1971, the Office of Chief Counsel of FRA negotiated settlements totaling $1,378,005.00 with 101 railroads, under the Federal Claims Collection Act, for civil penalty violations of the railroad safety laws. This represented an increase of $1,110,180.00, or 500 percent over the negotiated settlements reached with 21 railroads in FY 1970.

In addition to the above amount, U.S. District Courts assessed penalties of $12,158.96 and $4,956.96, respectively, for violations of the Safety Appliance Acts and the Hours of Service Act. The Federal Claims Collection Act and its implementing regulations provide that suits will be instituted only if the FRA is unable to obtain a reasonable settlement utilizing Claims Collection Act procedures. The District Courts also assessed criminal penalties totaling $2,865.00 for violations of the Hazardous Materials Act.

Medals of Honor Act. Under the Medals of Honor Act of February 23, 1905, as amended (49 U.S.C. 1201–1203), applications are considered for award of life-saving medals to persons who, by extreme daring, risk their own lives in saving or endeavoring to save lives in any wreck, disaster, or grave accident, or preventing or endeavoring to prevent such a wreck upon any railroad within the United States or involving any motor vehicle on the public highways. At the beginning of the year there were no pending applications involving railroads and only three were received during the fiscal year. Two of those are pending; one was denied.

Since enactment of the Medals of Honor Act in 1905, 131 applications have been received for the Award, 78 were awarded, 51 were denied and two are pending.

Signal and Train Control Equipment. During the year, 139 applications for approval of proposed modification of block signal systems, interlocking, automatic train stop, train control, and cab signal systems were filed by the carriers. At the beginning of the year action was pending on 36 applications previously filed. Of the total, 138 applications were acted upon during the year and action is pending on 37.

Thirty-one applications were filed requesting relief from the requirements of Federal Railroad Administration's Rules, Standards, and Instructions. At the beginning of the year, action was pending on 11 applications. Of the total, 37 were acted upon and action is pending on five.

During the year, 53 complaints were received regarding alleged violations of the Rules, Standards, and Instructions. At the beginning of the year action was pending on 15 complaints previously filed. During the year investigations were completed on 58 and action was pending on 10 at the end of the year.

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Also during the year, 25 cases involving violations of Signal Inspection Law (49 U.S.C. 26) were forwarded to the Chief Counsel for consideration compared with 12 cases during the previous year.

Table 24 shows, for a 5-year period, the number of applications for approval of modifications of block signal systems and interlockings as well as applications for relief from or modifications of the FRA Rules, Standards, and Instructions. Shown also are the number of inspections and devices inspected during the year.

The signal inspection activities resulted in bringing to the attention of railroad management a number of unsafe conditions requiring immediate corrective action. In several cases the inspectors were able to take corrective action with carrier personnel to prevent a serious accident.

Meetings were held with carrier officials to discuss the need for improved maintenance of signaling systems.

Seminars and meetings were held with carrier officials and manufacturers to discuss the need for more modern types of signaling systems which will improve the safety of train operations.

Engineering and Accident Analysis. Personnel of the Bureau of Railroad Safety's Engineering Branch participate in the development and evaluation of all technical projects, studies and analyses relevant to conventional railroad operation and equipment, conducted within FRA. Branch personnel have participated in the following during FY 1971:

1. Development of track standards and equipment standards in accordance with requirements of the Federal Railroad Safety Act of 1970 for issuance October 1971.
2. Award of a contract to the U.S. Naval Ordnance Laboratory at White Oak, Md. to investigate and evaluate methods for fire protection of railroad tank cars carrying hazardous material. In conjunction with this project the Federal Railroad Administration, the Association of American Railroads and the Railway Progress Institute have consummated a joint agreement with the Naval Ordnance Laboratory to conduct fire tests on nine ⅕-scale and two full scale tank car models to determine the thermodynamic characteristics and effectiveness of the new thermal protective system when subjected to accident fire conditions.
3. An FRA study has been completed on head protection of tank cars which indicates that the application of head shields to some types of tank cars carrying hazardous material may be economically justified.
4. A Cornell Aeronautical Laboratory study to reduce hazards of tank car transportation in relation to venting of the tank car.
5. Initiation of an internal FRA program to simplify and improve locomotive inspection reporting and processing.
6. Evaluation and award of a contract to provide a sophisticated and meaningful accident information system.

7. An internal study related to train derailments caused by bearing failures.

Work accomplished routinely includes the following:

1. Quarterly inspection of Northeast Corridor trackage;
2. Investigation of complaints concerning trackage and facilities received from Congress, labor organizations, municipal and state governments, and the general public; and
3. Development of special studies related to Bureau of Railroad Safety Regulations.

During FY 1971, accident analysis personnel undertook investigations of 90 train accidents involving 80 fatalities and 335 injuries. In four additional accidents the National Transportation Safety Board assumed jurisdiction. However, at the request of the Board, FRA personnel performed the field work necessary for the Board to determine the "Probable Cause" and to prepare a public report on the circumstances involved.

FRA published reports for 22 train accidents during FY 1971.

Table 14 shows numbers of serious accidents investigated from FY 1967 through FY 1971.

Hazardous Materials. The three FRA Hazardous Materials Inspectors and Safety Inspectors made 784 inspections of the movement of hazardous materials by railroad. The principal deficiencies noted were the improper placarding of freight and tank cars, location of such cars in trains, improper loading procedures for tank cars, and improper documentation of hazardous shipments at point of origin. Inspectors were able to take corrective action with carrier personnel and shippers in many cases, to prevent a recurrence.

A total of 722 Special Permits (including renewals) which allow movement of commodities not specifically covered by the regulations were approved for railroad transportation. Copies of the permits were distributed to the field staff of the Bureau of Railroad Safety for use in inspection and enforcement work.

Complaints and allegations of unsafe handling of hazardous materials while in transit were cited in 12 letters received from Congress, State and local officials, labor unions, and the public. The allegations were referred to the appropriate Regional Directors for investigation, report of findings, and corrective action with the carriers involved to prevent recurrence. During the year, nine complaints were found to have sufficient basis for possible prosecution in the courts, and were therefore forwarded to the Chief Counsel for appropriate action. During FY 1971 two instances of violation which had been sent to Chief Counsel during the previous year were successfully prosecuted and judgment made in favor of the Government during FY 1971.

Comprehensive safety regulations for the transportation of liquids by pipeline (49 CFR Part 195), became effective on April 1, 1970. During

the fiscal year a total of 330 Pipeline Carrier Accident Reports (DOT Form 7000–1) were filed with the Administrator.

The team of Bureau personnel that goes to major railroad accident scenes to begin investigative work includes a Hazardous Materials Specialist from this Branch. On two occasions during the year the National Transportation Safety Board preempted accident investigations involving hazardous materials which had been started by FRA personnel. However, FRA field inspectors were assigned to assist the NTSB in the railroad aspects of their investigation.

MERCHANT MARINE SAFETY

The main objective of the Coast Guard's Merchant Marine Safety Program is to conduct an effective preventive safety program to minimize the number of deaths and injuries and the amount of property damage in marine accidents (Tables 10 and 11).

Since Congress passed the first law providing for "inspectors" of steamboats in 1838, the role of marine safety has been expanded to include the frequent inspection of numerous other classes of vessels, the licensing and certification of their officers and crews, and the investigation of marine casualties and accidents.

Statistics for calendar year 1969, released during May 1971, indicate a continued record-breaking advance in the waterborne commerce of the United States, and register increases of 3.8% in tonnage and 3.9% in ton-miles over 1968. Tonnage in 1969 was 1,448.7 million tons, an increase of 52.9 million tons over 1968; ton-miles aggregated 302.9 billion or 11.5 billion ton miles more than in 1968. Although seasonal slumps and peaks develop in shipping during any given year, there is nothing to indicate that the rate of increase did not continue at the same level during FY 1971. These figures demonstrate the importance of Coast Guard activity in the field of Merchant Marine Safety from the stand-point of regulation, inspection, and manning of merchant vessels because of their impact on the national economy and the balance of payments abroad. Additionally, the volume of shipping creates a potential for increased search and rescue operations as well as a need to accelerate development of sophisticated aids to navigation and improved communications capability.

The enforcement of the Federal marine safety laws and regulations has been vested in the Coast Guard, and personnel are located throughout the United States and its territories as well as in various major seaports of Europe and Asia in order to insure compliance with the law and assist in the merchant mariner in whatever way possible.

Not only do the marine safety laws apply to U.S. flag vessels, but also to foreign vessels visiting U.S. ports. The Coast Guard insures that foreign freighters and tankers carry hazardous materials only under strict safety regulations prior to allowing these vessels to carry U.S. citizens from do-

mestic ports. Following are brief notes on several on-going merchant marine safety projects:

- A contract has been awarded for the development of a system to test merchant marine officers in the use of radar as a collision avoidance device and a navigational device.
- The program of modernizing license examination is proceeding. A major part of the new examination for the two lower grades of licenses will be completed by the end of FY 1972. The new system will centralize major examining functions and will allow for simplifying and standardizing administration of the licensing program.
- In cooperation with shipping companies, interested government agencies, and other elements of the local maritime communities, the Coast Guard has approved the establishment of coastwise sealanes in Southern California from Santa Monica Bay to Los Angeles-Long Beach.
- The tug/barge concept deals with tugs and barges connected together by an engineered, mechanical, rigid system capable of rapid connection and disconnection. Several design concepts are under review. The only system approved thus far is the Breit system. The first tug/barge combination using the Breit system has been built for Ingram Corporation and is presently undergoing sea trials.
- Proposals for novel ship designs, including high voltage (4160 volts) electrical systems and vessels with minimum manning standards; i.e., unattended enginerooms, have increased. Each of these requires special consideration to insure that for new designs a level of safety equivalent to that of conventional vessels is maintained.
- The advance in technology of design and construction of surface effect ships has been followed by the Coast Guard during the past year. A serious attempt to establish service using these craft is being made by a Canadian company in San Diego, California.

The Coast Guard's multifaceted program to develop modern regulations for the transportation of hazardous materials continued at an accelerated pace reaching the following notable milestones:

- Implementation of new regulations for unmanned barges which carry chemicals in bulk.
- Promulgation of regulations which require reporting of transportation incidents involving hazardous materials.
- Completion of draft of regulations for manned vessels which carry chemicals in bulk.

The foreign vessel Letter of Compliance program continued as a major activity. Under this program, foreign vessels considered to present an unusual risk to U.S. ports are required to obtain a Letter of Compliance based upon plan review and vessel examination. As of 30 June 1971, 309 vessels have been reviewed, with 95 currently under review. Since the

vessels are normally of complex design, technical demands on the Coast Guard are quite high.

During the past year, there has also been an increased interest on the part of U.S. owners and shipyards in using tankers designed for liquefied natural gas (LNG) and liquefied petroleum gas (LPG). To aid in reviewing the designs of these LNG/LPG ships, tentative guidelines have been drawn.

BOATING SAFETY

The Federal Boat Safety Act of 1971 was introduced in the House of Representatives on 22 January 1971 (H.R. 19), and in the Senate on 10 February 1971 (S. 696). This bill is an outgrowth of a proposal introduced in the 91st Congress, which passed the House too late in the session for Senate action.

Forty-nine State jurisdictions (including the Virgin Islands and Puerto Rico) have approved numbering systems in accordance with the Federal Boating Act of 1958. The five jurisdictions which do not have an approved numbering system are Alaska, New Hampshire, Washington, the District of Columbia, and Guam.

During FY 1971, 42 Cooperative Law Enforcement Agreements, containing some 115 understandings, were in force.

The Coast Guard expanded its boating safety activities both internally and externally. Some significant activities included:

Thirteen additional Boating Safety Detachments (BOSDETS) were established around the country. BOSDETS are three-man mobile units equipped with a 17-foot trailered boat and a vehicle whose mission is the promotion of safe boating through a balanced program of education and law enforcement. There are now 54 BOSDETS operating in the areas of greatest need throughout the United States.

The regional Boating Safety School's curriculum was expanded from one to two weeks. These annual schools were conducted in four locations for the first time this year; training was offered at Alameda, California; New Orleans, Louisiana; New York, New York; and Great Lakes, Illinois. A total of 174 students attended. These included 126 Coast Guard officers and men plus 48 State and other Federal officials. Training of 3,095 Coast Guard, State, and local law enforcement personnel in boating safety related subjects was completed, primarily through the efforts of boating safety detachments.

During the year, work was completed on a study of the various methods currently used to enhance the awareness of the recreational boating public to unsafe boating practices (Recreational Boating Safety Study). The study will serve as a basis for evaluating the cost effectiveness of the Coast Guard's existing Boating Safety Education Program and for introducing new methods and techniques in the education of the public in safe boating practices.

An estimated 45,000 hours were expended on education and information activities. An estimated seven million people visited Coast Guard boating safety exhibits during 1970. About 300,000 persons attended safety lectures.

Appearances were made on 500 radio and TV shows in behalf of boating safety.

The vessel oil and sewage control sections of the Water Quality Improvement Act of 1970 (PL 91–224) have significant potential impact on recreational boating. The Coast Guard's Office of Boating Safety has participated in the required consultations between the Department of Transportation and the Environmental Protection Agency relating to oil discharge and marine sanitation device standards, and in preparatory work for the forthcoming United States/Canadian Great Lakes Water Quality Agreement.

Achievement of the aims of the Boating Safety Program would be impossible without the services of the Coast Guard Auxiliary, a nonmilitary volunteer organization established pursuant to Title 14 U.S. Code. Auxiliarists are experienced boatmen, licensed amateur radio operators, or licensed aircraft pilots. Each is trained in seamanship, piloting, and related subjects prior to acquiring full membership.

The following is a comparison of auxiliary achievements and strengths in fiscal years 1970 and 1971.

	1970	*1971*
Persons receiving safe boating instructions	178,974	225,143
Motorboats examined (facilities and courtesy examinations)	221,100	255,087
Regatta patrols	4,136	4,671
Assistance missions	10,122	12,118
Lives saved	304	524
Total membership	30,253	32,363
Total facilities	15,983	16,557

The Auxiliary is presently active in approximately 1,000 communities in the United States, Puerto Rico, and the (U.S.) Virgin Islands.

PIPELINE SAFETY

The Office of Pipeline Safety (OPS) administers the Natural Gas Pipeline Safety Act of 1968 under delegation through the Assistant Secretary for Safety and Consumer Affairs. During the year the Department's safety program concentrated on development and publication of the first Federal safety standards for pipelines, building a strong Federal/State partnership with emphasis on an effective compliance program by State agencies, and informing the State agencies, industry and public about the Department's pipeline safety responsibilities and the new Federal standards.

The interim Federal safety standards required by the Act were in effect until November 12, 1970. On that date, the new Federal standards which had been issued on August 11, 1970, became effective.

Three amendments were made to the Federal standards during FY 1971. One amendment, applicable to six States, continued until January 1, 1972, the requirements contained in the interim Federal standards for odorization of gas in transmission lines. Another amendment made changes to correct technical discrepancies that were found in the new Federal standards. A third, issued June 25, 1971, established comprehensive requirements for corrosion control on gas pipelines.

Two other regulations issued by the Department are especially significant. Regulations establishing a system for reporting leaks and failures required annual summaries from each operator beginning in 1970 as well as reports on individual incidents. A summary of data reported under these regulations was included in the Third Annual Report on the Administration of the Act forwarded to the Congress in July 1971.

On October 16, 1970, a regulation was issued to provide for the filing of inspection and maintenance plans by operators of gas pipelines as required under section 11 of the Act.

SAFE HANDLING OF HAZARDOUS MATERIALS

The Hazardous Materials Control Act of 1970 provides that the Secretary establish and maintain facilities and staff to evaluate hazards connected with goods being shipped, establish a central reporting system for accidents, review all aspects of hazardous materials transportation, and recommend appropriate steps to provide greater control of the safe movement of such materials.

To undertake this work the Secretary delegated responsibility to the Assistant Secretary for Safety and Consumer Affairs. The Office of Hazardous Materials under the Assistant Secretary has included in its program the following projects:

1. Sponsoring hazardous materials transportation safety school programs in conjunction with leading universities in regions through the country.
2. Developing a central reporting system for hazardous materials incidents, and a hazard information system to provide technical and other information and advice to law-enforcement and fire-fighting personnel and to carriers and shippers for meeting emergencies connected with the transportation of hazardous materials.
3. Updating and modernizing regulations and issuing special permits to embrace new technologies.
4. Developing new definitions and classifications for materials that are health hazards and corrosives, and establishing a program to update standards for packaging of hazardous materials.

CHAPTER IV

ENVIRONMENTAL IMPROVEMENT

OFFICE OF THE SECRETARY

Secretary Volpe has assigned major responsibilities for environmental matters to the Assistant Secretary for Environment and Urban Systems who is charged with reviewing and coordinating Departmental programs and actions to insure that they are responsive to the administration's commitment to the Congressional requirement that environmental quality be a goal of all Department programs. Specific environmental responsibilities charged to the Assistant Secretary derive from Section 4(f) of the DOT Act, Section 102(2)(C) of the National Environmental Policy (NEP) Act of 1969, Section 16 of the Airport and Airways Development Act of 1970, Section 14 of the Urban Mass Transportation Act, and Section 106 of the Historic Preservation Act. Each of these pieces of legislation gives the Secretary of Transportation significant responsibility for ensuring that environmental factors are considered as a part of Department programs.

During FY 71, the Office of Environment and Urban Systems reviewed some 800 draft Environmental Impact Statements on transportation projects submitted in response to Section 102(2)(C) of the NEP Act. Many of these incorporated statements responding to the provisions of Section 4(f) of the DOT Act.

JUDICIAL DECISIONS. Two landmark judicial decisions during the year dealt with environmental questions relating to proposed transportation actions; these were the Overton Park Case and the Gilham Case. On March 2, 1971, in the Overton Park Case the U.S. Supreme Court cited the need for DOT's critical review of those cases where Section 4(f) is involved.

In this instance a highway through a Memphis, Tennessee, public park was involved. The Court stated that a "substantial inquiry", a "thorough, probing, in-depth review" must be undertaken to serve the paramount importance which the statute assigned to the protection of parklands. The Court stated that Section 4(f) required that "The few green havens that are public parks are not to be lost unless there were truly unusual factors present in a particular case . . ."

In the Gilham Case the Arkansas Federal District Court found that the Corps of Engineers had not responded to certain questions regarding the environmental impact of the proposed Corps of Engineers construction of Gilham Dam. In this case, the Court said that NEPA required that a detailed statement utilizing a systematic interdisciplinary approach should

include all environmental impacts of construction, should explore all alternatives to the project (including the alternative of *not* building), should list irreversible commitments of resources, and should include comments of Federal, State, and local agencies having particular expertise in the problem area under consideration.

RESEARCH AND DEVELOPMENT. The Assistant Secretary for Environment and Urban Systems has directed an environmental and urban research program aimed at:

1. Refining, testing and demonstrating techniques for assessing the environmental, social, aesthetic, and economic impacts of transportation;
2. Developing, testing and demonstrating the application of environmental factors to intermodal transportation planning techniques;
3. Evaluation of on-going DOT programs in relation to the national urban growth policy and the National Environmental Policy Act of 1969. The FY 1971 research commitment, to achieve the above objectives, was $820,000. Joint financing of this program with other agencies brought the total research program value to over $1.1 million in the year.

CITIZEN PARTICIPATION. As part of its research program, the Office of Environment and Urban Systems has let a contract for the preparation of a manual for citizens and citizen groups who seek to participate more effectively in the planning of transportation facilities. This manual will deal with the problem of inner city residents, with the concerns of conservationists and preservationists, as well as the broader general concern of those who seek better and more effective urban transportation planning as a step toward improved transportation systems. This manual for citizen participation is scheduled for distribution during FY 72.

OTHER DECISIONS. In other environmentally significant transportation decisions, the Office of Environment and Urban Systems has taken a lead role in the search for an environmentally compatible site for a proposed new jetport in South Florida. In still another case, a decision was made to eliminate a proposed highway interchange between I–71 and Victory Parkway in Cincinnati, Ohio. By elimination of the interchange five acres of a small park in a low income, high density neighborhood were saved. The officials recommended against approval of a highway project which would have seriously intruded on Lake Allatoona, a scenic recreation area. The Georgia State Highway Department has now recommended an alternative which will have less impact on the lake area.

BICYCLES FOR COMMUTING AND RECREATION. The Department, under Secretary Volpe's leadership, has strongly supported bicycling, a transportation form which enjoyed a renaissance in 1971, as a component of the transportation system. Secretary Volpe, along with the Assistant Secretary for Environment and Urban Systems, the Assistant Secretary for Systems Development and Technology and other Departmental officials showed their

personal interest by participating in Bicycle Day activities in the District of Columbia. State Highway Departments have been advised of the availability of Federal-aid Highway funds for constructing bikeways in conjunction with such highways. The Office of Environment and Urban Systems has coordinated Departmental efforts with those of the Department of the Interior, and the District of Columbia Government and City Council in order to make Washington a "model City for bicycles". Among specific concerns of interest to bicycle users which have been promoted by the Department are secure storage racks at Government facilities, secure bicycle parking in fringe areas and at transportation terminals, bicycle facilities for visitors to the Nation's Capitol, bicycle lanes and bicycle commuter routes.

ALASKA PIPELINE. The Assistant Secretary, (TEU) as a member of the Federal Task Force for Alaskan Development, is concerned with the transportation corridor in Alaska. Within the Department, studies were undertaken by the Office of Environment and Urban Systems in conjunction with the Department of the Interior and the Environmental Protection Agency on the potential environmental impact of a proposed pipeline, road and railroad from Valdez, the southern terminus of the Alaska Pipeline, to Puget Sound. The Coast Guard has also been involved in preparing environmental impact statements covering ocean shipment of oil from Valdez to the West Coast of the United States.

AVIATION

NEW OFFICE ESTABLISHED. The Department's increasing concern with environmental considerations in relation to aviation was reflected in FAA's establishment of the Office of Environmental Quality on December 22, 1970, and the simultaneous abolition of the Office of Noise Abatement, which formed the nucleus of the new office. "The scope of the new office has been broadened to include all segments of the environment," Administrator Shaffer noted. "We believe the new organizational structure and emphasis will better prepare us to meet our responsibilities under the National Environmental Policy Act. The office will assure effective development of policy and administrative procedures in the program areas of aircraft noise, smoke emissions, exhaust pollution, and aircraft waste."

OTHER ACTIONS TAKEN. Besides establishing an office of broader purview, FAA took the following actions in fiscal year 1971 in the area of aviation and environmental quality:

- Put into effect a program to reduce the level of aircraft-engine noise while increasing safety in the vicinity of airports serving jet aircraft. Under the program, terminal air traffic controllers delay the final landing descent of turbojets until these aircraft are relatively close to their destination airport; they also instruct jet pilots taking off to climb out as rapidly as their aircraft's performance and their pas-

sengers' comfort permit, keeping the jets and hence their noise high. This also enhances safety by minimizing the mix of jet and small general aviation traffic near the airport. By year's end, the program had been implemented at 387 airports, including 115 radar approach control facilities and 87 nonradar approach control facilities.

- Issued an advance notice of proposed rulemaking soliciting comments from the aviation community and the public at large on retrofitting existing jet aircraft with engine-noise-suppression devices. Recent technical developments have demonstrated that devices capable of significantly reducing jet engine-noise are within the state of the art. But still to be determined are the extent to which these devices affect aircraft airworthiness and performance on the one hand, and on the other the economic reasonableness of fleetwide retrofit. This advance notice complements a December 1969 rule establishing type-certification standards for all subsonic transport category or turbojet-powered airplanes approved after December 1, 1969. It also includes provisions to prevent design changes in older aircraft that might increase their noisiness. These provisions were vigorously applied to several current aircraft types during FY 1971.
- Issued an advance Notice of Proposed Rulemaking soliciting comments from the aviation community and the public at large on the establishment of noise standards as part of the criteria for type certificating commercial supersonic aircraft, on August 4, 1970.
- Helped promote a program designed to inform the public of the progress U.S. air carriers were making in retrofitting 737, 727, and DC–9 engines with smoke-reducing combustors. As part of the information program, airlines conducted flight demonstrations at airports throughout the country. One such demonstration was observed by President Nixon from the White House lawn in February 1971.
- Processed environmental impact statements from 93 airport development projects; such statements are required when a question arises about a project's impact on the environment. At the same time, it was determined that 249 other airport projects would have no significant impact on the environment.
- Made available to airport sponsors guidance for complying with air and water standards when constructing airports receiving aid under the Airport and Airway Development Act of 1970.
- Cosponsored, with the Society of Automotive Engineers, a conference entitled "Aircraft and the Environment." The conference, the first of its kind, brought together industry representatives and representatives from Federal, State, and local government to discuss solutions to noise and pollution problems at the Nation's airports. In welcoming the conferees, Secretary Volpe remarked: "One thing for sure, those pioneer days when a new airport was automatically greeted by community

exaltation are gone forever. The public is no longer fascinated with mobility per se. It wants mobility combined with clean air and peace of mind."

CLIMATIC IMPACT ASSESSMENT PROGRAM. As the fiscal year opened, it became clear that scientists were not in a position to be able to predict with the desired confidence the probable environmental effects of large numbers of high altitude aircraft operating in the stratosphere. Too many gaps existed in man's knowledge of the composition and dynamics of the atmosphere and even of the amounts and kinds of exhaust emissions produced by the prospective high altitude aircraft fleet. Partially for that reason, the Congress refused to continue funding the project to build SST prototypes. In order to fill those gaps, the Climatic Impact Assessment Program (CIAP) was planned and initiated with available funds. As the fiscal year closed, preparations were being made to carry out the detailed program plans of the Climatic Impact Assessment Program.

MOTOR VEHICLES

In February 1970, the President announced a new program to develop a virtually pollution-free automobile by 1975. As general director of this Advanced Automotive Power Systems program (AAPS), the Council on Environmental Quality (CEQ) assigned the lead agency responsibility for R&D to the Department of Health,Education, and Welfare (DHEW) and subsequently reassigned it to the Environmental Protection Agency (EPA) after the formation of that agency. The Department of Transportation—specifically the Assistant Secretary for Systems Development and Technology—was assigned the responsibility for investigating the mass production aspects of the program. The Assistant Secretary was also designated as the liaison to DHEW (now EPA) and was assigned general responsibility for coordinating all those activities of the Department that deal with low-pollution vehicles. During FY 1971, Department of Transportation staff supported AAPS by:

(a) Participating in meetings of the Advisory Committee on Advanced Automotive Power Systems, established by CEQ.

(b) Assisting in the review and evaluation of technical proposals for the AAPS program office of EPA.

(c) Advising on noise and safety specifications included in both the AAPS program and the complementary Federal Clean Car Inventive Program.

(d) Taking part in project reviews and coordination meetings. For all of the Department's programs, projects and technological work, minimizing pollution is a major concern. As an example, the Transportation Systems Center entered research contracts to improve the state of the art in electric propulsion and power collection, including the linear induction motor (LIM).

Development of a Low Pollution Powerplant for Transit Vehicles. The UMTA R&D bus program has current projects with this objective whose Federal funding totals more than $2.7 million.

UMTA funded demonstrations of the General Motors environmental improvement kit were conducted on San Francisco and Washington, D.C. buses. This kit is designed to reduce the smoke, noise and noxious chemical emissions from diesel engines, the type of engine most likely to be found in transit buses.

In other projects, UMTA is funding the development of external combustion bus engines which will minimize emissions of noxious gases.

UMTA also has projects under way to test innovative non-polluting systems of urban transportation, such as the operating demonstration of an automated, fixed-guideway system at Morgantown, West Virginia, and the prototype systems to be displayed and tested at the Dulles TRANSPO–72.

HIGHWAYS

A most significant feature of the Federal-Aid Highway Act of 1970 was the requirement that the Federal Highway Administration develop guidelines to assure the full consideration of all economic, social and environmental costs and benefits in highway project planning by July 1, 1972. The impact of highways on people and the environment was reemphasized as a matter of prime consideration at every stage of the project development—from system planning through design, route location, right-of-way acquisition, construction and maintenance. Considerations of compatibility of land use for mitigation and limitation of all pollution, and the balancing of ecological factors as well as other environmental considerations, must receive as much consideration as the need for fast, safe, and efficient transportation and the overall public interest in the development of highways.

In keeping with the mandates of section 4(f) of the DOT Act, FHWA has continued to examine each project requiring land from a public park, recreation area, or wildlife preserve to assure itself that there are no feasible or prudent alternatives. Where no alternative has been found, significant measures have been required to minimize any adverse effects the proposed highway project might have on the public facilities. The Federal Highway Administration published during the year a Highway Environment Reference Book containing all relevant statutes, regulations, and other information to assure that full consideration was given to all environmental factors in the planning, location, design, construction and maintenance of federally-aided highway projects.

The Act authorized increased funding for fiscal years 1971 through 1973 to carry out the Highway Beautification Act of 1965. As a result, the States renewed their activities to implement the outdoor advertising and junkyard control provisions of the Act. The moratorium on the penalty aspects of the program, which had been in effect for nearly 3 years, was

lifted on February 4, 1971, and thereafter the total number of States with satisfactory outdoor advertising laws rose from 24 to 32, and States with junkyard control laws rose from 40 to 46, plus the District of Columbia and Puerto Rico. Eleven States, however, did not enact a satisfactory outdoor advertising control law prior to adjournment of their 1971 legislative sessions. These States have been advised of a proposed determination to withhold 10 percent of their Federal-aid highway funds in accordance with the provisions of the Federal law. The complying States which had devised suitable programs were able to obligate virtually all of the $10 million available for fiscal 1971 to be used primarily for billboard removal.

The Office of Environmental Policy is planning courses and workshops to inform all levels of FHWA and State highway agency staffs about methods of identifying and responding to environmental effects in eight specific areas: social, economic, physical, noise and air pollution, esthetic, ecological, and transportation. The Office has professional employees working in all these areas.

FHWA has required that contracts for all Federal-aid highway projects approved since July 31, 1970, contain provisions specifically intended to minimize soil erosion and water pollution resulting from highway construction activities. Both speaking efforts and training sessions have spread information on environmental considerations.

The Federal Highway Administration has initiated research to improve cut-and-cover tunneling methods for use in urban areas. The aim of this research is to develop a construction method that minimizes disturbance of local traffic and businesses and that reduces noise, vibration, and air pollution.

New hydrological research on environmental problems included: "Erosion Control" studies aimed at reducing sediment pollution of surrounding water courses caused by highways; a study dealing with possible pollution caused by highway deicing chemicals; and a study to accurately define the quantitative water supply and waste disposal requirements of roadside rest areas. Several new reports on water supply and sewage treatment for roadside rest areas were prepared and are being published.

WATER TRANSPORTATION

Pollution of Navigable Waters and Beaches. The Coast Guard devoted a major effort to the prevention of the polluting of the nation's navigable waters and beaches by tanker oil spills. The conceptual designs of an air deliverable system for the recovery of oil from damaged tankers were completed, and the construction of a prototype system was initiated. In parallel with the Air Deliverable Anti-Pollution Transfer System (ADAPTS) development was the development of oil—water separator devices, which are needed to improve the capability of the recovery system to perform the difficult task of picking up oil at sea.

A second major effort in the Coast Guard's R&D program to provide a total capability for dealing with massive oil spills was the initiation of development of prototypes of air- and ship-deployable oil barriers. This concept was derived from studies of alternative means of oil recovery and containment on the high seas.

Construction of a prototype airborne, all-weather sensor system, capable of detecting and identifying the type of oil and mapping the extent of its spill, was initiated. This effort, together with the evaluation of existing oil "tagging" techniques, provided the basis for the first manual to provide aerial reconnaissance teams with the means to determine whether a vessel is discharging oil in the open sea in excess of legal limits.

Attention was given to the pollution caused by spills of other hazardous polluting substances through studies to determine the nature of response required in order to provide on-scene commanders with the proper guidance.

A program was started to develop for Coast Guard ships sewage waste disposal systems which will meet anticipated water quality standards.

Studies in pollution baselines measurement were initiated from which progress in marine environment protection may be determined. Twenty million dollars was appropriated to establish the fund to be used for clean-up of pollution due to oil or other hazardous substances on the navigable waters of the United States, and expenditures of $170,686.51 were incurred for clean-up efforts on 11 incidents during FY 1971. Just over $42,000 in fines and penalties collected from polluters were deposited in the Fund.

In September new regulations went into effect to reduce accidents and chemical spills at waterfront facilities that handle bulk dangerous liquid and liquefied gas cargoes. These regulations set up safety and operating standards.

Other Coast Guard Activities. Pursuant to the Water Quality Improvement Act of 1970, the Coast Guard prepared two accelerated studies for presentation by the President to the Congress. The first, primarily concerning methods for controlling hazardous substances to prevent their discharge, the most appropriate measures for enforcement, and recovery of any removal costs incurred by the United States was completed on 20 October 1970; the second study, concerning financial responsibility and limitation of liability for the cost of removing discharged oil and paying damages resulting from oil discharge, was completed in December 1970.

The Coast Guard has conducted an extensive review of regulations addressing oil pollution from vessels and marine terminals. Comprehensive regulations, drafted with assistance of the affected industries, will be considered at a public hearing this fall. The regulations will be promulgated under the authority of the Water Quality Improvement Act of 1970 and should do much to reduce oil pollution of United States waters.

In compliance with Sections 11(p), (4)f, and 12(g) of the Water Quality Improvement Act, the Coast Guard commissioned two important environ-

mental studies. The first study involved a comprehensive examination of the legal, economic, and technical aspects of liability and financial responsibility as related to oil pollution. The second study focused on a technical and detailed assessment of the nature and shipment of hazardous polluting substances. The results of these studies were submitted in formal reports to Congress and the President. Ideally, the studies will provide a basis for effective management in the clean-up and prevention of oil spills and for the framing of regulations to prevent the discharge of hazardous substances.

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CHAPTER V

PLANNING AND FORMULATION OF NATIONAL TRANSPORTATION POLICY

1972 NATIONAL TRANSPORTATION NEEDS STUDY

During 1971, the Department made significant progress on the 1972 National Transportation Needs Study, the first in a series of biennial national transportation studies. The Needs Report will present a full multimodal view of nationwide transportation systems to provide the basis for improved future planning and to increase the relevance of planning to Federal, State, and local governments and industry.

In gathering the data necessary for this extensive study of transportation systems throughout the Nation, the Department sought information from three primary sources. First, in cooperation with each of the 50 Governors and of elected local officials all over the land, the Department requested data on the transportation needs and capital improvement programs for each State and urbanized area through 1990. The four manuals prepared by the Office of Systems Analysis and Information to guide the efforts of the responding States and localities asked for two basic sets of information: an estimate of total capital investment needs to the year 1990 without any specified budgetary constraints; and a series of capital investment programs under three alternative Federal funding programs.

The second data source was the transportation industry itself. Utilizing industry associations when possible, meetings were held with major carriers, transportation equipment manufacturers, and shippers. All of the industry groups contacted were asked to review Department-provided projections of transportation activity, particularly in their own areas of concern, and to comment on the accuracy of these projections from their points of view. Special attention was drawn to the projection of the central current figure of GNP growth rate of 4.3%. Carriers were asked for their estimates of total capital investments in equipment and facilities that would be required to serve the forecasted levels of activity. Transportation users were requested to comment on the share that each transportation mode would carry.

The third source of information for the 1972 Transportation Needs Report was contacts with other Federal agencies which are directly or indirectly affected by or have programs which affect the Nation's transportation system and operation. Included are the individual administrations within DOT, the Corps of Engineers, the Departments of Agriculture, Commerce,

Defense and Interior, and the regulatory agencies ICC, CAB, and the Federal Maritime Commission.

During the year, the Department provided $1.3 million in planning assistance funds to the States to assist them in their multimodal planning and in the submission of their inputs to the 1972 National Transportation Needs Study. Additionally, the Department sent liaison teams into the field to visit study participants and to provide technical assistance to them where needed.

1974 NATIONAL TRANSPORTATION STUDY

The Department laid the groundwork for the next biennial transportation study this year by developing a draft plan for the 1974 study and by initiating the necessary organization to carry out the study.

NORTHEAST CORRIDOR REPORT

The completion of the Northeast Corridor Final Report marks a milestone for the Department's intermodal policy planning efforts and sets the stage for significant intermodal decision making in the future. The report recommends a series of policy actions designed to meet the growing demand for intercity passenger transportation in this region while minimizing the costs and adverse environmental impacts of moving large numbers of people. The Northeast Corridor Report recommendations emphasize the improvements needed in short-haul common carriers and highways to ensure relief of the most pressing problems during the "interim" 1970's time period, and present the priority intermodal R&D challenges that must be met to ensure adequate lead time for "long term" solutions during the 1980's.

OMB PLANNING STUDY

The Office of the Assistant Secretary for Environment and Urban Systems is completing an evaluation of the continuing, comprehensive, and cooperative transportation planning process required by Section 134 of the Highway Act of 1962. This study will take into consideration recent legislation that gives added strength to airport and transit planning efforts. The evaluation is to ascertain the degree to which transportation planning is coordinated and consistent with metropolitan goals and objectives and with other planning efforts, and to help make Federal transportation programs more responsive to State, metropolitan and local needs. To this end, the Study is examining alternative organizational arrangements at the Federal and metropolitan levels as well as alternative means to relate project implementation to multimodal transportation planning.

INTERDISCIPLINARY PLANNING

In fostering an interdisciplinary approach to planning for local needs, TEU has:

1. Conducted research into the potential value of design concept teams;

2. Coordinated the $3.5 million DOT grant to resolve transportation problems of the Boston metropolitan area. This comprehensive study will focus on multimodal planning, environmental planning, housing, employment, and community participation;
3. Coordinated DOT participation in the Indianapolis Unified Planning Program, an initial example of unified funding at the Federal level, crossing modal lines and encouraging multi-disciplinary and inter-agency planning;
4. Coordinated the implementation of the Secretary's action plan for making Washington, D.C. the transportation model of the country.

TRANSPORTATION DATA MANAGEMENT SYSTEM

One of the Department's long-range goals is the establishment of an extensive data base on the total transportation industry—the systems, facilities, and modal distributions—and the social and economic impact of these factors. Much progress in this area has been made by the Department during 1971.

Rail Carload Waybill Sample. Acting on a Memorandum of Agreement providing for DOT's operation of the Rail Carload Waybill Sample program signed by Secretary Volpe and Chairman Stafford of the Interstate Commerce Commission in 1970, the Department developed a new computerized system for multi-modal freight waybill data processing and for collecting commodity flow and revenue statistics. This system has been used to compile 1969 rail commodity flow statistics and it is anticipated that these statistics will be published early in FY 1972.

Transoceanic Cargo Study. The Transoceanic Cargo Study, investigating and developing methodologies for forecasting transoceanic trade and the distribution costs associated with its transportation requirements, was completed this year.

Oceanborne Foreign Trade Data. The Department has completed the initial system design to acquire and process computer tapes containing Bureau of the Census waterborne foreign trade data. The next major objective of this program, to obtain the appropriate computer system and software so that the data stored on these tapes may be accessed on a selective basis via remote computer terminal, is expected to be accomplished by the end of FY 1972.

Domestic and International Transportation of U.S. Foreign Trade: 1970. This survey, sponsored jointly by the Department of Transportation and the Army Corps of Engineers, and prepared by the Bureau of the Census, will produce new data on the domestic leg of U.S. foreign trade and link these new facts with already available information on the international segment of "liner-type" commodity flows. The new data alone is expected to shed substantial light on a very dark statistical area—the origins, destinations, means of transport and distances involved in foreign trade

movements within this country. The coupling of the domestic and the international legs of each shipment in the sample will create a new set of data for use in the systematic analysis of commodity flows between the interior of the United States and foreign countries.

SYSTEM DEVELOPMENT. In FY 1971, significant progress was made in the development of the overall data management system. First, an inventory of existing transportation statistics data bases was completed. The specifications for the preliminary data base management system were completed and various system configurations and computer software packages are currently being evaluated. Second, the initial Transportation Statistic Locator System was completed. The system will provide the ability to locate, identify, and describe important documents, data bases, and files. Third, the review and selection of the various data bases and time series for the Macro-Summary System was partially completed. The system, a major component of the transportation information system, has as its function the furnishing of internally consistent summary forecasts of transportation activity to various elements of the Department.

U.S. METRIC STUDY. Public Law 90–472, which authorized the U.S. Metric Study, directed that the Metric Study Group "consult and cooperate with other government agencies, Federal, State and local" in carrying out the investigation. A survey of Federal Government Agencies, in which the Department of Transportation participated, was therefore established to assess the effects of metrication on Federal Government functions. The Department's participation was coordinated with the Metric Study Group by the DOT Metrication Committee—whose membership was drawn from each of its agencies and administrations. The Metric Study was completed early in 1971, with the Report to Congress being scheduled for completion by mid-1971.

CENSUS USE COMMITTEE. An important milestone in data management was the creation of the Intradepartmental Census Use Committee. The objectives of the committee are to obtain the conversion of 1970 Census of Population into a data base which will serve the Department; to provide coordination and information to agencies desiring to enhance the capability of States and local governments to utilize census data for transportation planning; to coordinate the department's inputs and programs design to the 1972 Census of Transportation and other census programs; to serve as liaison between DOT and the census for reporting program progress on jointly funded programs; and to provide interdepartmental coordination with other census-user agencies.

AVIATION PLANNING

NATIONAL AVIATION SYSTEM PLANNING REVIEW CONFERENCE. The Department's aviation planning was highlighted by the 1971 National Aviation System Planning Review Conference, the third in a continuing series of

annual FAA conferences designed to provide an open forum for top Federal aviation officials, representatives from the private sector of the aviation community, and the interested public to exchange views on a broad range of aviation interests. The proposals made at these conferences are part of the input going into the FAA planning from which emerges the annual 10-year National Aviation System Plan, a document providing long-range planning guidance for the agency. The 1971 conference, a 4-day affair held on April 26–29, in Washington, D.C., considered such topics as transportation funding, capital equipment priorities, airport development, short-haul air transportation, and aviation's impact on the environment.

National Aviation System Ten Year Plan, 1972–1981. Secretary Volpe, in addressing the National Aviation System Planning Review Conference, urged the conferees to "think big—think confidently and think boldly because our future will require big, confident and bold plans." The number of passengers enplaned each year, for example, is expected to increase from today's 173 million to about 500 million in 1981. How FAA plans to cope with this growth is the subject of the *National Aviation System Ten Year Plan, 1972–1981*, published in March 1971. Among other things, the plan calls for (1) completing the semiautomation of en route air traffic control (ATC) facilities and radar-equipped terminal ATC facilities; (2) introducing a microwave instrument landing system; (3) introducing aeronautical satellite communications for oceanic routes; (4) modernizing flight service stations; (5) providing assistance for the planning, construction, and improvement of airports. A primary objective of the plan is to use advanced technology to increase manpower productivity, especially in air traffic control, thus obviating the need for increasing manpower in proportion to growth in aviation activity.

Civil Aviation Research and Development Policy Study (CARD). The Department of Transportation and the National Aeronautics and Space Administration completed a Joint Study of Civil Aviation Research and Development Policy, undertaken in response to a recommendation by the Senate Committee on Aeronautical and Space Sciences. The Study is a comprehensive treatment of civil aviation—its future needs for research and development, the benefits it provides to the country, the policies which affect its growth, the problems it faces, and the potential it possesses for future contributions to the Nation.

The report identifies noise, congestion, and low-density short-haul economics as key problems. DOT and NASA are developing a joint action plan to implement the study recommendations.

HIGHWAY PLANNING

1972 National Highway Needs Report. During FY 1971 the Federal Highway Administration made considerable progress toward the completion of the most comprehensive of the continuing series of reports on the future

highway needs of the Nation. These statutory reports are made biennially, with this third report due in 1972. For this report, the 50 States, the District of Columbia, and Puerto Rico—working in collaboration with the Department of Transportation—supplied information on the present status of their highways, roads, and streets and forecast their needs to 1990. Concomitantly with the needs study, they also estimated the mileage of each functional class of highway for 1990 and the amount of travel on them. These data, when combined with those of the 1968 National Highway Functional Classification Study reported in the 1970 National Highway Needs Report, will provide a basis for ascertaining the effects of changing usage on the various highway systems. The results of these and a number of other correlative studies of highway finance and taxation and of the impact of highways on society, the economy, and the environment will be used to: (1) Evaluate alternative highway investment programs, (2) weigh the effects of alternative growth policies on highway transportation, and (3) formulate alternative programs for achieving national transportation goals.

CHAPTER VI

EFFORTS TO IMPROVE SOCIAL CONDITIONS

OFFICE OF THE SECRETARY

The Department of Transportation during FY 1971, under the leadership of Secretary Volpe, has continued to develop and implement a civil rights program with the objective of assuring equal employment opportunity, equal housing opportunity, and equal opportunity to participate in and receive the benefits of all programs assisted by the Department. Actions taken during the period have been primarily to perfect the use of existing techniques and to complete the development of the regulatory framework for the program.

The Department's $5 billion construction program, one of the largest in the Federal Government, gives the Department's civil rights effort a considerable leverage. To assure that all minorities have equal opportunity to share in the employment generated by this construction program, the Department's contract compliance activities have been stepped up to an average of 150 pre-award determinations and to 300 post-award compliance reviews each quarter. These civil rights reviews encompass evaluation of all air transportation and inland water transportation facilities, shipbuilding and ship repair industries as well as direct and federally-assisted construction contracts.

Within the Department the program to provide equal employment opportunity has been moved ahead by the establishment of a Goals and Timetables program. Introduced by the Secretary at his special EEO Conference in May, 1970 the program became effective July 1, 1970. The prescribed reporting dates were December 31, 1970, and June 30, 1971. The minority group employment census taken as of May 31, 1971, showed a marked increase in the number and percentage of minorities employed by the Department since the inauguration of the Goals and Timetables approach. The total number of minorities increased during the year from 7,828 in May 1970 to 9,448 in May 1971. The comparable percentages were 8.1 percent in 1970 and 9.1 percent in May 1971. During the fiscal year a total of 1,818 minorities were recruited for civilian occupations as compared with 1,751 during FY 1970.

Two additional assignments were made during the year which will impact on employment of minorities and women within the Department. A coordinator for Federal Women's Program was assigned and a Civil Rights Officer for the Transportation Systems Center was selected.

In his fifth special EEO conference in February, the Secretary emphasized two aspects of the civil rights program affecting internal employment in addition to the Goals and Timetables program. He pointed out the need for employing more women in professional and managerial positions and for providing opportunities for upgrading women already in the Department. By subsequently appointing a woman to a supergrade position in the Office of the Secretary, he personally took the lead in this area.

At the end of this fiscal year the Department, implementing another of Secretary Volpe's desires, participated in the convention of one of the leading Spanish surnamed organizations. The objective of this effort was not only to assure that all Americans including those with Spanish backgrounds are aware of opportunities for employment within DOT but equally to assure that they become aware of the extent of DOT activities and the effects and benefits resulting from these undertakings.

The program to assure that minorities share equitably in the economic and social benefits of DOT grant-in-aid projects which affect the everyday life of almost all Americans has been increased. The DOT regulations developed to carry out Title VI of the Civil Rights Act of 1964 are now regarded as the model for the Executive Branch because of the broader and more specific coverage contained in them than in those of other departments and agencies. Title VI review activities have increased to an average of 235 per month. In FY 1970 the average was 210.

In addition to utilizing the civil rights program to directly bring about equality of opportunity in employment and in the receipt of benefits derived from grant-in-aid activity, the Department has acted to assure equality of treatment in housing. The Department is developing a requirement that applicants for DOT assistance to projects in metropolitan areas supply an analysis specifically showing whether a proposed project would have a positive impact on any existing patterns of racial concentration in the area involved. At the close of the fiscal year, the project to develop this requirement was underway.

The Youth Opportunity program during FY 1971 produced dramatic results as compared to those attained in previous years. 263,745 young people received benefits from the program—an increase of 145 percent over the previous year's results. The young people participated in a variety of programs—73,587 received jobs; 19,474 received training or recreational benefits; 170,684 received transportation assistance. Jobs which were primarily in the private sector resulted from actions by those with direct or federally-assisted contracts through the operating administrations. 2,342 young people were employed in the Department nationwide.

Transportation for the Handicapped. The Assistant Secretary for Environment and Urban Systems has enlarged his Office's role in promoting transportation services for the elderly and the handicapped.

MODEL CITIES. The Office of the Assistant Secretary for Environment and Urban Systems maintains DOT liaison with the HUD Model Cities program. Planned variations in the program, in which the Office was involved, will be implemented in FY 1972.

TRANSPORTATION SYSTEMS CENTER

The Transportation Systems Center has appointed a full-time Civil Rights Officer and two Equal Employment Opportunity Counselors. As of the end of FY 1971, TSC counted 30 members of minorities among its 575 full-time permanent employees. Women employees represented 21 percent of the total permanent work force at the end of the fiscal year, a 43 percent increase over the July 1, 1970 level.

Six handicapped employees were taken over from NASA/ERC by TSC on July 1, 1970. Since then an additional handicapped worker has been appointed to TSC.

TSC has actively engaged in four programs that focus on the employment of youths: Stay-in-School—19 employees; College Work Study—15 employees; Cooperative Education—15 employees; Summer Employment—six youths. College Work Study agreements have been negotiated with eight local colleges or universities, and cooperative agreements are currently in force with six colleges or universities.

MINORITY BUSINESS ENTERPRISE PROGRAM

OVERALL EFFORT. The Department of Transportation efforts to assist minority business enterprise during FY 1971 were directed primarily towards:

1. Ensuring full opportunities for minority business enterprises as contractors to perform work and provide services for grantees under its multibillion dollar annual grant-in-aid programs.
2. Providing better opportunities for minority business firms as subcontractors under direct Federal prime contracts.
3. Conducting orientation seminars, establishing goals and timetables, and providing follow-up visits for operating procurement offices in support of efforts to increase direct contracting with minority business firms under Section 8(a) of the Small Business Act.
4. Studying and promoting effective ways of providing improved business opportunities in the transportation industries for minority entrepreneurs.

DETAILED PROGRAMS. During 1971 meetings were sponsored that brought together members of the American Association of Airport Executives and the Airport Operators Council International and leaders of organizations representing minority businessmen to open the doors to minority

businessmen to perform a share of the work in the Airport Development Program. Separate meetings were also conducted with the National Business League, National Urban League, Black Economic Union, Interracial Council for Business Opportunity and in Washington, D.C., the Mayor's Economic Development Committee. In turn these organizations have conveyed the Department's interest in the program to their memberships. A program was continued at the Washington, D.C. headquarters offices to arrange a coordinated meeting for any minority firm requesting introduction to DOT procurement offices. This system permits the minority firm to make one presentation instead of seven and to meet representatives of seven procurement activities in one place rather than move to seven locations in two buildings.

FAA sponsored meetings have been held with the Association of State Aviation Executives and the Cabinet Committee on Opportunity for the Spanish-speaking. The cooperation of the Negro Airmen International has been solicited to obtain their ideas on new businesses that could be developed at airports and to identify airports that could support additional businesses in which minority entrepreneurs would be interested.

The nationally circulated magazine *Black Enterprise* was persuaded to interview FAA officials on their concern for the minority business program for an article to be published. A similar effort has been initiated with *Ebony*. An airport by airport survey has been initiated to give both the Department and the minority businessmen a better appreciation of opportunities.

The DOT representative on the Subcommittee on Federal Procurement of the Interagency Committee on Minority Business Enterprise took the lead in drafting clauses to be included in all Federal contracts to provide for award of subcontracts to minority business enterprises. These clauses are being coordinated for inclusion in the Federal Procurement Regulations.

A DOT representative chaired a working group under the Subcommittee on Federal Procurement to develop procedures for increasing minority business enterprise participation in small purchases. A DOT representative participated in the work of the National Task Force on Minority Business Concessions and a strong effort was made in all elements of the Department to discover concession potentials for minority entrepreneurs. Because most DOT facilities are smaller than the size of activity considered adequate to support concession operations, only limited opportunities have been disclosed. This activity is continuing.

The Department made a substantial number of direct contract awards under the Small Business Administration Section 8(a) program. 106 awards were made in FY 1971 under the 8(a) program for a total amount of $3,386,672. This represents 74.5% of the $4,454,000 identified as potentially suitable for award under 8(a) at the beginning of the year. Considerable effort has been expended in assuring that the minority contractors

are able to complete their contracts and to date no contractor awarded a DOT contract under Section 8(a) has had to be defaulted by the Department for failure to perform.

In addition to the Section 8(a) program strong efforts were devoted to the program to deposit funds in minority banks, even though the Department manages very few deposits of Federal funds in banking institutions and engages in relatively few advances of funds to contractors or grantees. Perhaps the largest deposits were those of the St. Lawrence Seaway Development Corporation which deposited $20,000 in each of six minority banks. This effort is continuing. In another program eight requirements were solicited from the National Urban League. Three contracts totalling $257,291 were awarded in FY 1971 and four more (plus two later phases of one of the awarded contracts) were in process at the end of the year for an additional amount of $635,000. One grant to NUL for a $226,000 study was negotiated in FY 1971 but not awarded until after the end of the year.

TRENDS. In FY 1970 the Department entered the program by hurriedly identifying a total of $4,246,000 as possibly procurable under Section 8(a). Much of this may not have been well suited to the program and the mechanics of getting an award made were not well understood. By the end of the year, twenty "8(a)" contracts for a total of $894,264 had been awarded. An improved list of potential procurements totalling $4,454,000 was assembled for FY 1971 and concentrated effort produced the 106 contracts for $3,386,672 by the end of the year. During several months of the year one individual was assigned to visit field procurement offices, arrange coordinated meetings with minority group leaders, and generally promote the program.

For FY 1972 the procurement offices identified $9,673,000 of potential procurements suitable for Section 8(a) award. Plans are being developed to provide a full time employee at the Office of the Secretary level to promote the program. A new computerized contract reporting system is being installed to indicate how much competitive procurement is being awarded to minority firms.

Efforts to place further contracts and grants with the National Urban League will be continued. Study of means to ensure improved opportunities for minority enterprises in the transportation industry will be continued. The program to award concessionnaire operations to minority entrepreneurs will be given continued emphasis.

FEDERAL AVIATION ADMINISTRATION

During FY 1971, the second full year of operation of its Office of Civil Rights, FAA's accomplishments in the civil rights and equal employment opportunity area included:

- Raising the number of FAA minority-group employees from 2,929 at the end of FY 1970 to 3,786 at the end of FY 1971—an increase of

from 5.8 percent of the FAA work force to 7.0 percent. Of the 8,101 new employees hired during the reporting period, 1,126 (13.89 percent) were members of minorities.

- Establishing as a minimum objective the filling of one out of every five vacancies occurring throughout the agency with a member of a minority group. Between February 17, 1971, when the goal was enunciated by the FAA Administrator, and June 12, 1971, 27 percent of all vacancies were filled with minority group members.
- Continuing the "150 program," which had been established in FY 1970 for training as air traffic controllers or electronic technicians people from segments of the U.S. population with large, untapped manpower sources—namely, blacks, women and the disadvantaged. A total of 178 GS–4 trainees successfully completed "150 program" training. Of these, 139 were minority group members: 120 men and 19 women. Upon completing the 6-month "150 program" course, trainees are promoted to GS–5 and admitted to training leading to journeyman status.
- Initiating in cooperation with the Opportunities Industrialization Center an orientation program designed to familiarize air traffic control job applicants with the techniques of test taking. Half of the job applicants completing this pretest program passed FAA's ATC aptitude test. On December 21, 1970, Secretary Volpe himself administered the oath of office to 59 minority group trainees embarking on ATC careers who had successfully participated in the pretest program.
- Appointing the first woman to serve as chief of an airport control tower.
- Compiling a comprehensive list of black air traffic control specialists as one more means of assuring that these journeymen receive full and fair consideration for supervisory positions. FAA regions were requested, among other things, to (1) identify those journeymen on the list who were fully qualified to fill a supervisory position; (2) list existing or anticipated supervisory position vacancies for which identified journeymen could be considered. At year's end, it was expected that similar lists would be compiled on journeymen controllers belonging to other minority groups.
- Requiring selecting officials to report on the efforts they made to consider women and members of minority groups before filling GS–14 and GS–15 positions at FAA Headquarters, regional headquarters, NAFEC, the Aeronautical Center, and the Bureau of National Capital Airports. This action was taken to help bolster the thin ranks of women and minority group members in these higher-level general schedule positions.
- Opening one more channel for the exchange of views on equal employment opportunity between employees and management by estab-

lishing a 13-member Civil Rights Committee, on September 30, 1970. In addition to serving as a sounding-board for the discussion of EEO problems, the committee (1) suggests methods for improving the employment environment, (2) examines employment practices and procedures, (3) reviews proposed employment directives, and (4) performs other specified advisory functions.

- Establishing an Equal Employment Opportunity Staff in the Office of Personnel to assist the Director of Personnel in the implementation of (1) equal employment opportunity programs, (2) Federal women's programs, (3) Vietnam veterans' programs, (4) youth employment programs, and (5) programs for the handicapped.
- Launching a publicity program designed to interest black and other minority group businessmen in operating airport concessions.
- Avoiding nearly one million dollars in costs in the Alaskan Region since 1966 by hiring native Alaskans rather than personnel from the 48 contiguous United States. The savings were realized by avoiding the cost of transferring people in and out of the Alaskan Region.
- Setting aside 20 vacancies at FAA field facilities for the use of equal employment opportunity recruiters in order that firm job offers may be made to minority-group and women job applicants.
- Sponsoring a tour of the Aeronautical Center for four representatives of national community organizations and 24 officials from colleges with predominantly black student bodies. This tour helped forge a stronger link in FAA's chain of relationships with such colleges and organizations.
- Issuing a strongly worded policy statement over the Administrator's signature on equal employment opportunity for women. In his statement, the Administrator reiterated his unqualified support of the Federal women's program and indicated he would follow very closely agency progress in that area.

U.S. COAST GUARD

Equal Employment Opportunity Reviews. During FY 1971, 11 in-depth reviews and evaluations of Coast Guard units were made—five more than in 1970. For the first time, selected reviews examined equal opportunity and treatment of military as well as civilian personnel. Three of the 11 reviews pertained to military personnel only. Review emphasis was placed on program compliance with uniform application of EEO standards and criteria.

Goals and Timetables. Goals and timetables were established for recruitment, training and promotions for civilian, female and minority group personnel, dividing the fiscal year into two equal segments. The goals for both periods were exceeded so that the totals of minority and female employees rose gradually.

MINORITY GROUP EMPLOYMENT. As of June 1970, minority group civilian employment was 23% of the total and in June 1971 23.4% of the total. The average grade of all General Schedule employees was 6.9 in June 1970 and of minorities 5.1. In June of 1971 the average grade was 7.0 and for minorities 5.15.

CONTRACT COMPLIANCE. On-site reviews of contract compliance is equal employment were conducted as follows:

	FY 1970	*FY 1971*
Pre-award	1	6
Post award	38	34
SIC* 44 (Water Transportation)		
Pre-award	0	0
Post award	2	8
SIC 373 (Ship Building and Repair)		
Pre-award	1	1
Post award	20	17

*Standard Industrial Code.

MINORITY BUSINESS ENTERPRISE. A total of $610,000 worth of contracts was awarded to minority group enterprises by the Coast Guard.

RECRUITING. Special recruiting aids were developed for advising minority group personnel of opportunities in the Coast Guard. These included a full page advertisement in *Black Collegian* magazine, a pamphlet "What Choice Does Black Youth Have," a booklet "Great Black Athletes," and a "Minority Recruiting Guide."

COMMANDANT DISCUSSION SESSION. The Commandant sponsored a Civil Rights Discussion Session at Coast Guard Headquarters at which participants included a representative cross section of Coast Guard military personnel.

MILITARY COMPLAINTS. A directive was issued which established special procedures for military personnel to file complaints of discrimination.

MILITARY SUPERVISOR EVALUATIONS. A directive was issued requiring the evaluation of efforts and effectiveness in equal opportunity in Officer Fitness Reports.

FEDERAL HIGHWAY ADMINISTRATION

MINORITY EMPLOYMENT. The Federal Highway Administration materially increased its minority group employment during the last fiscal year. Minorities now constitute 12.1 percent of the Administration's full-time employees in permanent positions, as compared with 11.1 percent on June 30, 1970.

Twenty-seven percent of all new employees recruited were members of minority groups. It is particularly significant that in FHWA's recruitment

for professional employees entering career training programs, 27 percent were members of minority groups. This includes engineers, auditors and right-of-way specialists. Employees entering these occupations at grades GS–5 or 7 are assured of regular advancement to journeyman levels at GS–11 and 12. As these employees advance, it is hoped that the proportion of minority group employees at the higher grade levels will increase materially. At the present time minorities are still concentrated in the lower pay categories. There are only two minority employees holding supergrade positions (GS–16) in the FHWA; eight have a GS–15 rating; and 13 are in grade GS–14. While it had been estimated that 11 percent of FHWA promotions would go to minority group employees, 16 percent of the total promotions actually were received by minorities.

Policies and procedures have been established for processing complaints of discrimination based on race, color, religion, sex or national origin filed by applicants or employees of FHWA. The Counseling Program formally got underway January 1, 1971. During the last half of FY 1971, 28 employees were counseled by the FHWA's EEO Counselors; none of the grievances during this period reached the formal complaint stage, although two formal complaint cases filed earlier were closed during this period.

Employment of Women. In FY 1971, FHWA launched its Federal Women's Program, by naming of the Program Coordinator in February 1971. Due to a limitation of position slots, this position was filled on a part-time basis. Federal Women's Program Coordinators have been named in three regional offices; it is anticipated that the other regional offices will name Women's Coordinators shortly. Since that time, the agency surveyed occupations held by women. FHWA identified and submitted to the Departmental Office of Civil Rights the names, titles and grades of women in levels GS–12 and above as of June 30, 1971. The list included one GS–15, 11 GS–13's and 24 GS–12's. There are no supergrade positions held by women in FHWA and none at the GS–14 level.

FHWA's Cooperative Education Program currently has arrangements with 18 colleges and universities to develop pre-professional personnel by placing college students on work projects directly related to their areas of academic study. The main objective of this program is to attract and develop potentially high quality engineering, accounting and computer science personnel for career development programs. On June 30, 1971, a total of 21 Cooperative Education Students from 10 colleges and universities were enrolled in the program either on FHWA work assignments or in school. Twelve of these are minority students representing six universities with predominantly minority enrollments.

Compliance Reviews. Contractors' EEO activities are monitored by FHWA area and district engineers during routine contact and in-depth inspections. During FY 1971, FHWA personnel completed 239 statewide inspections-in-depth, 1,106 stage inspections, and 14,714 contact inspections.

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In addition, State highway departments conducted over 5,659 EEO inspections in addition to comprehensive compliance reviews.

The FHWA Compliance Review Program resulted in 2,672 reviews during FY 1971 by all elements involved in this activity. Of these 2,672 reviews, 2,076 were considered to be satisfactory. Of these satisfactory reviews, 392 were the result of followup action on earlier reviews which had determined deficiencies in EEO posture. At present, there are 170 reviews reflecting deficiencies awaiting further followup action.

Training Programs. During FY 1971, the Federal Highway Administration established procedures for conducting on-the-job training on selected Federal-aid highway projects with a goal of enrolling 10,000 highway construction workers each year; at least 5,000 of these are expected to be minority workers. Under this program, opportunities are provided for basically unskilled workers to acquire new skills and thereby be able to compete more equitably for higher paying employment within the highway construction industry. The Program requires the States to include requirements for the training of a specific number of persons in any appropriate Federal-aid highway contract. It is intended that the total number included in contracts during a year will equal or exceed the State's suggested minimum annual training goal. The highway contractors will provide the necessary training in accordance with a program that is acceptable to the State and FHWA. Reimbursement will be made to the contractor on the basis of 80 cents for each hour of training he provides, up to a maximum of $800 per trainee per contract.

At the end of FY 1971, a total of 3,200 trainees, or some 33 percent of the nationwide goals, had been specified for training on selected Federally aided highway contracts. Twenty percent of all States have attained 50 percent or more of their suggested minimum annual goal, and two States have exceeded their suggested minimum annual goal.

As the result of the Federal-Aid Highway Act of 1970, procedures were also established for supportive services to increase the effectiveness of approved on-the-job training programs. The supportive services to be provided such as recruiting, counseling, transportation, or administration of on-the-job training are not generally considered to comprise part of on-the-job craft training. Although Federal reimbursement will be provided under this program, no funds were available during FY 1971.

As part of its Minority Business Enterprise Program, FHWA developed a system to gather information from regional offices about FHWA contracts and subcontracts awarded to minorities. During the first 9 months of the fiscal year, 166 contracts were awarded to 84 minority contractors on Federal-aid highway work. Of this number, 61 were black, seven Indian, eight Spanish surnamed, and eight Oriental. The dollar value of these contracts was over $29 million. This included $17 million worth of contracts awarded in Hawaii to seven minority contractors.

YOUTH OPPORTUNITY PROGRAM. The Federal Highway Administration in its 1970 External Youth Opportunity Program exceeded its goal of 50,000 jobs. Disadvantaged and minorities accounted for 61 percent and 17.8 percent, respectively, of the FHWA total. The External Youth Opportunity Program is an on-going, year-around effort, having concentrated promotional effort geared to the peak construction period of the summer months when the majority of the youths seek temporary employment.

Much of the success of the youth opportunity program is due to the enthusiastic support of the American Road Builders' Association, the Associated General Contractors of America and the State highway departments. In many parts of the country, individual contractors have provided jobs for youths on their own initiative, and the American Association of State Highway Officials has provided support and leadership at the State level.

SMALLER ADMINISTRATIONS

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION. The Office of Civil Rights is located in the Office of the Administrator. During FY 1971 it was successful in raising the total numbers of minority group employees to 39 percent of the total; this is an increase of 20 percent over last year's minority employment. The Administration also appointed two minority group employees at the GS–16 level.

URBAN MASS TRANSPORTATION ADMINISTRATION. UMTA combines its civil rights and its service development programs in a single office which has four divisions:

1. Division of Internal Programs. During FY 1971 a minority recruitment out-reach program was developed in UMTA that resulted in the selection of minority members of all ethnic groups, both males and females, for professional positions in UMTA. At the end of FY 1971, minority employees in UMTA numbered about 37 percent of all employees.
2. The Division of External Programs conducted four complaint investigations alleging racial discrimination and conducted over 200 compliance reviews of contractors and recipients of UMTA funds.
3. Division of Special Programs developed a model minority Business Enterprise Plan for possible use by UMTA and other Government agencies.
4. Division of Service Development was transferred to the Office of Civil Rights on November 30, 1970. It is concerned with improvements in public transportation to increase its availability to disadvantaged persons—the young, the old, the handicapped, the poor and others who cannot afford private transportation or for whom it

is otherwise unavailable. During FY 1971 the Service Development Program funded 10 projects for a total of $2,403,435 for research and development of systems to aid the mobility of the transit-deprived elements of the population.

Federal Railroad Administration. The FRA civil rights program has progressed substantially in several important areas. Successful efforts were made in the continuing policy of locating and employing minority candidates for the Railroad Inspection program. Efforts were intensified in providing appropriate training opportunities for FRA minority employees as part of a planned promotion pattern. Also, as professional vacancies or new positions developed, the Office of Civil Rights searched out qualified minority candidates to fill these positions.

The Alaska Railroad's program has been considerably curtailed due to local Alaskan economic pressures, but minority applicants continued to be selected for the Railroad's Apprentice Programs.

CHAPTER VII

RESEARCH AND DEVELOPMENT

MANAGEMENT OF RESEARCH AND DEVELOPMENT IN OST

The benefits to be derived from a coordinated national transportation research effort were a significant spur to adoption of the DOT Act in 1966; since then the difficulties associated with achieving this goal have required continuing and expanding effort in the Department. Growth in executive and Congressional commitment to research, increased appropriations, and the establishment of a national research facility at the Transportation Systems Center highlighted the need for careful planning and direction of an integrated R&D program. As steps were taken this past year to assure effective management, the need for technological development in transportation became more clearly defined, leading to a better projection of the form and content of future programs. Concurrently, the necessary elements for effective DOT R&D management were developed, and substantial progress was made toward incorporating these elements into the Department's management environment.

Many of the specific activities engaged in during the fiscal year to strengthen management of the Department-wide R&D activities were discussed in detail in the report submitted in March 1971, to the House Committee on Appropriations, Subcommittee on Transportation. Two major developments reflect special effort in the areas of management control and support:

(1) A formal Department of Transportation R&D Management System was developed as the end result of an intensive 6-month study and design effort. Implementation of the system, to proceed in FY 1972, will provide the requisite procedures, controls, and certain criteria to ensure executive visibility and operational management of all aspects of the problem—from long-range planning, through budgeting and appropriations requests, to program implementation, monitoring, and completion.

(2) In its support role as "responsible agent" for the collection, organization, and dissemination of appropriate technical information, the Department established the special post of R&D Information Officer within the Office of the Assistant Secretary for Systems Development and Technology. During the past fiscal year he has been responsible for development of a scientific and technical information system on trans-

portation research for both the public and private sectors. In a parallel effort, an internal R&D management information system has been established. The system provides both technical and funding data on planned, on-going, and completed transportation research to permit appropriate management controls.

AVIATION R&D

SAFETY-RELATED RESEARCH AND DEVELOPMENT. FAA continued to work toward the elimination or reduction of a broad range of aviation hazards. Some of the more notable R&D efforts of this kind during the reporting period were in the following areas:

- *Wake turbulence.* These hazardous vortexes, which occur in the wake of large aircraft, are the subject of a multimillion dollar study at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, N.J. The program, begun on a modest scale 5 years ago, is directed toward (1) evaluating air movement sensing devices; (2) dissipating wake turbulence in the vicinity of airports; (3) reducing vortex strength at its source. Laboratory testing using laser and acoustic devices was largely completed during the reporting period, and field testing of two related, but not identical, acoustic devices was begun. At year's end, a contract for a scale study of airport environment modification was expected to be awarded in October 1971, and the construction of the NAFEC Measurement Facility, which was specifically created for this program, was expected to be completed in November 1971.
- *Gelled fuels.* Two gel-fuel studies were contracted for as part of FAA's long-range program to develop fuels that reduce postcrash fire hazards. This program, which began in calendar 1963, has demonstrated that a number of gelled fuels have excellent fire-reducing qualities; because of their high viscosity, however, these fuels were found to be incompatible with the fuel systems of modern jets. Accordingly, these two studies will attempt to define gel qualities that represent the best compromise between fire reduction and fuel system compatibility. The best of the gels produced under these contracts will be subjected to further extensive tests.
- *Runway grooving.* Since their introduction in this country, grooved runways have been extremely successful in preventing dangerous hydroplaning on touchdown. Each year, on the order of 15 civil transports skid off the sides or ends of slippery runways; to date, no incident of this kind has occurred on a grooved runway. A water film of sufficient thickness to support dynamic hydroplaning cannot form between the average high points of a grooved runway and the aircraft's tire. It has been suspected, however, that runway grooves, by increasing the rate of wheel spin-up, may produce shallow chevron-

like cuts on the tires of aircraft making repeated landings on a dry grooved surface. During the reporting period, FAA investigated this problem by conducting tests at three airports with different runway groove configurations. The investigation revealed that dry grooved runways do cause an aircraft's wheels to spin faster than dry ungrooved runways. The wider grooves produced higher wheel accelerations. But no evidence of tire cutting was observed. FAA will continue to study this problem.

- *Collision-avoidance system.* (See chapter III.)

In addition to the foregoing, FAA continued to work on long-range safety-related efforts looking to (1) a reduction in the number of general aviation accidents due to stall; (2) the development of new techniques for the removal of snow, ice, slush, and water from airport runways; (3) the development of procedures and equipment minimizing or preventing in-flight bird strikes in the vicinity of airports; (4) the improvement of occupant survivability during general aviation aircraft accidents; (5) the improvement of airport firefighting equipment and techniques; (6) the development of hookless aircraft arresting systems for use at airports and STOLports.

OTHER RESEARCH AND DEVELOPMENT. R&D programs in such areas as navigation, communications, aircraft development, and human factors, among others, were also continued.

Highlights.

- *Aeronautical satellite systems.* On January 7, 1971, the Office of Telecommunications Policy of the Executive Office of the President directed the Department of Transportation to incorporate communication satellites into FAA's air traffic control system for the use of aircraft flying transoceanic routes. Under the White House plan, FAA would have a preoperational system in place over the Pacific in 1973 and over the Atlantic in 1975. A 1980 target date was set for the operational system. The proposed satellite network, which would employ an ultra-high-frequency (UHF) band near 1,600 megahertz (one megahertz is a million cycles per second), would have a number of advantages over the existing system. The new system would (1) make new and less-congested communications channels available to overocean traffic (the HF band now used on transoceanic routes is becoming increasingly cluttered by the growing number of international overwater flights and is expected to reach the saturation point sometime in the mid-1970's); (2) improve the reliability of point-to-point communications (today's system suffers from fading, static, and other interference often causing aircraft to lose radio contact with distant ground stations); (3) reduce aircraft separation standards—and thus increase overocean route capacity—by allowing air traffic controllers to monitor,

and pinpoint the location of, ocean-crossing aircraft (since the lack of reliable point-to-point communication in today's system makes ATC surveillance of transoceanic flights impossible, flight separation requirements far exceeding those in use over land have been adopted for the safety of ocean-crossing aircraft; this has severely limited the capacity of overwater air corridors). Commercial, rather than Government, communication satellite facilities would be used to the maximum. By year's end, FAA had initiated program planning and begun preparing satellite and ground systems specifications.

- *Microwave instrument landing system.* On June 21, 1971, FAA issued a request for proposals for an analytical engineering study bearing on the development of a new, microwave-scanning-beam instrument landing system (ILS) for civil-military common use. Development of the new system had been recommended by DOT's Air Traffic Control Advisory Committee in March 1970, and by a special committee of the Radio Technical Commission for Aeronautics in December 1970; subsequently, an interagency Governmental committee chaired by FAA prepared a 5 year plan for the system's development and implementation. The ILS currently in use, a unidirectional system employing VHF and UHF radiofrequencies that has remained essentially unchanged since its introduction in the early 1940's, suffers from certain inherent limitations. Perhaps its greatest limitation is dependence on a fairly smooth airport surface in order to transmit an acceptable signal in space. Consequently, the system cannot be installed in some areas without expensive reconfiguring of the terrain. The construction of a new hangar or even the accumulation of snow on the ground can adversely affect the system. The microwave system does not have such a high degree of sensitivity to its surrounding environment. It would provide precision, high-integrity guidance that is relatively insensitive to the effects of terrain, structures, other aircraft, and weather. It would eliminate the need for marker beacons by continuously informing the pilot of his distance from touchdown; it would not require extensive reconfiguring of airport terrain; and it would be capable of operating at airports where the current system cannot operate because of terrain irregularities. Moreover, since the new system would employ a wide-angle scanning beam, as opposed to the unidirectional beam of the present system, it would increase the number of available flight paths.
- *ARTS (Automated Radar Terminal System) II.* This system, which has evolved from components of ARTS III (see "NAS Modernization" in chapter VIII), is an experimental automation program for low-to medium-activity terminal areas. The system can employ either numerics or alphanumerics, and, like ARTS III, is programable and modular. During the reporting period, the first field evaluation of ARTS II took place at Knoxville, Tenn., a low-to-medium-density

terminal area. The evaluation encompassed three separate test phases: (1) A numerics-only phase; (2) an alphanumerics phase; (3) a two-display configuration phase. The system performed so well during this part of the evaluation that the Knoxville terminal facility and the Air Traffic Service requested that it remain operational after the evaluation is completed.

- *STOL aircraft.* In January 1971, the Department of Transportation awarded a $23,800 contract to a leading trunk air carrier to determine the technical and economic feasibility of using short takeoff and landing (STOL) aircraft on short-haul routes.
- *Offshore jetport.* In June 1971, FAA awarded a $390,000 contract for a feasibility study of a close-in, offshore jetport to serve New York City. The contract contemplates two study phases. The first phase will focus on the technical, social, and economic feasibility of constructing an offshore jetport on Long Island Sound or on the Atlantic Ocean south of Long Island. If the feasibility of constructing such an airport is established, a second phase would be required to select a jetport site and develop a functional jetport design. At year's end, the entire study was expected to run from 12 to 15 months.
- *Sonic-boom simulator sleep chambers.* FAA took delivery of two such chambers during the reporting period. Capable of simulating booms of various intensities, the chambers are being used in a program in which sleeping human subjects are subjected to sonic booms of 1 pound of pressure per square foot. The study will attempt to determine the pressure level at which sonic booms significantly disturb human sleep.

Fourth Generation Air Traffic Control System. A continuing effort at Transportation Systems Center (TSC) is a study for the Assistant Secretary for Systems Development and Technology of alternative concepts for "fourth generation" air traffic control systems, including automated ground-based and satellite systems. The objective is to develop solutions for the air traffic control needs of the late 1980's and beyond. This work is being coordinated with the FAA and in consultation with the user groups.

Satellite Systems for Aeronautical Purposes. TSC has responsibility for development of aircraft avionics equipment to operate with satellites, and, in addition, provide support to the FAA for other aspects of satellite systems development.

Air Traffic Control Radar Beacon System Improvement. Another significant ATC program is to upgrade the radar beacon system to improve air traffic control capabilities by increasing communication levels and reliability of data transmission.

Inertially Augmented Instrument Landing Systems. Through flight testing at NAFEC and simulation and analysis at TSC, an evaluation was performed of an improved landing technique which combines existing

ground-base instrument landing systems (ILS) with on-board inertial navigation equipment.

Bioinstrumentation for Vehicle Operation. Common to all modes of transportation is the need to measure the visual performance of operators. Such data indicates the operator's ability, state of his training, and his physiological condition. A portable oculometer has been designed, constructed and evaluated at TSC. It can operate in a simulator, or a training device, or in an actual transportation environment including an air traffic control station.

STOL Navigation and Guidance. TSC has employed specialized computer equipment to simulate and analyze STOL approach and departure guidance techniques. Recommended avionics equipment has been specified. Flight testing is scheduled.

Merger Impact Modeling. Through TSC's computer modeling and simulation capability, TPI analyzed the impact of a proposed airline merger under review before the Civil Aeronautics Board. This was the first occasion the Department had used computer modeling and analysis to assist the CAB.

SST Development. Although the SST prototype development effort was terminated as a result of Congressional action in March 1971, certain key technology efforts were continued. These advanced technology projects were identified by a multi-agency panel and represent carefully selected R&D programs that should be completed and documented to make the technology available in useful form to current and future air transportation vehicle designers.

MARITIME R&D

Maritime Air Cushion Vehicles. Since early 1971, the Coast Guard has been testing Air Cushion Vehicles (ACV's) for use in various missions such as search and rescue, aids to navigation, law enforcement, and pollution control. An evaluation unit with two ACV's has been established at San Francisco, and a third vehicle is being tested in Arctic conditions at Point Barrow, Alaska, under the auspices of the advanced Research Projects Agency of the Department of Defense. The AVC's are amphibious and can travel at speeds of 80 m.p.h. over water, land, or mud flats virtually without a wake. In San Francisco, the craft have already logged over 1,000 hours of operations and have participated in several rescues. It is planned to send one ACV to the Great Lakes in late 1971 for further testing in winter ice operations. If the various evaluations indicate areas of Coast Guard operations in which ACV's are more cost effective than existing facilities, they will be considered for adoption as new items of Coast Guard hardware.

Ocean Stations. The Coast Guard continued its operation of the multimission Ocean Station Vessel Program in both the North Atlantic and

Pacific. These ocean station vessels perform essential meteorological and oceanographic services plus ancillary navigational, communications and rescue services for air and marine commerce. These Coast Guard cutters also collect a variety of scientific data while engaged on ocean station patrols.

The four mid-Atlantic ocean stations represent the United States' input to a 16 nation agreement under the aegis of the U.N.'s specialized agency, the International Civil Aviation Organization (ICAO).

Additionally, weather station HOTEL, 200 miles east of Cape Hatteras, was operated to meet a high priority requirement for East Coast storm forecasting. This station is being continuously manned primarily by the USCG *Gresham* during the 8-month period between 1 August and 30 March annually in order to provide meteorological coverage of both the hurricane and winter snowstorm seasons.

The two Pacific ocean stations are also manned continuously by Coast Guard high endurance cutters. Although operated for the Department of Defense, these two stations have definite ties to the international scheme on the Atlantic side and perform nearly identical missions.

A detailed study on how to utilize the Coast Guard facilities for the dissemination of marine weather information is nearing completion (Weather Dissemination and Altering Study). Currently, the marine weather broadcast system is affected by such problems as slow dissemination of weather warning; forecasts being too generalized, with little attention to local weather peculiarities; and broadcasts which are too infrequent, and on radio channels not available to large portions of the boating public. The study will recommend alternative solutions to these problems in order to improve the safety of the environment in which boat users operate.

The protection of life and property by search and rescue (SAR) is a major Coast Guard function. Coast Guard Research and Development concentrated on development of a Distress Alerting and Location System, including the Loran Omega Course and Track Equipment (LOCATE) concept and an improved computerized search planning capability, and the completion of a SAR radar detection system.

Government and industry joined forces in the initiation of a full-scale fire test program, starting with the examination of materials and coatings for containers of flammable liquid.

An analysis of structural methods to prevent or reduce the chance of pollution due to hull failure of tankers in collisions was initiated, together with an examination of the stress to which a Great Lakes ore ship is subjected.

The safety of the mariner in a large vessel or small boat was the concern of two primary efforts to provide all-weather navigation aids. The feasibility of a total Marine Traffic System was demonstrated by the operation of an experimental Harbor Advisory Radar facility in San Francisco

and the examination of a River and Harbor Position Location System for areas of significant, but less dense ship traffic congestion.

Small scale efforts in the development of icebreaking techniques contributed to the lengthening of the Great Lakes shipping season from 9 to 10 months.

The project to improve overall effectiveness of life jackets (personnel flotation devices) leading to the development of more effective standards for wearability and reliability, was completed.

OCEANOGRAPHY. At the end of FY 1971, the Coast Guard had more than 440 vessels capable of significant levels of oceanographic and marine science activity. During the year, these vessels were engaged in a diversity of both Coast Guard and cooperative programs. On all six ocean stations, observations of the water mass were made on a daily or 6-hour basis, including the occupation of nearly 3,000 oceanographic stations. Standard sections in both the Atlantic and Pacific Oceans continued to be occupied on an intermittent basis. Among the cooperative projects in which the Coast Guard took part were: (1) Western Beaufort Sea Ecological Assessment Survey (WEBSEC–70), (2) Water mass studies in conjunction with ICNAF, (3) Atlantic-Mediterranean Water & Sedimentology Survey (ROMEOS), (4) Cobb Seamount (Project SEAUSE). With the formation (Executive Reorganization Act Number 4) of the National Oceanic and Atmospheric Administration (NOAA) and the subsequent transfer of the Coast Guard's National Data Advisory Development Project to NOAA, Coast Guard emphasis in this area of marine science has changed from research to operational support. The oceanographic vessel *Acushnet*, formerly assigned to the Navy's North Pacific Study, is being transferred to the Gulf of Mexico as the principal support vessel to the NDBP.

R&D COORDINATION. The multimission capability of the Coast Guard and its traditional cooperation with other agencies, national and international, was effectively demonstrated in its research and development program and projects.

- Close coordination with the Environmental Protection Agency in matters relating to pollution standards.
- Close coordination with the Army Corps of Engineers on matters of domestic ice breaking.
- Close coordination with the Navy on matters of ship pollution control research.
- Close coordination with the National Science Foundation on matters of polluting substances other than oil.
- Close coordination with the Ship Structures Committee on matters of ship strength and stability.

- Close coordination with the Intergovernmental Maritime Consultative Organization on matters of tanker design.
- Close coordination with the National Oceanographic and Atmospheric Agency on matters of data buoy development and support.

TRAFFIC SAFETY R&D

Much of the research conducted by NHTSA during FY 1971 supported the priority programs of Alcohol Countermeasures, Crash-survivability and the Experimental Safety Vehicles. Some of the background research has been covered in the sections on this subject, other developments will be briefly mentioned here.

Accident Investigation. A scientific system of accident investigation and reporting is essential to any real understanding of accident and injury causes and to an assessment of the efficacy of the solutions or partial solutions which are being applied. It must provide data on the performance of motor vehicles and of drivers on the highways under a great number of variables. NHTSA uses a system composed of varying degrees of detail, know as "levels".

- Police/driver accident reports
- Bilevel investigation studies
- Multidisciplinary investigation reports

The routine police/driver reports form the basis of national statistics on the magnitude and general composition of highway safety problem. The bilevel investigation adds certain information to usual forms which is of concern to NHTSA in some facet of the traffic safety endeavor. This add-on type of data collection is usually conducted for a limited period of time, then eliminated or details of another kind may be substituted. The multi-disciplinary accident investigation teams carry out on-the-scene detailed investigations into selected kinds of collisions. Collectively the information gathered can point the direction for NHTSA efforts in further research, or in issuing standards to correct what may have proven to be an unnecessary weakness in automotive structure or in the roads and highways.

Automotive Research Highlights. Persistent difficulties in arriving at a uniform tire quality grading system have now been overcome and the results will be available to the public in the near future. They will enable a purchaser to select tires suitable for the kind of use the buyer envisages. The criteria include high temperature performance, endurance, strength and smoothness. Two additional parameters will be available by the end of FY 1972: traction and treadwear.

Another area which had eluded a scientific approach was an objective means of measuring vehicle handling qualities. A hybrid computer simulator has been developed which is capable of predicting handling performance to the limit of tire/road adhesion. It is an effective low-cost device

for analyzing handling qualities of a great variety of vehicles; and it has the potential for the analysis of complex vehicle-drived-environment interactions.

Safety of vehicles-in-use has been another difficult field for scientific analysis. During this reporting period a survey was conducted of vehicle defects as a function of make, model, year, mileage, climate and topography, which makes possible an evaluation of remedial measures such as periodic motor vehicle inspection. Another project was concerned with ease of maintenance and repair. Preliminary results indicate that vehicles could be designed so that parts critical to safety would be readily accessible at little or no added production cost—and at an estimated annual national saving of $1.5 billion.

Other examples of vehicular research include:

- In support of crash-survivability an active program in occupant packaging (airbags, padding, etc.) has reached the stage of testing with human volunteers.
- Crash sensors are being developed at the DOT Transportation Systems Center.
- Structural crashworthiness research is developing techniques of automobile construction which will permit controlled collapse of vehicle components to absorb impact energy otherwise injurious to the occupants. Tests indicate that it may become possible for occupants to survive a head-on crash at 60 m.p.h. without severe injury.
- A special program to develop bumpers to absorb energy in event of collision and prevent underride.
- Improved braking systems are a constant subject of NHTSA research, as are rearview mirrors, and better lighting.

Driver and Highway Research Highlights. In support of the high priority Alcohol Countermeasures Program, NHTSA has sponsored research and development of portable breath testing devices and alcohol interlocks which would prevent operation of a vehicle by an intoxicated driver.

NHTSA and the Coast Guard are cooperatively conducting an experiment to determine the effectiveness of driver education programs. A group of Coast Guard recruits is being given a driver training course while a "control" group is learning seamanship. The driving records of the two groups will be monitored during their period of service which will permit evaluation of the driver training program.

In the field of driver licensing, research goals are to develop tests of medical status, physical capacity, driving skill and knowledge; and to develop effective and uniform licensing enforcement practices. The research projects are too numerous to detail, but they include: driver-license

data requirements; enforcement of driver license denials or revocations; visual requirements for licensing; and testing requirements.

Concern over crashes caused by drowsiness or inattention stimulated research in driver alertness and the development of a simulator which tests the effects of time, noise, and traffic on the driver.

Nearly 10,000 pedestrian deaths annually impelled NHTSA to undertake research into the important causes and remedial measures. A recently completed study contains analyses of principal causes (school age children darting out) and recommendations for prevention. Further research is required in this difficult field.

Other aspects of traffic safety are under investigation such as improved traffic control devices, more graphic highway signs and traffic enforcement practices.

THE NATIONAL DRIVER REGISTER. The National Driver Register is a Federal-State cooperative license record exchange service which provides State licensing officials with a single source of data on problem drivers. The file now contains 2.8 million records (none more than 7 years old) and more than 3,000 accessions are added every day. More than 65,000 inquiries are processed each twenty-four hours.

HIGHWAY R&D

URBAN TRANSPORTATION PLANNING RESEARCH. Studies have been undertaken in FY 1971 to find ways of improving mass transit use of highways. One such study involves the development of routes and improved bus service in the Shirley Highway corridor. Another study, the "Milwaukee Busway Study" is developing designs for a bus highway, central business district (CBD) distribution system, fringe parking facilities, and a downtown terminal.

In order to improve the link between highway transportation and air travel, a study is being conducted to investigate ground transportation to airports in the Baltimore-Washington area and to develop a national methodology for analysis of airport access problems in large cities.

The Federal-Aid Highway Act of 1970 provides the authority to finance fringe parking facilities and many associated features, in conjunction with the authority contained in the Urban Mass Transportation Assistance Act—to assist in the acquisition of transit vehicles and their servicing facilities—which provides the necessary tools to make mass transit appealing to commuters. Although it is too early to assess the impact of this fringe and corridor parking legislation, the States are expected to take advantage of the possibilities offered to move more people in fewer vehicles within urban areas.

Significant progress was made in the Office of Highway Planning in the completion of a battery of computer programs for use by States and cities

in analyzing parking problems and the effectiveness of proposed solutions with particular application to proposed Federally-aided off-street parking facilities. The new "Parking Principles" manual furnishes definitive information on parking conditions and operations by size of city. Solutions are suggested for parking and terminal problems in cities, including the design, location, and operation of parking facilities.

A mathematical model and computer program was developed to evaluate priority lane operations on freeways (reserving one or more lanes for buses and high occupancy vehicles). The model has been developed to handle various conditions such as: queing and nonqueing situations, varying the number of reserved lanes, varying the occupancy of vehicle permitted to use reserve lanes, varying distribution of vehicle occupancies, etc. An entire feasibility study was completed for a specific freeway in Cleveland, Ohio. The study concluded that it would be feasible to reserve one lane for buses and automobiles with three or more occupants. Agreement on implementing a full-scale demonstration in Cleveland was not obtained, but there is a strong desire on the part of the Florida DOT to undertake such a demonstration.

The Transportation Resource Allocation Study (TRANS) neared completion of the development of analytical procedures which can assess the consequences of alternatives levels of expenditures on various types of transportation improvements. The TRANS effort will form one of the basic analyses in connection with the FHWA's 1972 Report to Congress on Highway Needs. The study team developed operational computerized models for urbanized, small urban, and rural portions of the country. These models permit the quantification of a number of nonuser impacts, including air pollution, displacement of people and business, and land used by transportation.

DEMONSTRATION. During FY 1971, Region 15 performed approximately 250 separate demonstrations involving well over 1,500 engineers from State highway departments, the U.S. Forest Service, and the National Park Service. These demonstrations included aerial photogrammetry, statistical quality control, skid resistance measurement of pavements, steel corrosion detection, and erosion control procedures.

In one project to demonstrate the savings, efficiency, and accuracy obtained by using analytical triangulation to eliminate supplemental ground control surveys for photogrammetric mapping, savings of $500 to $1,000 per highway mile of surveys are estimated. As a result of the demonstration, the Nebraska Department of Roads plans to purchase a stereocomparator in FY 1972 and should save $1 million in mapping costs alone since it plans an additional 2,000 miles of primary highways in the next 10 years. In Florida, a comparision between the FHWA stereocomparator system and Florida's monocomparator system revealed that the stereocomparator required 47 percent less time. Similar demonstrations are planned in Mississippi, South Dakota, and North Carolina.

Another project on the practicality and administrative feasibility of modern quality assurance concepts in selected phases of highway construction demonstrates the application of control charts to production of base aggregates, bituminous concrete, and portland cement concrete; the feasibility of more rapid test methods for quality control; and the advantages of statistically based acceptance sampling plans in measuring and evaluating product quality. The ultimate benefit of this work will be more uniform quality of construction which will result in longer pavement life.

Another project will demonstrate a simple nondestructive steel corrosion detection device development by the California Division of Highways to detect corrosion of steel in reinforced concrete before physical distress has been observed. Also being demonstrated is a simple nondestructive electrical resistance device developed to evaluate waterproofing systems for bridge decks. In fiscal 1971, a two-man field crew completed over 200 demonstrations of these devices in 27 States. Demonstrations are scheduled for 17 other States.

A research project has shown that polarized headlighting (1) is technically and economically the most promising system likely to solve the night visibility problem on rural highways; (2) would result in increased safety, vehicular control, and comfort for the motorist; (3) would improve visibility and reduce glare for motorists; and (4) would probably improve traffic flow and utilization of the road network. Researchers have recommended that prior to nation-wide implementation, a public demonstration and evaluation of polarized headlights should be conducted in a relatively isolated community with both urban and rural roads.

MAINTENANCE. The program to develop new technology for highway maintenance reached a high point during the year. Documented benefits range from more uniform levels of maintenance to cost savings of about 20 percent on routine activities. Louisiana has realized benefits of more than $10 million, and these benefits continued to build up at the rate of $5 million during the past 5 years.

MATERIALS. Efforts to incorporate new sensor systems and techniques for materials exploration and testing provided some encouraging results during the year. Airborne microwave radiometry offers some promise for locating subsurface cavities. Geophysical testing techniques have great potential for rapid, economical testing to determine pavement thickness, to measure depth from the pavement surface to steel reinforcing bars in portland cement concrete pavement, and to measure density of compaction of bituminous concrete pavement.

Through a research study, a new class of cements was developing which is essentially based on the reaction between phosphoric acid and the naturally occurring and plentiful mineral wollastonite. The new cement is unique in attaining high strength within a few hours. Thus, it minimizes traffic delays and disruption when necessary repairs are made

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on concrete pavements and bridge decks. The new cement will be fully evaluated in the laboratory and compared with other rapid-patching products.

STRUCTURES. The Case Western Reserve University researchers, in cooperation with the Ohio Department of Highways and FHWA, have developed a rapid method for determining the bearing capacity of piles. These data are collected by a special electronic computer that evaluates the static bearing capacity in the field and displays the results after each hammer blow. The method is much quicker and cheaper than the standard static load test, which may cost $5,000 and take two days. The new method takes about 1 hour and costs about $100 per test.

The FHWA is participating in a cooperative research endeavor with the National Bureau of Standards and the National Oceanic and Atmospheric Administration on wind tunnel studies of wind turbulence. FHWA also has begun a study of natural wind patterns and resultant structural aerodynamic response on a existing suspension bridge.

The FHWA is sponsoring research studies of fracture toughness and stress corrosion susceptibility of bridge construction steels, and is seeking improved methods for detecting critical flaws in steel bridge members such as those that were significant in the 1967 collapse of the Point Pleasant Bridge. Coordinated staff research studies on fatigue of bridge members and bridge loading spectra are also being conducted.

HYDRAULICS. During fiscal 1971, the FHWA completed the major elements of rehabilitation of the former National Hydraulic Laboratory in Washington, once operated by the National Bureau of Standards.

A 23-foot-wide flume is now operational, with a flow capacity of 36,000 gallons per minute. The flume will be used to obtain solutions to problems of hydraulic flow through bridge openings in wide, heavily vegetated flood plains, such as exist in the southeastern United States. The flume has been precisely surveyed, and the first bridge opening model has been installed for system calibration and design of the instrumentation system.

Preliminary testing, with the aim of selecting roughness elements to simulate the heavy vegetation, has been conducted in a small 9-inch flume and the results are now being evaluated.

TRAFFIC SYSTEMS. Tests of the FLASH System (Flash Lights and Send Help) on Florida Interstate Highway 4 conclusively showed the positive potentials of the system. Stranded motorists, motorists using the highway on which the system was installed, and the Florida Highway Patrol all supported the principle of a convenient means for cooperative motorists to report others who need help. Tests are continuing in order to improve and evaluate hardware designs which will operate reliably. Further tests will also be conducted to improve the instructions on using the system which are furnished to the public through signing.

Another kind of aid to the motorist is the computer-controlled signal display which senses traffic on expressways and their on-ramps, and guides motorists on the ramps into smooth merges with expressway traffic. Such a system, using two different system concepts—known as "pacer" and "green band" concepts—was tested for technical feasibility on an entrance ramp of "Boston Beltway" route 128 near Woburn, Massachusetts. Of drivers using the system who responded to questionnaires, about 80 percent said that the merge control systems and displays were of help.

A new type of vehicle sensing device called a magnetic gradient detector has been developed by FHWA staff research. This type of sensor is significantly more economical to install in the roadway than inductive loop detectors now available, and has the advantage of a sharply defined sensing zone which may also make it possible to determine vehicle speed from a single sensing head. Since more than one conventional inductive loop detector is required to measure speed reliably, this new development, being experimentally tested at present, may reduce hardware and installation costs in traffic control systems requiring vehicle speed data.

In the summer of 1970, the Office of Research awarded a research contract to define the nature and extent of truck-induced aerodynamic effects on passenger vehicle control. This effort was prompted by questions raised on a proposed increase of the limits in size and weight of trucks operating on the Interstate Highway System.

The present effort, considered preliminary, will identify the safety factors associated with the simultaneous operation of trucks and passenger vehicles on the same facility, and examine the effects of increasing the overall dimensions of trucks. The research includes experimental (both wind tunnel and full-scale tests) and analytical phases. The experimental phase is completed and the analytical portion, currently underway, will be completed in September 1971. Primary attention has been directed to the car-truck interaction. Techniques developed in this study also will be used to determine the effects of wider buses on other traffic.

The FHWA research and development program relating to skidding has been reoriented toward reduction of skidding accidents on wet pavements. One effort of particular significance involves standardization of equipment for measuring pavement skid resistance. An agreement recently concluded between the FHWA and the National Bureau of Standards provides for development of procedures to calibrate skid measurement devices and for a first-order national reference standard.

Social, Economic, and Environmental Research Related to Highways. Other research was initiated to analyze alternative solutions to the urban highway noise problem, to determine indirect costs of accidents, and to develop a uniform code for eminent domain.

The National Cooperative Highway Research Program completed studies which described the running costs of motor vehicles as affected by highway

design and the impact of highways upon urban values. Economic consequences of highway improvements were also summarized and evaluation procedures were prepared.

Several reports were completed which help unravel some of the complex issues and problems surrounding the integration of socio-economic considerations in the highway planning process. One such report, "Economic and Social Effects of Highways," includes 200 summaries of highway impact studies plus a brief narrative which synthesizes the findings.

WHEEL AND TRACK VEHICLES R&D

Pueblo Test Center. The R&D program in the FRA's Office of High Speed Ground Transportation received a boost with the inauguration of the Department's High Speed Ground Test Center in Pueblo, Colorado on August 22, 1970.

The first task for developing the 45 square mile Test Center was carried out by the Department's Federal Highway Administration which surveyed and mapped the entire area. Construction then began on a 6.2 mile portion of Linear Induction Motor (LIM) test track and 3.6 miles of access track to connect the Center with the Pueblo Army Depot. Both were completed by April of 1971 in time for a visit to Pueblo on May 19, 1971 by the Secretary to inaugurate official testing of the LIM test vehicle which, prior to its arrival in Pueblo, had been undergoing low-speed testing at the manufacturer's testing facility in Torrance, California. The LIM test vehicle will be tested at the Center up to the design point of 250 m.p.h. at 2,500 h.p. or 3,750 lb. thrust.

The Tracked Air Cushion Vehicle (TACV) program reached the hardware stage with the award of a $3.5 million contract for the construction of a Tracked Air Cushion Research Vehicle (TACRV). Construction of the vehicle will be completed and testing will start at Pueblo in April 1972. The TACRV, which is powered by a LIM having an output of 10,000 lb. thrust for continuous power and 15,000 lb. thrust for acceleration, is designed to attain 300 m.p.h. and will test a larger LIM at the higher speeds, along with various air-cushion systems and vehicle suspensions.

Design was begun on a 22-mile TACRV guideway, and a portion will be constructed by the April 1972 TACRV testing date. In a related development, the Department awarded a design contract for an electric power distribution system for the 300 m.p.h. TACRV guideway.

Under a joint program with UMTA, design of a simulator for the Rail Dynamics Laboratory at the Center was also completed late in FY 1971. The four Department of Transportation instrumented rail test cars have provided valuable data in designing equipment for this laboratory and will later be a source of data for programming and operation. The instrumented test cars serve to inspect rail track efficiently. The four cars have been used regularly to survey track geometry, measure track irregu-

larities and evaluate suspension and ride quality. Now that the Federal Railroad Administration has jurisdiction over the inspection of track and roadway under the Federal Railroad Safety Act, the Department has been determining how the test cars can enable the entire national system of track to be effectively and efficiently inspected on a regular basis.

In the latter part of FY 1971 the design for the Test Center Project Management Building was completed. Construction began in June 1971 and the scheduled occupancy date is December 1971. The building will be the first of several at the Test Center and will serve as headquarters for the Department's manager and various DOT contractors.

Although the Test Center is managed by FRA, the planning and development of the Center represents a cooperative Departmental effort. The FRA's Office of High-Speed Ground Transportation relied heavily on other agencies for support in construction engineering and construction contract administration. The largest amount of support came from Federal Highway Administration (FHWA) which provided invaluable services in design and contracting for grading, earth moving, erosion control, drainage, roads, bridges, tracks, and guideways. Federal Aviation Administration (FAA) provided expertise in the contract administration for building construction, and the National Oceanic and Atmospheric Administration of the Department of Commerce carried out the first-order-accuracy surveying and monumentation work for control points. Urban Mass Transportation Administration (UMTA) and Transportation Systems Center (TSC) have provided the design and support requirements for transit testing.

Joint Test Facility—FRA/UMTA. The second major rapid rail-oriented facility is the wheel/rail dynamics laboratory. This laboratory will be built and operated jointly by the FRA and UMTA. It will consist of a hydraulically actuated shaker platform capable of programmed vibration of transit rail vehicles and simulation of track running surface. The laboratory will permit the testing of rail cars under controlled, simulated conditions and will aid in the design and development of safer, more comfortable cars.

UMTA Test Facilities. The Urban Mass Transportation Administration is constructing two types of test facilities at the Pueblo center:

1. *Test track.* The test track will consist of a 9.1-mile oval which will be divided into sections representing both state-of-the-art construction techniques and proposed new construction techniques. Careful attention will be paid to roadbed characteristics and track fastening techniques, as well as alignment and other construction methods. The test track is to be employed for the evaluation of new vehicle and new vehicle component designs, and for the evaluation of various types of track construction. The track will be instrumented for tests relating to the dynamics of vehicle/rail/foundation interactions.

2. *Rail system diagnostic car.* Another major program allied with the Pueblo track is the development of a Rail System Diagnostic Car capable of analyzing potential hazards in subway track before they cause an accident or derailment. The Transportation Systems Center, acting as Systems Manager for UMTA, is analyzing bids for the Rail Diagnostic Car, which should be ready in 1972.

At the Department's Transportation Systems Center in Cambridge, Massachusetts, R&D has progressed in support systems for high-speed vehicles such as power collection, on-board power conditioning and communication between the wayside and the vehicle without the necessity of radio frequency allocation from the Federal Communications Commision. In the selection of an obstacle detection system for employment at high speeds, the evaluation of different concepts has narrowed down to a near-infra-red system, which has successfully undergone environmental tests—summer heat beam-bending tests in New Jersey and winter tests in Wisconsin—to determine its operational reliability in both warm and cold climates.

Tracked Air-Cushion Vehicles. As contributing subsystem technology to the TACV program, studies during the past year included an investigation of vehicle-guideway interaction to determine trade offs between guideway structural requirements and vehicle suspension system characteristics, and of flexible-base air cushions to determine methods of active control to achieve good ride qualities. Also, a study is being conducted at the Transportation Systems Center at Cambridge on aerodynamically supported vehicles, i.e., ram wings, to take advantage of the lift available at the higher ground speed.

A detailed assessment of the state of both foreign and domestic technology for 150 m.p.h. tracked air cushion vehicles was made. Site visits were made to the major U.S. organizations and to eight foreign organizations actively engaged in the development of air cushion vehicle systems and subsystems. It was concluded that U.S. technology was leading in the major critical areas even though the United States had not yet operated a complete vehicle on a test track. The systematic research and development program of the Office of High Speed Ground Transportation has laid a sound U.S. technology base for complete vehicle development. An interadministration project office developed specifications for a competitive procurement of urban vehicles. Two competing designs are currently being developed by the contractors and one or more vehicles will be fabricated during FY 1972.

For speeds in excess of 300 m.p.h., feasibility studies were begun on the use of magnetic levitation for vehicle suspension in high speed ground transportation systems. This concept proposes the use of extremely powerful electromagnets to lift streamlined vehicles as high as a foot above aluminum guideway strips. Information has been exchanged with Japan and Germany, both of whom have made considerable headway in this field.

Suspended Vehicle Systems. System studies and trade-offs began on vehicles suspended below a guideway. The Suspended Vehicle System (SVS) may have wheeled, air cushion or magnetic suspension and the required elevated guideway may be of cable or of more conventional rigid construction. Such systems hold promise of higher speeds at low costs compared to underground systems, as they utilize existing rights-of-way and eliminate the problems of grade crossings. A system definition study was completed in June 1971 which established the feasibility of a 120 m.p.h., SVS synthesized from state-of-the-art components with slightly more advanced subsystems.

For tube vehicle systems which promise speeds in excess of 300 m.p.h., a computer program to predict drag and power requirements for high speed vehicles traveling in nonevacuated tubes was completed. Proposals have been requested and received to provide experimental data for this program.

Tunneling. In tunneling technology, the most significant developments during the past year were the completion of a computer program to estimate the costs of tunneling in hard rock and the design of a high pressure water cannon for rock fracturing. Research also continued into improvement of tunnel liners.

Others. In railroad safety research and devlopment carried out under the OHSGT, two studies aimed at reducing the dangers of tank cars transporting hazardous materials were completed. One study developed the criteria governing the release of vapor and/or liquid for hazardous materials transported in tank cars under adverse operating conditions. The other was an analysis of end shield concepts to reduce the possibility of puncture during derailment.

Also completed in FY 1971 was a theoretical and experimental study of using acoustic pulse propagation in rail car wheels. This was the first step toward the ultimate goal of developing a method for detecting minute flaws in steel wheels.

More stable track structures will be determined from the development tests of several short test sections in a heavily traveled section of the Santa Fe Railroad which is subjected to high-tonnage use. Design improvements will be determined from the test sections by comparisons of cost and performance with a conventionally designed control section.

High speed vehicles and systems require that the stated safety requirements be more advanced than any established standards for existing ground vehicles. In support of this need, a comprehensive safety manual covering all rail and air-cushion transport modes is in preparation. The purpose is to provide complete, compatible, advanced safety standards requirements for each separate vehicle design for inclusion in requests for proposals and construction contracts. The initial effort covers only the ground vehicles,

with similar safety standards for their guideways and operations planned for a later date.

DEMONSTRATIONS. The demonstration programs in the Northeast Corridor continued to enjoy success during FY 1971. Even though conventional train patronage declined in the Corridor during FY 1971, the Metroliners attracted an increasing number of passengers, reaching nearly 3 million by the end of the fiscal year covering the 30-month period since service began.

Despite favorable public reaction however, the Metroliners have proven costly to maintain and have been less reliable than the conventional passenger trains traveling between New York and Washington. The causes of these problems are being examined with a view toward modifying two Metroliners which will serve as prototypes. After successful testing, the remaining Metroliners will receive similar modifications. The improvements will include modifying the propulsion system to reduce thermal loading on electrical equipment and changing the axle gearing for a top speed of 130 m.p.h. rather than 170 m.p.h.

Along with these improvements, an analysis was begun aimed at improving the ride quality of the cars.

The Turbo train demonstration program between Boston and New York, scheduled to expire in October 1970, was renewed and significantly expanded in purpose and scope when President Nixon agreed with the recommendations of the Secretary that the Turbo operation be continued temporarily while the Department negotiated contract changes in bases of lease and maintenance. On January 23, 1971 a new 2-year contract with United Aircraft, the builder of the train, became effective. Terms included: construction of four new cars (two for each trainset) and modification of present train-sets to include ride quality improvements and noise reduction. Modifications would also be made to improve reliability and reduce maintenance time and costs. Once one of the trainsets was modified and refurbished, it departed on a 4,600 mile special run from Providence, Rhode Island, to Pueblo, Colorado in connection with National Transportation Week and dedication of the Department's High-Speed Ground Test Center. This trip generated plans for a nationwide tour of the Turbo designed to test the durability and reliability of the equipment and to assess public reaction to new and improved equipment.

Since January 23, 1971 when the new demonstration began, 247 of 256 trips have been completed for a 97% average. For the 247 completed trips, only seven delays exceeding five minutes were attributed to the equipment.

A part of the Washington-New York demonstration, the Capital Beltway Railroad Station, opened on March 16, 1970, has doubled in usage. The station's purpose is to provide easy access for suburbanites and to provide ample parking facilities, both of which are not readily available near

Union Station in Washington. A survey of those using the station revealed that 70% of those interviewed would have chosen a mode other than rail because of the inconvenience in reaching the mid-city location. Another 82% urged that there was need for more departures from the station.

In the meantime, construction continued on a second suburban station located in the vicinity of the Garden State Parkway and Route 27 in Woodbbridge, New Jersey. The facility is scheduled to be completed in September 1971.

Rail travel in the Corridor declined overall in FY 1971 yet Metroliner travel increased 44%. The jump was aided by the addition of one round trip per day on August 24, 1970 and two more on May 1, 1971, to replace conventional trains.

New York-Boston rail passenger traffic in FY 1971 declined 31%. Turbo traffic dropped 8%, too, due to the fact that the number of weekly round trips was reduced from nine to five in January 1971. The reduction was needed to carry out the modification and refurbishment program on the Turbos.

In another area of involvement, last year a contract was awarded to conduct a study on the feasibility of extending the regional rapid transit system from Washington to Dulles Airport. The study was scheduled for completion early in FY 1972.

MASS TRANSPORTATION R&D

Technical Studies. In the Technical Studies program, a total of 63 new grants were approved, amounting to $14,136,256, while 13 other previously-approved grants were amended, adding $868,996 in Federal funding. Grand total was $15,005,252.

Many of the grants involved studies of bus service in smaller communities which are in danger of completely losing transit service. Among such cities were included Gulfport, Mississippi; Lewiston, Maine; Syracuse, New York; and Colorado Springs, Colorado. Upon completion of these studies capital grant applications may be evolved.

Rapid transit planning grants were approved in several cities, including Houston, Detroit, and Denver while additional grants were approved to continue studies already underway, such as those in Atlanta and Baltimore. The results of these studies will provide communities with definite plans upon which decision about building rapid transit systems can be made.

A third category of study is that leading to some special goal, as for example a downtown circulation system in Minneapolis; a black-owned bus system in Winston-Salem, North Carolina; or a tracked air-cushioned vehicle system to serve the Los Angeles International Airport; and an extension of the Kennedy rapid transit line to Chicago's O'Hare International Airport.

During FY 1971 several technical studies grants were approved looking toward operational improvements in such major cities as Baltimore, Philadelphia, Chicago, and Pittsburgh. In some cases these studies may become the basis for a region's eligibility for full two-thirds capital grant funding. Further grants were made to assist such areas as Boston, New York, Chicago, and San Francisco in carrying out long-range public transportation planning in conjunction with total transportation and regional comprehensive planning.

AREA-WIDE COMPREHENSIVE PLANNING. In the past year, the technical studies grant program, authorized by Section 9 of the Urban Mass Transportation Act of 1964, has been expanded to support the underlying process of areawide comprehensive and transportation planning. The long range plans for public transportation and the plans for immediate action programs thus assisted are prerequisites that must be met by local public agencies to establish their eligibility for UMTA capital grants under Sections 3 and 4 of the Act.

Until this expansion in the scope of planning activities supported by the Section 9 program, technical studies were used primarily for preliminary engineering, architectural and managerial studies related more directly to capital investment projects. These studies, sometimes called feasibility studies, are still eligible at no reduction in their level of funding. The addition of systems planning studies means that, in keeping with the spirit of the Urban Mass Transportation Act, the whole spectrum of necessary studies to back up development decisions in urban public transportation is now eligible for Federal assistance. The only projects that are not now eligible under Section 9 are projects to test and demonstrate new ideas and methods for improving urban public transportation systems and service. These are eligible for assistance under the Urban Mass Transportation Research, Development and Demonstration Program (Section 6 of the Act).

DEVELOPMENT OF NONPOLLUTING FORMS OF TRANSPORTATION. Of the major noxious components of diesel engine exhaust, nitrous oxides (NO_x) are the most difficult to reduce. They are produced whenever air is subjected to the high temperatures which accompany combustion. Under a grant from UMTA, the Southern California Rapid Transit District has contracted with the North American Rockwell Corporation to develop the process, hardware, and cost analysis for a catalytic muffler assembly to eliminate the objectionable components from diesel exhaust. The systems will use both an oxidizing catalyst and a molten alkali scrubber and should be particularly effective on nitrous oxides.

The Rankine cycle type engine, an external combustion engine, holds promise as a future low-pollution power plant. The use of all working fluid to transform heat energy into mechanical energy in an operation largely separate from the combustion process, allowing processes to be optimized independently for lowest emissions and high mechanical efficiency.

As a first step toward its development for transit propulsion, the California steam bus project will develop and demonstrate the feasibility of this kind of engine in urban buses. Under this program three different designs will be produced and each will be tested in transit service in a different California locality. Subsequent development could produce an inherently low-pollution successor to the present diesel engine.

A related effort is the development of a Rankine engine using an organic working fluid for testing in a medium-size bus in Dallas, Texas. When these results are compared with the results of the California project, they will provide the basis for valid comparison in transit service of four different propulsion systems: gasoline, diesel, organic rankine and regenerative gas turbine.

Advanced Propulsion Systems. Two demonstrations to test and evaluate propulsion systems for rapid transit cars were initiated. The New York Metropolitan Transportation Authority will test the Garrett Energy Storage system on two subway cars. The system consists of a solid state control package and two flywheels mounted on each car. Energy normally dissipated as heat during the braking cycle is absorbed by the flywheels. This energy is used during acceleration to minimize the electrical demands from the third rail. In case of emergency, such as a power failure, Energy Storage cars, using flywheel power only, can move to the next station where passengers can leave trains in complete safety.

The Cleveland Transit System will test a new AC electrical system which is expected to reduce maintenance costs. A new control system will provide a smoother ride. Also, some of the cars will be equipped with new interiors representing the best in current design. Passenger reaction to the improved amenities and smoother ride will be assessed.

Automatic Vehicle Monitoring. Four contracts, totaling some $860,000, were let to test methods of electronically locating transit or other public service vehicles as they move over urban streets.

This tracking capability will provide transit operators with constant information on the location and schedule adherence of all their vehicles. The dispatch center will then be able to take action as needed to keep each route on schedule and maintain the proper level of service. The rider will be spared the now too common occurrence of a long wait for an overdue bus, followed by the arrival of three buses running in a "pack".

The tracking techniques will eventually be integrated into an overall Automatic Vehicle Monitoring (AVM) system which can provide two-way voice communication, automatic signaling of mechanical problems, automatic collection of ridership data needed for route planning, and a driver-actuated "silent alarm" which will instantly summon police aid when criminal action threatens.

Tests will be conducted in Philadelphia, Pennsylvania to determine the relative efficiency of several competing techniques for vehicle tracking in the dense, congested, urban environment.

Development of Innovative Forms of Transportation. During FY 1971, UMTA approved the Haddonfield (N.J.) Dial-a-Ride Project. When operational, a phone call within this 3 sq. mi. area with a population of 15,000 persons, will bring a small bus, equipped for handicapped users, to the door. A taxi-like trip, with only a few intervening stops for other passengers, will take the rider to his destination for little more than a conventional bus fare. It is expected that this innovative on-demand service will be heavily used by residents going to Philadelphia and Camden by train. Thus, the Haddonfield Demonstration will be an outstanding example of multi-modal system development.

Projects involving automated systems for moving people are underway. Four of these will be demonstrated at TRANSPO in 1972. Morgantown, West Virginia is the site for a system involving automatic vehicles operating on a fixed guideway. Large numbers of students will be transported between two campuses of the University of West Virginia by this system.

University Research and Training Program. The University Research and Training Program supports research and training in urban transportation problems through direct grants to institutions of higher learning, and through grants to other public bodies for fellowship awards to personnel in the urban mass transportation field. The major accomplishments for FY 1971 follow:

(a) 33 colleges and universities were awarded Urban Transportation Research and Training Grants.

(b) Over 40 people who have received grant support, have graduated or received advanced degrees and taken jobs in the transportation field. About 350 students have received grant support to date.

(c) UMTA grant funds have developed over 35 new college level courses in transportation.

(d) During the year, 100 Fellowship Grants for Managerial Training were awarded, representing 52 different public bodies taking advantage of these grants to upgrade personnel.

Relationship of Transportation to Urban Development. FHWA and UMTA, often with joint funding, develop research study designs, evaluate requests for proposals, and monitor contract research activities. One such project is the Urban Traffic Control System (UTCS) combined with Bus Priority System (BPS). In 1970 they contracted with Sperry Rand of New York to install and supervise the operation of a computerized traffic-responsive control system which ultimately will cover 112 intersections along Wisconsin Avenue and downtown Washington, D.C.

The system uses sensors buried in the pavement to detect and send to a central computer information on traffic flow. The computer will control

traffic signals to provide the best traffic movement for the conditions. In addition, 35 intersections will have transit bus detectors activated by specially equipped buses; the computer will then control traffic signals to give the buses preferential treatment. Detector loop and antenna installation has been completed at about 65 percent of the intersections.

When completed, the system will serve as a real-life environment facility to develop and test advanced traffic control strategies to reduce congestion on city streets. There will be demonstrated savings to motorists in terms of reduced travel time and fewer stops and delays. Corollary effects in reduction of accidents and air pollution are anticipated.

URBAN CORRIDOR DEMONSTRATION PROGRAM. A joint effort of FHWA and UMTA was launched during FY 1971 to alleviate urban traffic congestion. Contracts totaling almost $2 million were signed with 11 cities throughout the country to begin planning new methods of relieving urban traffic congestion under the Urban Corridor Demonstration Program. The planning studies should be completed during FY 1972.

A report was presented on one early implementation project, financed with FHWA administrative funds, which provided the I–495 Exclusive Bus Lane from the New Jersey Turnpike to the Lincoln Tunnel. This $500,000 project frees 35,000 bus commuters from their frustrating morning crawl through this 2.5-mile extremely congested highway section. The 15-minute average time-saving for each bus amounts to over 2 full days for each bus commuter during the average 225-day working year.

In addition to this first implementation project, approximately $3.8 million was approved under this TEU-coordinated, FHWA-UMTA funded urban corridor program to implement additional proposals to alleviate the twice-a-day traffic bottlenecks that clog central city areas. The money will go to 10 of the 11 participating cities. The cities in the program are Atlanta, Georgia; Cincinnati, Ohio; Dallas, Texas; Dayton, Ohio; Los Angeles, California; Louisville, Kentucky; New York City; New Jersey Corridor; New Haven, Connecticut; Philadelphia, Pennsylvania; Minneapolis-St. Paul, Minnesota; and Washington, D.C.

Joint efforts of FHWA and UMTA facilitated several new developments or extensions of earlier projects. Thus the final section of the temporary exclusive bus lane on the Shirley Highway (I–95 in northern Virginia) was opened. This in combination with additional bus service provided through UMTA financing has already produced over a 120 percent increase in bus ridership.

Agreement has been reached and commitments given by FHWA and UMTA to the California Division of Highways and the Southern California Rapid Transit District to start construction of an 11-mile exclusive bus highway in the median adjacent to I–10 in Los Angeles, a project that will cost approximately $51.5 million. The highway will provide a rapid transit bus facility with an average speed of 40 m.p.h., including stops. FHWA approval has also been given for allocation of Interstate funds for

the additional right-of-way and construction costs for a bus mass transit facility within the Crosstown Expressway (I–494) in Chicago.

COMMUNICATIONS TECHNOLOGY FOR URBAN IMPROVEMENT. The Department of Transportation, together with Housing and Urban Development, Commerce, Justice, the Federal Communications Commission and the Postal Service, sponsored a study by the Telecommunications Committee of the National Academy of Engineering. The final report detailed 17 projects, including four in transportation, where telecommunications could be used to improve the quality of urban living.

PIPELINE SAFETY R&D

Several activities were sponsored by the Office of Pipeline Safety (OPS) during the year to collect safety information. Data from these studies will be circulated to the State agencies, industry, and concerned public to promote technological progress in pipeline safety.

A study was contracted to design and develop a data system to process the leak and test failure reports received by OPS. This system will provide the Office with pertinent data to detect problem areas, evaluate regulatory programs and assess the effectiveness of regulations.

Another study involved a gas leak detection survey of 20 representative municipally-owned gas distribution systems. Some incidents within this 900-member municipal sector of the industry had indicated that further study of their physical condition was needed to determine if there was a potential safety problem peculiar to this group. Results of the survey revealed that the condition of these municipal systems was comparable to that known for other gas distribution systems throughout the country.

Based on its own experience, as well as earlier studies for the Committee on Commerce of the United States Senate, the Office of Pipeline Safety recognized a need for greater knowledge about the potentially serious problems of pipeline corrosion. A program contract was awarded to determine the state-of-the-art concerning corrosion of steel and iron pipelines. By means of an extensive literature survey, direct questionnaire and personal contracts with authorities in the field, the contractor developed answers in the areas of corrosion control, cathodic protection effectiveness, recognized levels of protection, codes of good engineering practice, corrosion mechanisms, leak records and their use in eliminating hazards, and economic factors. Information from this study will help the Department focus on specific areas in developing regulatory solutions to the problem of corrosion damage.

Experience available to the Department indicated that gas leaks in low or medium pressure distribution systems were among the leading causes of potential hazards to the public. The Department awarded a contract to investigate improved sealing materials and techniques for urban gas distribution. One especially significant conclusion of this study was the de-

scription of a new gaseous sealant just entering the sealant market which makes possible the sealing of leaks in an operating system without taking it out of service.

The Department also contracted for the development of basic information and preparation of manuals for investigation and inspection of pipeline accidents and for monitoring State safety programs. Use of the manuals will make for effective working procedures between the OPS and the various State agencies in all pipeline safety activities.

HAZARDOUS MATERIALS R&D

The Office of Hazardous Materials furnished technical support and expertise to the Department and to other Federal Departments and Agencies, State and local authorities, and the private sector on regulation development and accident investigations and other problems and questions arising from the transport of hazardous materials.

These technical efforts including R&D constituted a balanced approach aimed at providing solutions to day-to-day problems and simultaneously updating and systematizing the overall DOT Hazardous Materials Regulations.

Close working relationships exist with personnel from the Administrations and other Government Departments and Agencies to keep each other informed of ongoing and contemplated research and development of mutual interest. This same approach is being used in an effort to promulgate uniform standards and other safety criteria within the Federal establishment as well as internationally, and to avoid duplication of effort and effect economies.

CHAPTER VIII

PROGRAM DEVELOPMENTS

UPGRADING TRANSPORTATION SYSTEMS— NEW BUSES AND RAIL CARS

UMTA Capital Grants Program. Shortly after enactment of the Urban Mass Transportation Assistance Act of 1970, which provided a quantum increase in resources available for mass transportation programs (to $3.1 billion for Fiscal Years 1971–75), the Urban Mass Transportation Administration completed a study which will lead to revision of its project selection system.

Whereas the program has been managed basically as a financial assistance program, without much pressure for making hard choices because demands have not significantly exceeded resources, the proposed system, under review in collaboration with affected public and private interest groups, anticipates the need to make hard choices, particularly among projects related to development of large-scale metropolitan systems involving several hundred million dollars each. The suggested system calls for evaluation of projects with respect to basic objectives of the program pertaining to alleviation of commutation problems, enhancing mobility for the disadvantaged, and producing favorable effects on urban development and urban environment. It makes transportation-related purposes, rather than financial need as such, the basis for project selection.

During Fiscal Year 1971, the Urban Mass Transportation Administration utilizing its original selection criteria approved 49 new capital grant projects and 20 amendments to previously approved projects. This involved a total commitment of $284.7 million with new capital grants going to 43 metropolitan areas in 22 States. One previously approved grant was cancelled during the fiscal year.

With the completion of the FY 1971 program, the cumulative total of Federal fund commitments to capital grant projects by UMTA is now $964,582,569, involving 195 projects (two additional projects having been cancelled) in 34 States, the District of Columbia, and Puerto Rico. These grants are classified by mode of transportation as follows:

Rail (38 projects)	$673,326,947	70%
Bus (154 projects)	266,882,006	28%
Ferryboat and other (3 projects)	24,433,616	2%
	964,582,569	100%

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Grants approved in FY 1971 will assist in the purchase of 2,521 new buses (including 210 trolley-buses)and 315 new rail cars. From the beginning of the program through June 30, 1971, a total of 6,929 new buses and 1,920 new rail cars have been assisted through the capital grant program.

Among the larger, more significant grants for the year were the following:

- An additional grant of $40 million to the San Francisco Bay Area Rapid Transit District which, added to a prior commitment, brings the total of the grant to $68 million.
- An additional commitment to the Metropolitan Transportation Authority of New York amounting to $35.7 million, bringing the total grant to $56.7 million to be utilized for the purchase of 350 new multiple-unit commuter cars for the Long Island Railroad.
- The Public Utilities Commission of San Francisco received an additional grant of $25.7 million for new rail equipment bringing UMTA's total grant commitment to the Municipal Railway of San Francisco to $31.8 million.
- A grant of $18,800,000 to the Massachusetts Bay Transportation Authority of Boston for the construction of the new South Bay Maintenance Center, a combined rapid transit yard and shop and bus garage. Completion of this new facility will make possible the abandonment of existing rail facilities in Cambridge, and the site will be the location of the new Kennedy Library.
- A number of cities received grants to assist in the purchase of new bus fleets. Some very large cities received grants, but many were given to smaller cities such as Champaign-Urbana, Illinois; Baton Rouge, Louisiana; and Williamsport, Pennsylvania.
- The trend to public ownership in the transit industry, already well established, is accelerating. The following cities received capital grants to assist in the purchase of their transit systems: Baton Rouge; Louisiana; Honolulu, Hawaii; Iowa City, Iowa; Portland, Oregon(a surburban system); Madison, Wisconsin; Toledo, Ohio; Salisbury, Maryland; Canton, Ohio; Wausau, Wisconsin; and Denver, Colorado.
- One of the year's most significant projects was the grant of $8,564,000 to the Southern California Rapid Transit District to assist in the construction of a busway along the San Bernardino Freeway between Los Angeles and El Monte, and purchase of 100 new high-speed, air-conditioned buses. There will be three stations, with parking facilities at one, along the 11-mile stretch of freeway.

In addition to the UMTA grant, the Federal Highway Administration is participating to the extent of $29.1 million. The entire concept of reserved busways is now being stimulated as a quick and relatively inexpensive route to traffic relief in many metropolitan areas.

Upgrading of Transportation Systems: Rail Cars. A number of projects were initiated during FY 1971 which will significantly improve

railcars. Work was initiated under two contracts for the development of guideline specifications for rapid rail cars and for commuter rail cars in close cooperation with transit authorities and suppliers.

Significant hardware improvement projects were undertaken for both rapid rail and commuter rail operations. Under a grant to the New York Metropolitan Transportation Authority, two prototype dual power (gas turbine-electric) commuter trains will be constructed. Incorporating a low pollution turbine power plant with a self-propelled electric drive, the new GT-IV trains will be able to operate under their own power or from a third rail in electrified zones.

Upgrading of Transportation Systems: Dual Mode R&D. TSC has been named the systems manager for the DOT Dual Mode research and development program. Dual-mode transportation systems are those in which vehicles operate under automatic control and/or automatic power in one mode and under manual control in the second mode. The project is in the economic analysis and technical feasibility phase.

Planning New Technology for Transpo. UMTA is cooperating in the development of four new technology systems. All are nonpolluting and will be demonstrated at Transpo in 1972. They represent the best of the proposed systems. UMTA-sponsored work in FY 1971 in developing personal rapid transit systems may be briefly summarized as follows:

1. Screening and detailed evaluation of ten promising new systems undertaken by the Applied Physics Laboratory, John Hopkins University.
2. A comprehensive study, analysis and simulation of the automatic control problem for large-scale systems, also undertaken by the Applied Physics Laboratory.
3. The design development and construction of a major system at Morgantown, West Virginia under the general engineering supervision of the Jet Propulsion Laboratory, California Institute of Technology.
4. The study of requirements for specialized small-scale components and hardware development for personal rapid transit systems, recently initiated as a joint project of the Transportation Systems Center and the MITRE Corporation.

UPGRADING TRANSPORTATION SYSTEMS—RAILROADS

Amtrak. One of the major goals of the FRA's Office of Policy and Planning during F Y1971 was realized with the passage of legislation authorizing the creation of the National Railroad Passenger Corporation (Amtrak).

The Act directed the Secretary of Transportation to submit to Congress a report designating a "basic system" of rail passenger service. In his preliminary report, the Secretary selected 16 city pairs or end points between which rail passenger service must be provided and also listed various

routes between these cities. In the final report of January 28, 1971, 21 city pairs were presented. The basic system was presented to the presidentially-appointed incorporators of Amtrak who selected the specific routes, train frequency and other elements of service to be provided after May 1, 1971.

On the May 1 start-up date, the Corporation, under contracts with the railroads, began operating 184 passenger trains over 20,000 miles of track, serving some 325 cities and towns in the United States. Later, additional trains were added on an experimental basis.

Rail Services. Also enacted in FY 1971 were the Emergency Rail Services Act of 1970 aimed at providing federal loan guarantees to railroads in reorganization and the Federal Railroad Safety Act of 1970 that gave the Secretary of Transportation broad regulatory authority over all areas of railroad safety. Accordingly, FRA began developing safety standards in three areas found to encompass the major causes of railroad accidents: track and roadbed, equipment and human factors. By the end of FY 1971 FRA had published initial track safety standards in the *Federal Register* and invited comments from interested parties. A public hearing was planned. Similar procedures will be followed in the other two areas.

Research. In addition to charging the Secretary with expanded regulatory authority, the Railroad Safety Act authorized more intensive safety research. The Act required a comprehensive study of the problem of eliminating and protecting rail-highway grade crossings and called for a report with recommendations to be submitted to Congress a year from the law's enactment, October 16, 1971. The Federal-Aid Highway Act of 1970 also required a full investigation of the problem with a report due to Congress in July 1972.

FRA is cooperating with the FHWA in this joint effort. A research plan identifying specific grade crossing data needs is underway and criteria for the design of low-cost crossing protection devices are being developed at the Transportation Systems Center.

In a related development, a report was completed on the visibility and audibility of trains approaching rail-highway grade crossings. The study focused on the investigation of devices and color schemes, proposed or in use on locomotives, which serve to make the train visible or audible to motorists approaching crossings.

Solving Railroad Problems. Also in conjunction with the Railroad Safety Act, the FRA awarded a contract aimed at developing a railroad accident information system which is deemed critical to the formulation of safety criteria and standards through identification of safety problems and hazards. A technical information processing system will also serve to provide decision makers at all levels the type of information needed to plan effective programs.

In an effort to reduce the overall railroad freight car supply problem, FRA initiated plans for designing an effective demurrage system. A contract for the study was expected to be awarded early in FY 1972.

An in-house analysis of railroad revenue losses due to rates below variable costs was completed along with an analysis of various minimum and maximum rate criteria and their effects on carriers and shippers. An assessment of information systems requirements was also made for structuring a waybill processing and analysis program. Initial determination of operations research support requirements for FRA was completed and mathematical and statistical support provided. A computer terminal complex was ordered with delivery and installation set for early in FY 1972.

The Office of Policy and Planning assisted two task forces made up of representatives of railroad labor and management to study two critical railroad problems: (1) How to improve service through terminals, and (2) how to upgrade track and roadway conditions. The reports of the Task Forces were completed in FY 1971. The assistance was part of a larger agreement from a high-level railroad labor-management committee to accept Departmental help in resolving joint labor-management problems and improving rail service nationwide.

In its efforts to ameliorate the impact of railroads and railroad facilities on the environment, FRA continued to work with East-West Gateway Council in St. Louis on the study of a plan to relocate and consolidate rail yards along the east bank of the Mississippi River. The move would free 500 acres of valuable property for better commuity use and also permit the modernization of obsolete rail facilities. Plans were underway by the end of FY 1971 with the Department of Housing and Urban Development, the State of Illinois and various components within the Department of Transportation to undertake a study designed to identify public and private benefits, design requirements, costs and methods of financing.

THE ALASKA RAILROAD. The Alaska Railroad is under a mandate from Congress to operate within its revenues. The Railroad has not required an appropriation from Congress for operating expenses since 1939, nor for capital improvements since FY 1956, with the exception of the rebuilding as a result of the 1964 earthquake.

Due to severe adverse economic conditions and sharp increases in labor and other costs during FY 1971, the Railroad suffered a net loss of $3,075,305.33 after depreciation charges of $2,503,638.92.

During FY 1971 the Railroad handled 1,229,025 tons of revenue freight for a total of 214,434,000 ton miles, decreases of 12.5 percent and 20 percent under totals from FY 1970 respectively. During the same period 94,192 revenue passengers were transported for a total of 14,999,225 passenger miles.

The Alaska Transportation Corridor Study in which the Railroad is participating is proceeding on schedule and within cost estimates. The study should be completed and the results available by April 1972.

COAST GUARD PROGRAMS

USE OF CUTTERS. The tempo of operations for the Coast Guard's high endurance cutter (HEC) fleet of 33 ships continued at a high level of approximately 215 days away from homeport. This level of actual ship employment exceeds the desirable standard of 180 operating days by approximately 20%. Multimission ship requirements were met despite the fact that two-thirds of the HEC fleet vary in age from 25–35 years.

Two new construction *Hamilton* class HEC's were launched; another one is scheduled for launching in late summer. All three of these 378-ft. ships are expected to be operating by the end of FY 1972, thus adding the 10th, 11th, and 12th hulls to this high endurance cutter class.

Two older HEC's, the USCG cutter *Bering Strait* and USCG cutter *Yakutat*, were turned over to the Vietnamese Navy on January 1, 1971 as part of the Vietnamization program.

Highlighting other aspects of the multi-missions HEC's included assistance to other agencies such as the use of USCG cutter *Mendota* for PROJECT CHASE (dumping of nerve agent munitions at sea during August 1970); patrol of the America's Cup Sailing Regatta in September 1970; rescue of 11 survivors in the *Texaco Oklahoma* tanker disaster of March 27, 1970 off the Atlantic coast; deployment to Southeast Asia in support of Navy Seventh Fleet operations; and participation in major fleet exercises with the Navy.

ICEBREAKING. The Coast Guard continues to manage and operate all U.S. icebreaking resources, polar as well as domestic. This task is accomplished with seven polar icebreakers, two devoted to domestic icebreaking and numerous smaller, multimission ships have icebreaking capabilities. The Coast Guard is supporting national interest in Arctic resupply, defense programs, sea ice research and marine science research with six major deployments to the Arctic during the summer of 1971, two to the Arctic during the winter of 1972, and three ship deployments in support of Operation DEEPFREEZE in the Antarctic during the 1971–72 austral summer. In addition to the routine mission of keeping Northern U.S. ports and waterways open to winter navigation, the Coast Guard is lending close cooperation to the Demonstration Project on the Extended Great Lakes Navigation Season. Late in the spring of 1971, the Coast Guard made the decision to assign the polar icebreaker USCG cutter *Edisto* to Milwaukee, Wisconsin, for a three year trial of her usefulness on the Great Lakes. Increases in winter shipping have created demands for icebreaking beyond that which can be handled by the one major Great Lakes icebreaker USCG cutter *Mackinaw*. During the winter *Edisto* will help *Mackinaw* break ice in the Lakes, and in the summer, *Edisto* will make routine Arctic deployments. The assignment of *Edisto* is one more phase of Coast Guard participation in the Great Lakes Season Extension Demonstration Project which included, among other things, the establishment of the Ice Navigation Center at Cleveland.

ENGINEERING.

Electronics Engineering. The new radio station at San Francisco is designed to provide total HF coverage of the Eastern Pacific Maritime Region. The station is being constructed north of San Francisco, with the transmitter site near Bolinas, and the receiver site at Point Reyes. Building construction started at both sites. The radio equipment at the station will be some of the most sophisticated available. Preliminary design has been completed, and detailed design of the system and hardware procurement are in progress. The award of contract for the antenna system is anticipated in August 1971. Present time schedules indicate that the station will go on the air July 1972.

Ten radar beacons have been installed at locations along the North Slope of Alaska. These beacons are capable of responding to a pulse from most marine radars to provide distance bearing and identification information at distances up to 20 miles. Since the character of this coastline makes visual aids impractical, radar beacons are being evaluated as an alternative short range aid to navigation in that area.

Plans for replacement of the Libyan Loran-C station are firm with site selection completed. Estimated operational date is January, 1972. The location remains classified until approval of the site is received from the government involved.

Naval Engineering. The following vessels were accepted and placed in service: One 75-foot coastal buoy tender, four 82-foot WPB patrol craft.

The following vessels are authorized and are presently under construction: Three high endurance cutters; *Munro, Jarvis, and Midgett;* one medium buoy tender; USCG cutter *Red Oak,* launched June 19, 1971.

Plans and specification for the new polar icebreaker have been completed. A contract for the construction of this vessel will be awarded early in FY 1972.

Plans and specifications have been completed for central collection systems for 50 percent of the vessel classes for FY 1972 installations. Pollution abatement equipment has been evaluated for future year installation in the Coast Guard fleet.

The program to extend the useful life of the older cutters *Ingham, Duane,* and *Bibb* has been completed.

Major habitability improvements aboard the cutters *Campbell, Spencer, White Heath, White Pine,* and *White Sumac* have been accomplished.

Electronic equipment modernization has been accomplished aboard the cutters *Hamilton* and *Chase* with the installation of SOS 38 sonar equipment.

Major improvements to habitability and machinery on the buoy tenders *Madrona, Laurel* and *Conifer* have been initiated.

Civil Engineering. A large number of projects were completed during FY 1971, due in part to the construction deferral during most of FY 1970,

which increased the number of contracts awarded in the final quarter of FY 1970 and the first quarter of FY 1971. The initial projects to eliminate the discharge of offensive wastes from ships have been completed and the remainder of these projects are being funded out of annual operating budgets. New stations and training facilities, such as the Synthetic Flight Training System under construction at Mobile, Ala., are enhancing the capabilities of personnel to perform search and rescue missions. The aging physical plant is either being modernized or rebuilt to modern standards.

Ocean Engineering. The Lighthouse Automation and Modernization Program (LAMP) has been established; it will be completed in 3 years. Procurement of equipment and construction will occur during the first year, installation of equipment and procurement of electronics the second, and during the third year, personnel will be withdrawn from the lighthouses.

The Lightship Replacement Program is on schedule with the first five large navigational buoys (LNB) on station.

Satellite Navigation equipment has been installed on most icebreakers and vessels designed for oceanographic duties. This system is providing precision navigation in support of oceanographic research.

The Coast Guard VHF-FM Program. A June 1970 ruling by the FCC provided requirements which shifted the primary mode of communications for the boating public from the traditional high frequency band to the relatively new VHF-FM. High frequency will only be used if there is a special need for long range communications and then be used in the single sideband mode instead of the current double sideband.

The Coast Guard has used VHF-FM, which is limited to essentially line of sight ranges for its intra-service communications, for a number of years. The Coast Guard distress notification system is not adequate to provide distress coverage to the boating public and therefore a major expansion program is necessary. The Coast Guard has embarked on a three year program which, when completed, will provide VHF-FM distress frequency coverage to boats up to 20 miles offshore completely around the continental United States. Areas such as the Great Lakes, Puget Sound, Long Island Sound, etc., will be covered completely. Sixty new VHF-FM sites will be installed during FY 1972, 30 sites in FY 1973 and the final 35 sites in FY 1974.

The VHF-FM distress system when completed will provide safety communications to an estimated 450,000 boat owners.

Coast Guard Program—AMVER. Automated Merchant Vessel Report System Operating Change. The Automated Merchant Vessel Report System (AMVER) has been changed to centralized computer operation using the new CDC 3300 computer at Coast Guard Headquarters. A new operational feature of this system is that each Rescue Coordination Center

(RCC) which has a Search and Rescue (SAR) teletype drop now has direct access to AMVER computer programs and can obtain desired information without delay.

AVIATION PROGRAMS

AIR TRAFFIC ACTIVITY. FY 1971 showed a decline from the peak levels of aviation activity registered during FY 1970—the first decline in these annual figures since FY 1961. As in that year a decade ago, a general slowdown in the U.S. economy coincided with the drop in aviation activity.

FAA's airport traffic control towers (ATCT's) handled 54,249,954 takeoffs and landings, 3 percent below the FY 1970 total of 56,181,465. FAA's air route traffic control centers (ARTCC's) handled 21,326,439 aircraft flying under instrument flight rules, 1 percent below the FY 1970 total of 21,606,369. The decline at ATCT's was general and affected all categories of flying—air carrier, general aviation, and military, with air carrier operations experiencing the greatest decline—6 percent below the FY 1970 level.

AIRSPACE MANAGEMENT. One direct effect of the decline in air traffic activity was the alleviation of the problem of congestion that had been troubling FAA over the last several years. Indeed, in April 1971, it became possible for the FAA Administrator to direct the agency's air traffic control (ATC) facilities to exercise greater flexibility in granting pilot routing and altitude requests for all types of aircraft using the system. Conditions permitting, FAA controllers were empowered by the Administrator to—

- Relax the requirements for preferred routings.
- Assign the most economical altitudes.
- Approve direct routes.
- Discontinue standard instrument departures.
- Honor requests for direct radar vectors.

Schedule Restrictions. The decline in activity also permitted FAA to relax somewhat the schedule restrictions in force since June 1, 1969, at five airports with high-density traffic. In October 1970, schedule restrictions were lifted at Newark Airport, where demand (an average of 42 operations an hour during peak activity) was significantly below the hourly quota of 60. At the same time, schedule restrictions in force at O'Hare International, Kennedy International, La Guardia, and Washington National Airports were extended to October 25, 1971. By spring, however, the air traffic situation at Kennedy and O'Hare had so improved that, on May 14, 1971, FAA issued a notice of proposed rulemaking to relax the schedule restrictions at these airports.

Area Navigation. Though FAA was able to relax its ATC procedures, it by no means relaxed its efforts to effect a lasting solution to the

problem of airway congestion. Specifically, the agency continued to develop a nationwide area navigation network. Area navigation has a decided advantage over the air navigation system in general use today because it permits the establishment of new flight paths without deploying ground-based navigation aids along each flight path.

On July 22, 1970, in a rulemaking action, FAA established a regulatory basis for the designation of low- and high-altitude area navigation routes. Accordingly, on April 29, 1971, the agency established four transcontinental high-altitude area navigation routes between New York City and Los Angeles and Oakland, Calif. These four transcontinental routes, forerunners of a nationwide area navigation network, were described by FAA Administrator John H. Shaffer as "the first major expansion of the airway system since the introduction of omnidirectional navigational radio transmitters in the early 1950's." At year's end, it was expected that approximately 89 high-altitude area navigation route segments would be available for use by the end of calendar 1971. The agency also continued to develop during the reporting period a low-altitude area navigation route structure.

Lowering Area Positive Control. On April 21, 1971, Administrator Shaffer announced FAA's intention of lowering the base of area positive control down to 18,000 feet over the entire contiguous 48 States. This action was expected to reduce the potential of midair collisions while expediting the flow of traffic. Aircraft operating in area positive control airspace must be, among other things, (1) flown under instrument flight rules by a pilot with an instrument rating, and (2) equipped with a radar beacon transponder and other specified equipment.

On May 27, 1971, the base of area positive control was lowered from 24,000 to 18,000 feet over the northwestern and northern tier States—a geographic expanse under the control of the Seattle, Minneapolis, and Great Falls Air Route Traffic Control Centers. Previously, the 18,000-foot base had been in effect only in the Boston, New York, Chicago, Cleveland, and Indianapolis ARTCC areas and a portion of the Washington (D.C.) ARTCC area. At year's end, the 18,000-foot base was scheduled to go into effect in the Los Angeles, Oakland, Salt Lake, and Denver ARTCC areas in July 1971; in the Kansas City, Houston, Fort Worth, and Albuquerque ARTCC areas in September 1971; in the Miami, Jacksonville, Atlanta, and Memphis ARTCC areas and the remaining Washing ARTCC area in October 1971.

Air Traffic Control Systems Command Center. On July 29, 1970, FAA consolidated the functions of four Washington Headquarters facilities—the Central Flow Control Facility, the Central Altitude Reservation Facility, the Airport Reservation Office, and the Air Traffic Service Contingency Command Post—in one new facility, the Air Traffic Control Systems Command Center. The integrated center was expected to perform

its various ATC functions more efficiently than had the four separate facilities, thereby contributing to the overall reduction of schedule delays in the ATC system. The command center is unique in the FAA organizational scheme in that it is the only "firing line" facility at the Washington Headquarters level.

AIRPORT AID AND PLANNING. In setting down the requirements for a National Airport System Plan (NASP), the authors of the Airport and Airway Development Act of 1970 recognized the increasing importance of long-range planning in developing a system of airports adequate for the Nation's current and projected needs. NASP spans a longer time period (at least 10 years) than the old National Airport Plan, which it replaces; it is also more comprehensive in content than the old plan.

Airport Planning and Planning Grants. The Airport and Airway Development Act requires that the first NASP be published by May 1972. FAA spent fiscal year 1971 gathering data for the plan, including inputs from its field elements, and issuing implementing instructions. Revised versions of NASP are expected to receive a substantial input from the Airport Planning Grant Program (PGP), also established by the Airport and Airway Development Act; however, since the PGP got underway just this fiscal year, the first NASP will receive scant input from this source. In the meantime, FAA is placing a great deal of reliance on forecasting as a tool for determining when and where new airport development and expansion should take place. During the reporting period, FAA began forecasting the level of aircraft and passenger activity over the next 10 years at approximately 1,000 major airports.

In order to promote the effective location and development of airports and as previously pointed out, the development of an adequate National Airport System Plan, the Airport and Airway Development Act authorizes the Secretary of Transportation to make grants for airport system planning and airport master planning. For FY 1971, Congress appropriated $10 million for this program. On February 3, 1971, the agency announced it was accepting applications for such grants; in March, the first planning grant went to the Massachusetts Aeronautics Commission for the development of a comprehensive Statewide airport system plan. By year's end, FAA had approved 43 planning projects in 27 States valued at $3.6 million. Of these, 29 grants (valued at $1.2 million) were for preparing master plans for individual airports; 14 (valued at $2.4 million) were for Statewide or regional airport system plans.

Airport Development Aid Program. In FY 1971—the first year of operation under the Airport Development Aid Program (ADAP)—FAA obligated more money for airport development projects than in any previous year. A total of $170 million was available to this program during the year; FAA obligated the entire sum in response to a heavy

demand for Federal assistance. The previous single-year high of $103.4 million had been set in FY 1969.

On December 29, 1970, FAA published a notice of proposed rulemaking setting forth policies, procedures, and criteria for administering ADAP. A final rule had not been issued by the end of the fiscal year.

NATIONAL AIRSPACE SYSTEM MODERNIZATION

NAS En Route Stage A. This program is being implemented in phases at 20 ARTCC's in the contiguous United States. The first phase will provide the centers with automated flight data processing (FDP); the second, with radar data processing (RDP). FAA is currently implementing the first phase and developing the second.

At the end of the reporting period, 14 ARTCC's (Atlanta, Boston, Chicago, Cleveland, Denver, Forth Worth, Houston, Indianapolis, Kansas City, Los Angeles, New York, Oakland, Seattle, and Washington) had a computerized FDP capability. Thirteen of these centers utilized NAS En Route Stage A hardware; New York employed pre-NAS En Route Stage A hardware. As for complementing software, nine centers (Boston, Fort Worth, Oakland, Kansas City, Denver, Seattle, Atlanta, Los Angeles, and Indianapolis) operated with the NAS En Route Stage A type, while five centers (New York, Cleveland, Washington, Chicago, and Houston) were using locally developed FDP software programs. Of the nine centers using both NAS En Route Stage A hardware and software, seven—Boston, Indianapolis, Los Angeles, Forth Worth, Oakland, Kansas City, and Denver—brought computer updating equipment to the operational stage during the reporting period. This provides controllers at these centers with a limited capability to update center computers from their control positions.

The agency also continued to develop the program's full computer updating capability, the NAS En Route Stage A Model 3 computer program, which will be delivered in two parts. The first part—flight data processing—was coded and brought to the system test phase during FY 1971. Coding of the second part—radar data processing—began during the reporting period; at year's end, this coded program was scheduled to be delivered to the Los Angeles ARTCC in February 1972.

Early in the reporting period, the contractor for the computer display channel plan view display undertook to correct unacceptable deficiencies in this equipment. In December 1970, a redesigned plan view display was successfully demonstrated. At year's end, the display was in production; the first computer display channel (with displays) was scheduled for delivery to an operational site (Los Angeles) in March 1972.

Progress was also recorded at the Jacksonville ARTCC, site of the first NAS En Route Stage A field installation. This center utilizes a NAS En

Route State A computer with prototype display equipment that differs from that being procured for the national system. The full flight data processing portion of Jacksonville's computer program was operational during the reporting period. In addition, on June 24, 1971, the operational readiness of the high altitude beacon tracking portion of the site's radar processing functional package was successfully demonstrated. As a result, at year's end, Jacksonville was in the process of changing over to this level of operation.

The following NAS En Route Stage A equipment was delivered to FAA by its contractors during the reporting period:

- One IBM 9020A computer, to the Memphis ARTCC. This was the last of 15 9020A's contracted for.
- Three IBM 9020D computers (one each to NAFEC, Los Angeles, and Washington). These machines, which have a greater computing capacity than the 9020A's, are being procured for FAA's nine busiest centers.
- Two IBM 9020E display channel processors (one to NAFEC, one to the FAA Academy).
- Nine computer updating equipment (CUE) subsystems, bringing the total delivered thus far to 15. At year's end, seven more CUE subsystems were scheduled to be delivered during FY 1972.
- Thirty-one common digitizers, bringing the total delivered thus far to 52.
- Twelve weather and fixed map units, to field sites. An additional 61 such units were delivered to the FAA Depot for temporary storage.

Automated Radar Terminal System (ARTS) III. This system, which will be installed at 61 of the Nation's busiest terminal radar control facilities was contracted for in February 1969. The contract provided for procuring the system in three lots—12 systems in the first lot, 23 in the second, and 29 in the third. At the beginning of the reporting period, lot No. 1 was in production; in November 1970, FAA issued a notice to proceed for lot No. 2; in May 1971, it issued a notice to proceed for lot No. 3.

The first two ARTS III systems were delivered in December 1970—one to FAA's Aeronautical Center, the other to Chicago's terminal radar control facility at O'Hare International Airport. A third ARTS III was delivered to Washington National Airport in mid-June 1971; by the end of the same month, a fourth system was delivered to Denver's terminal radar control facility.

The system at the Aeronautical Center went into service in February 1971. It is being used primarily to train electronic technicians. Formal on-site system tests were performed on Chicago's ARTS III during April and May; the system achieved initial operating capability in June.

OTHER AVIATION PROGRAM DEVELOPMENTS

FACILITIES AND F&E FUNDING. Fed by revenues from the aviation user taxes that went into effect on July 1, 1970, the level of F&E (facilities and equipment) funding during FY 1971 increased over the FY 1970 level by 6.25 percent. The number of major FAA facilities in operation at the end of this reporting period also showed a slight increase over the FY 1970 yearend total. For details see table 7.

Weather Teletypewriter Communications System. At year's end, FAA had completed installing a modernized Weather Teletypewriter Communications System at Kansas City, Mo. The modernized system, scheduled for commissioning in FY 1972, uses digital computer applications. When in full operation, it will replace three existing weather networks and consolidate the message switching function of 36 separate interchange centers in a single center. The new switching center offers important advantages over the electromechanical and semiautomatic facilities it will replace—more data, greater selectivity, and faster service. Circuits will operate at speeds from 10 to 2,400 words per minute, depending on requirements, and will be tailored to meet the specific needs of such users as FAA flight service stations, the National Weather Service, airlines, and others.

Satellite Communication Service. In June 1970, FAA inaugurated the first full-time point-to-point satellite communication service in air traffic control, between San Francisco/Oakland and Honolulu. This service consisting of one voice and three teletypewriter channels leased from the International Telecommunications Satellite Consortium (Intelsat), proved superior to the high-frequency radio circuits previously in use. Later in the reporting period, a direct-speech satellite circuit was established between the Anchorage and Honolulu ARTCC's.

While these satellite circuits considerably improved ATC communications between the contiguous 48 States and Hawaii, the problem of deficient point-to-point communication between Hawaii and points west, particularly Japan, continued to prevail. In consequence, FAA initiated a program to supplant, wherever feasible, the existing high-frequency radio circuits in the Pacific with satellite or submarine cable circuits through cost-sharing arrangements with foreign correspondents. By year's end, the United States and Japan had reached agreement to share the cost of simultaneous voice/record satellite service between the Honolulu and Tokyo air traffic control centers. The service was expected to begin on September 20, 1971; at the same time, the Anchorage center would be tied into the Honolulu-Tokyo leg, thus providing a circuit on which any of the three centers may communicate with one or both of the others. Plans had also been formulated by the end of the year for similar satellite service between Guam and Tokyo, Guam and Manila, and other points.

Visual Approach Slope Indicator. In October 1970, FAA adopted a three-bar visual approach slope indicator (VASI) that keeps pilots of long-body jet aircraft on the proper slope during approach for landing. The bicolor (red-white) VASI is located alongside the runway at the touchdown or aiming point. When the pilot is on the proper glide slope, the far indicator is red and the closer one is white. But when the pilot is above the glide slope, both indicators are white; when he is below the slope, both are red. The system is designed primarily for runways not equipped with an instrument landing system.

Urban-Related Aviation. A solution to some of the problems of urban traffic jams would be the systematic use of V/STOL (vertical/short takeoff and landing) aircraft to complement surface modes of transportation. FAA activities in this area during the reporting period included:

- Cooperating with the City of Houston in the structuring of a STOL feeder system to operate between Clear Lake Airport and Houston Intercontinental Airport. This system, when implemented, was anticipated by FAA as providing an opportunity for evaluating STOL procedures in a live operational environment.
- Assisting the State of Florida in determining the feasibility of establishing STOL service between Disney World and such Florida terminals as Orlando, Tampa, and Jasksonville. Establishment of this service would inaugurate the first true STOL operation in the United States.
- Issuing an advisory circular (November 5, 1970) setting forth criteria for planning and designing metropolitan STOLports for short-haul (city center to city center) air transportation.
- Collecting data on the feasibility of using area navigation equipment to narrow STOLcraft routes in terminal areas. (See "Organizational Changes" in chapter XI.)

IMPROVING MOTOR VEHICLE SAFETY

STANDARDS AND REGULATIONS IN FORCE. A total of 35 Federal Motor Vehicle Safety Standards (FMVSS) have been issued to date. Seven of these were promulgated during FY 1971 and they include rules on retreaded tires, power windows, air brakes, side door strength, exterior protection, flammability of interior materials and occupant crash protection. In addition, 37 amendments to strengthen previously issued entered into force during this reporting period. Regulations, as distinct from standards, are also published. Two new ones were published during the past year on tire identification and recordkeeping and on defect reports. This brings the total of published regulations to seven during the past 5 years.

RULEMAKING

Crashworthiness was the objective of two major developments of standards: (1) The occupant crash protection standard; and (2) exterior

protection (bumpers). Under the occupant crash protection rule, passenger cars must have passive systems as of January 1, 1972, or as an alternate, improved safety belts with a "Fasten Seat Belts" warning and buzzer if the front seat belts are not worn. Effective August 15, 1973, passenger cars will be required to provide passive protection in head-on barrier crashes at speeds up to 30 m.p.h. And on August 15, 1975, passenger cars must provide complete passive protection in head-on, angular frontal, lateral and rollover crashes at speeds up to 30 m.p.h. It is planned to upgrade passive protection to the 40 m.p.h. level for passenger cars manufactured after September 1, 1976 and up to 50 m.p.h. at a later date. This 3-year cycle for upgrading the passive protection requirement is intended to correspond, approximately, to a 3-year model change cycle in the automoblie industry.

The standard on exterior protection requires that automobiles withstand a front impact of 5 m.p.h. and rear impact of 2½ m.p.h. after September 1972, without damage to safety-related components. Lights, cooling systems, exhaust and fuel lines must be protected and hoods, doors and trunk lids must remain operable. After September, 1973, manufacturers will be required to standardize the zone of protection of bumpers. Front and rear bumpers will extend from 16″ to to 20″ above the ground, which would reduce the incidence of override and interlock. It has been proposed that the speed of rear impact protection be increased to 5 m.p.h. as of September 1974. Comments on this proposed amendment are currently being received and reviewed.

A standard of great importance to parents which became effective April 1, 1971, will govern minimum performance requirements for seating systems used by children between the ages of 6 months and 3 years.

Operating systems were the subject of several significant rulemaking actions in FY 1971. A regulation on Tire Identification and Recordkeeping established procedures for notifying the first purchasers of tires in the event of recall due to safety defects. A standard was issued which requires that retreaded passenger tires provide the same minimum safety performance as new passenger car tires. A standard and several Notices of Proposed Rulemaking (NPRM) were issued which specify braking system performance for trucks, buses, multi-purpose vehicles and motorcycles. An amendment was issued which upgrades the standard on motor vehicle lights. An NPRM was published which would upgrade the rear field of view requirement, and extend the existing standard to trucks, buses and motorcycles. Other NPRM's address the subjects of high speed warning and control and a fail-safe requirement for accelerators.

Motor-Vehicle Safety Plan. The initial 22 standards issued in 1967 were generally based on existing practices and made mandatory previously optional safety devices. They had little impact on systems design in the manufacturing industry. The current generation of new or amended

standards do effect the manufacturing cycle from planning and design through tooling and product cost.

A plan for motor vehicle safety programs was published primarily as a guide to NHTSA staff in the development and issuance of Federal Motor Vehicle Safety Standards (FMVSSs), but is made available to the public to assist the many constituencies of the safety community in their planning and programing. This plan was updated and published in September, 1970. A current revision will be issued shortly. It is based upon a systems approach to motor vehicle safety in planning for both accident avoidance and crashworthiness improvements.

COMPLIANCE ACTIVITY. FMVSSs are described and issued in terms of performance in prescribed types of tests. The manufacturer must certify that the specified test results have been achieved. NHTSA is responsible for independently investigating to verify the certification or possible compliance violations of the standards. Fifty-seven vehicles have been tested to 141 vehicle performance requirements; 10,212 pieces of equipment, including 6,003 tires, seat belts, brake hoses, brake fluid and lighting equipment; and 113 potential violations of import regulations. Results of the tests are published regularly and verified failures are reported to the manufacturer who must then notify the first purchaser as with any other safety-related defect. At this time, there is no legislative requirement for recall of vehicles and correction of defects. However, notification is generally followed by a recall campaign on the part of the manufacturer and at his expense. All vehicles and tires recalled are not necessarily faulty, but represent the extent of the population runs requiring inspection for possible safety defects.

COMPLIANCE TEST FACILITY. The need for a DOT Test Facility has been recognized by Congress, and a site was selected during FY 1971 at the Ohio Transportation Research Center, East Liberty, Ohio. A prospectus was prepared and submitted to Congress. To date, it has been approved by two of the four cognizant Congressional Committees, and the DOT has included a request for $9.6 million for lease or acquisition in the FY 1972 Appropriations Bill.

DEFECT NOTIFICATION AND RECALLS. The law requires manufacturers to send first purchasers and the Secretary a notice of safety-related defects in their products, when defects are known. Defects which present a possible safety hazard but which are not necessarily covered by the FMVSSs are brought to the attention of NHTSA through citizen and consumer group complaints, information from other Government agencies, motor vehicle periodicals and dealer service bulletins and notices. NHTSA accident investigation teams also report such hazards. These complaints are investigated and given thorough engineering analysis. If confirmed, action is initiated.

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The end result is that between September, 1966 and June 30, 1971 some 16,600,986 vehicles had been recalled in 764 campaigns, of which 2,097,638 and 185 campaigns involved foreign vehicles.

LITIGATION

Nader et al v. *Volpe et al.* Plaintiffs sought to require NHTSA to pursue its safety defects investigation of some 150,000 ¾-ton GMC and Chevrolet straight pickup trucks equipped with three-piece wheels. Subsequently, as a result of NHTSA's continuing investigation of wheel failures involving this truck population, on November 4, 1970, General Motors Corporation was directed by NHTSA to issue defect notifications to the owners of these trucks. On January 25, 1971, the Court granted the Government's motion to dismiss the action as moot.

General Motors Corporation v. *Volpe et al.* On November 4, 1970, General Motors filed this lawsuit in the United States District Court for the District of Delaware in an attempt to enjoin NHTSA from requiring General Motors to issue safety defect notifications to over 150,000 owners of ¾-ton pickup trucks. On December 21, 1970, the Court dismissed General Motors' lawsuit upon motion of the Government. General Motors has appealed to the U.S. Court of Appeals for the Third Circuit.

United States v. *General Motors Corporation.* On November 6, 1970, NHTSA caused suit to be filed against General Motors in the District of Columbia, seeking to force the company to issue defect notifications to more than 150,000 owners of ¾-ton GMC and Chevrolet pickup trucks. The Government complaint also seeks civil penalties of $400,000 from General Motors for its failure to issue defect notifications. The action was pending, with both sides pursuing discovery procedures, at the end of the fiscal year.

National Association of Motor Bus Owners et al v. *Volpe et al.* NAMBO brought this lawsuit against the Department in 1969 attacking the validity of NHTSA's Regrooved Tire Regulations. On January 12, 1971, the court awarded judgment to the Government and sustained the validity of these regulations and their applicability to intrastate carriers. NAMBO has appealed.

Nader v. *Volpe et al.* In May 1971, NHTSA filed an appeal in the United States Court of Appeals, from an adverse decision of the District Court that would prevent NHTSA from granting any single-manufacturer exemption from the applicability of a Federal Motor Vehicle Safety Standard. The appeal was pending at the end of the fiscal year.

Petitions for Review filed in the Courts of Appeal by Wagner Electric, seeking to challenge Standard No. 108 (Clamps and Reflective Devices for Passenger Cars, etc.), and by Jeep Corporation, seeking to challenge Standard No. 208 (Seat Belts and Occupant Crash Protection), were both dismissed during the fiscal year.

Commencing about the first day of May 1971, every major automobile manufacturer in the world, except General Motors, Mercedes-Benz, and Volkswagen, filed Petitions for Review in the United States Court of Appeals seeking to invalidate Standard No. 208, Occupant Crash Protection. Separate petitions were filed by Ford, Chrysler, American Motors and the Automobile Importers Association (representing all foreign manufacturers except those mentioned). These cases, representing the most significant challenge, on both economic and safety issues, that the NHTSA has ever been confronted with in court, will probably be argued in the early fall of 1971.

ENFORCEMENT

During FY 1971, $234,000 was collected in compromise of 15 different civil penalty claims for violations of the National Traffic and Motor Vehicle Safety Act.

The largest of these settlements were:

$100,000 from Fiat Motor Company for importing motor vehicles that did not comply with Standard 204, Steering Wheel Rearward Displacement;

$50,000 from General Motors, for manufacturing passenger cars that did not comply with the backup-lamp requirements of Standard 108;

$35,000 from B. F. Goodrich, and $18,000 from Goodyear, for manufacturing tires that did not comply with Standard 109.

In most of these cases, and in many others that did not involve civil penalties, manufacturers recalled vehicles or equipment for replacement or repair, at the urging of the NHTSA.

NATIONAL MOTOR VEHICLE SAFETY ADVISORY COUNCIL

The Council's function is to consult with the Secretary on motor vehicle safety standards. The Council was very active during FY 1971, held frequent meetings and formulated numerous recommendations. Some of the most important concerned tire quality grading standards, consumer warning bulletins, uniform effective dates for vehicle standards, traffic safety research, vehicle interior flammability, and passive restraint systems. Issues which the Council considered and about which it made recommendations to the Secretary were Federal preemption of State safety standards, the problem of granting limited exemptions to small manufacturers on certain safety standards, and the proposed Senate bill on automobile repairability. The Council also held a highly successful conference "Partnership in Safety" to involve officials from 15 southeastern States in the national motor vehicle safety program.

The Council's 22 members represent the motor vehicle manufacturer, the motor vehicle equipment manufacturer, dealers, consumer groups and safety researchers.

NATIONAL HIGHWAY TRAFFIC SAFETY PROGRAMS

FEDERAL-STATE-COMMUNITY RELATIONSHIPS. The philosophy underlying the Highway Safety Act of 1966 is that traffic safety is a national rather than a Federal effort; that the Federal function is to provide leadership and financial assistance to the States and communities to improve and expand their own programs. The law stipulates that each State should be implementing a highway safety program approved by the Secretary by December 31, 1969. These programs are comprehensive, of several years' duration, and based upon the uniform national highway safety performance standards promulgated under the Act. They comprise the legislative, organizational, operational and financial plans which together form a coordinated basis for the application of modern management principles to highway safety.

The primary responsibility for organization, enforcement and effectiveness remains with the States and their political subdivisions. In the development of their programs, the States have wide latitude in adapting the standards to accord with their particular economic, social and political situations. Federal funds aid the States to get their programs organized and moving and Federal assistance supports research to improve highway safety knowledge and to train personnel in the skills required.

ANNUAL HIGHWAY SAFETY WORK PLAN. Until December 31, 1970, Federal funds were obligated to States on a project-by-project basis following review of proposals (some 2,000 annually) by the National Highway Traffic Safety Administration. At that time States had the option of changing to an Annual Highway Safety Work Plan which would detail the steps to be accomplished for a year, and three States did so. The plans were approved by the Regional Administrators, and Federal funds then obligated on an annual basis in accordance with budgetary limitations and procedures. Between December 31, 1970 and June 30, 1971, it remained optional with the States to follow the annual work plan or the old case-by-case approach. However, by the close of the reporting period, all of the States, the District of Columbia, and Puerto Rico were proceeding under approved annual work plans for FY 1972.

FUNDING. In 1966, Congress authorized the appropriation of $267 million to be used on a 50/50 matching basis from the inception of the program through FY 1971 to assist the States in their planned and approved highway safety improvements. Most of those funds were utilized and during this same period, the States and communities expended some $7 billion of their own funds for highway safety. Authorization of additional funds to continue traffic efforts in the States and communities was contained in the Highway Safety Act of 1970.

STANDARDS AND STANDARD IMPLEMENTATION. Sixteen standards have been issued thus far, and two additional standards (on pupil transportation and on accident investigation and reporting) are expected to be approved for promulgation in the near future. As noted in the section on Legislation,

responsibility for program development, coordination, and research is now divided between NHTSA and FHWA. FHWA is assigned three standards and a portion of a fourth which are closely related to design and maintenance of the highways. NHTSA administers the remainer which are particularly germane to the vehicle and the driver, the courts, and traffic records.

The States and communities have demonstrated their determination to cooperate fully in implementing the standards and progress has been steady and in some instances remarkable. For example, the State legislatures have enacted an impressive body of statutes basic to the safety programs:

- Motorcycle helmet laws. In 1966 only three States had laws requiring helmets; in 1971 such laws are in force in 45 States, the District of Columbia, and Puerto Rico.
- Implied consent laws. In 1966 only 19 jurisdictions had such laws; in 1971 they are in force in all jurisdictions except Illinois and the District of Columbia.
- Blood alcohol intoxication level of .10 percent. In 1966, this level was established in four States; in 1971 it is the law in 37 jurisdictions.
- Driver licensing, driver education, emergency medical services—substantial progress in new implementing legislation.

Selective Traffic Enforcement Program (STEP). STEP (reduction of accidents through reduction of traffic violations) is the outgrowth of a new concept in highway safety whereby sufficient funds are concentrated on certain remedial measures and for a long enough period to determine their effectiveness through a built-in evaluation process. The Department of Transportation and NHTSA have entered into contracts with Chattanooga (Tenn.), El Paso (Tex.) and Sacramento (Cal.) to evaluate law enforcement at high accident locations. The projects will continue through September 1974 and are expected to become models for other cities in assessing techniques, manpower, and equipment needed to reduce accidents. It is planned to initiate another series of projects designed to improve the skills of the average driver and to screen out poor drivers.

Military Assistance to Safety and Traffic (MAST). MAST was a pilot project carried out jointly with the Department of Defense which used military helicopters for ambulance duty; the copters came from five military sites which represented different military capabilities and varying terrain and climatic circumstances. During the test period, 445 missions were flown by MAST helicopters which aided 557 injured persons of whom 65 percent were traffic victims.

Youth Order United Toward Highway Safety (YOUTHS). YOUTHS was launched in November, 1970 by the Secretary of Transportation to involve the young people of the country in highway safety programs. It was motivated by the disproportionate number of traffic fatalities among

the 15–24 age group (double their ratio of drivers). The newly formed 15-member YOUTH Highway Safety Advisory Committee has made recommendations on speed control devices and public information "buckle-up" campaigns, and explored other issues such as crash survivability, muscle cars, and alcohol countermeasures. A national conference "SURVIVAL '71" is planned by the Committee for October 1971, to arouse more young people to participate in traffic safety issues and programs.

NATIONAL HIGHWAY SAFETY ADVISORY COMMITTEE

This advisory body counsels the Secretary on State and community highway safety matters. It held two major meetings during FY 1971 which resulted in recommendations on the two new proposed highway safety standards described above, and a recommendation to the Secretary that he issue a "report card" to the States on their relative progress in implementing the highway safety standards. It has also participated in a review of the existing 16 standards and made recommendations to streamline and consolidate them.

CONSUMER PROTECTION

Office of Consumer Affairs. In September 1970, the Secretary established an Office of Consumer Affairs under the Assistant Secretary for Safety and Consumer Affairs. This Office is the Department's point of contact on consumer protection activities. It has developed relationships with both governmental and private groups and organizations devoted to consumer interests. The Office is also the Department's coordination point for interdepartmental consumer-oriented programs.

Other responsibilities of the Office include identification of the problems of transportation users, development of recommendations for actions to alleviate the problems, and development of information and education programs of value to transportation users. The Office assisted a 21-member Citizens' Advisory Committee in preparing its Report to the Secretary on Transportation Quality.

The Director of the Office, appointed on April 14, 1971, quickly established plans to hold a nationwide series of public hearings on difficulties encountered by consumers in using transportation services, and programs to produce and distribute information to consumers.

Automobile Insurance. In March 1971, Secretary Volpe transmitted to the President and the Congress the policy findings and recommendations which resulted from the Department's two-year study of automobile insurance and compensation. In summary, it concluded that the existing insured tort liability system was ill serving the accident victim, the motoring public and society at large, and should be changed. A review of the alternatives led to a decision that the States be urged to move promptly to a first party, no-fault system of insured accident compensation; that losses not be shifted

on the basis of fault in order that the protective and damage resisting features of a motor vehicle might be reflected in its insurance premium cost; and that recovery of damages for intangible injuries, i.e., those for pain and suffering, be sharply limited. A Concurrent Resolution embodying these conclusions and recommendations was urged on the Congress. Shortly thereafter, the Department joined with the Council of State Governments and the National Conference of Commissioners on Uniform State Laws in a project to draft a model state law incorporating the auto insurance reforms believed necessary and desirable by the Administration.

VEHICLE HAZARD WARNINGS. The Secretary announced a new policy in October 1970. In the event a potential safety hazard becomes known to NHTSA, the Department will "come to the motorist's aid" by issuing a public warning of the use-risk involved pending a full investigation. These warnings, in the form of Consumer Protection Bulletins are intended to be used only rarely, when the possible danger warrants informing the public before a thorough investigation can be completed. As the year ended, two had been issued. The first which involved the front suspension on Ford police pursuit vehicles, advised of the degree of risk and under what circumstances, the models affected, and the remedy available. The second concerned escaping fumes in the General Motors Corvair. It also explained the risk, models and remedy and requested that consumers inform the Administration of instances of escaping fumes and heater defects.

Consumer Advisories are issued to inform the public on known hazards connected with certain vehicle components when improperly used or maintained. During FY 1971, several such advisories were published: the importance of proper selection of brake fluids and maintenance practices; dangers associated with school bus brake chaffing and means of avoiding it; dangers of mismatching tire types on passenger vehicles, and outline of compatible combinations; special risks from inadequate fuel tank types and crash hazards of brake and handlebar modifications by owners of motorcycles; notice of more stringent requirements for manufacturer's notices to consumers and informing the public of closer follow-up on defect reporting for more effective protection of users.

The second edition of an annual publication, or guide, to automobile purchasers was issued. It is a composite listing of manufacturers' data for all new passenger cars sold in the U.S. by make and model and contains a comparative listing of tire reserve loads, passing ability and stopping distance.

An Alcohol Countermeasures Forum was held at which 118 women's organizations were represented. The program to combat drunken driving was outlined to them and they were informed in what ways they could be helpful.

A series of 60 second radio spot announcements were distributed in album form to 2300 radio stations, most of which were used to increase

public awareness of traffic safety, such as use of seat belts, safe driving habits, and the heavy contribution of alcohol to highway tragedy. In another series, well-known racing drivers donated their services to make 24 radio and four television announcements on ways to stay alive on the highway. Other television spot announcements deal with problem drinkers who drive. Still another series of three 30 second television films informed the public of safety problem situations on Interstate highways. They were distributed to all commercial stations and used by nearly all of them.

Films have been used by NHTSA to inform and protect the consumer. "To Save Your Life" is a 30 minute picture to inform the public on the scientific research being applied to the causes of traffic crashes, injuries and deaths, and to finding ways in which they can be ameliorated. Another half-hour documentary deals with the drinking driver, new methods which assist in identifying him, means of restricting his opportunities to drive, and appropriate treatment. A second film on the same theme now in process is a dramatic treatment of the problem of the drinking driver called "Gentlemen of the Jury."

A number of publications to inform the public of various aspects of highway safety and the work being done to improve it were brought out during the reporting period:

- "Read Before Driving" is a pocket-size pamphlet updated annually to include new or revised vehicle safety standards. These pamphlets are used in driver education classes, and are sent to State highway safety offices and to local police departments and are inserted in the glove compartments of many new cars. Distribution runs in the millions.
- "Highway Safety Literature" contains announcements of all recent NHTSA acquisitions, and the executive summaries of NHTSA's completed research reports. It is brought out weekly with composites periodically.
- "Federal Motor Vehicle Safety Standards and Regulations," published periodically.
- "National Highway Safety Program Standards," updated as required.
- "Motor Vehicle Safety Recall Campaigns," published regularly.

HIGHWAY PROGRAMS

Relocation Housing. At the beginning of 1970 the Congress passed the Uniform Relocation Assistance and Real Property Acquisition Act. This Act extended the relocation assistance programs and benefits provided in the Federal-Aid Highway Act of 1968 to all public works programs. FHWA regulations require that before any highway project can be approved, guarantees must be provided that people who must be relocated will be housed in safe, sanitary, decent housing that is at least equivalent to the housing to be taken from them. In addition, large sums are available to

see that those who are to be relocated suffer no financial loss because of this relocation. Among the benefits, the Act provided for increased moving cost allowances, increased payments for rental and purchase of replacement housing and for mortgage interest and closing costs for the replacement housing. By the end of FY 1971, 36 States had legislative authority to provide the payments and assistance in accord with the 1970 Uniform Relocation Act. (Table 26.)

The Act also provides that if a Federal or federally assisted project cannot proceed because comparable replacement housing is not available, funds may be authorized to provide necessary replacement housing. At present California is the only State to have such a program. The State is actively engaged in construction or replacement housing in both the Watts area of Los Angeles and in San Ysidyo near San Diego.

At year's end, FHWA has been advised, as a result of meetings with the States on the 1972 Interstate cost estimate, that a number of States were considering the construction of replacement housing. Though there are as yet no procedures for handling of the construction of such housing, FHWA will initiate the operating procedures for full implementation of guidelines as soon as HUD issues them.

Advance Highway Right-of-Way Revolving Fund Program. During fiscal year 1970, 16 States obligated the originally allocated $31 million. In July 1970, an additional $50 million was allocated, and by the end of the fiscal year, the total allocated amount of $81 million had been released and obligated by 28 States. The Office of Right-of-Way has in abeyance formal requests for $45,843,143 of advance acquisition funds pending release of additional obligational authority in FY 1972.

A recent survey of the State highway departments taking advantage of this program indicates that approximately $30,900,000 of Federal and State funds were saved as a result of using this fund during fiscal years 1970 and 1971.

Progress on the Interstate System. During FY 1971 mileage of Interstate Highway in use rose to 32,026, an increase of 1,999 miles during the year. Mileage completed to full standards was increased by 2,160, an average of 5.9 miles per day. At the end of the fiscal year, 75.1 percent of the System's total rural mileage and 76.5 percent of the total urban mileage were in use.

In addition to the sections in use, 4,142 miles were under construction at the end of the fiscal year, and engineering and right-of-way acquisition work was completed or underway on 40,868 miles of the 42,500-mile System—about 96.2 percent of the total.

Construction Contracts and Prices. The Federal-aid highway construction program is accomplished through competitive bidding for contracts awarded by the various State highway departments. Competitive

bidding during FY 1971 averaged 4.8 bids per contract in the Federal-aid primary and Interstate programs.

During the year, 4,387 Federal-aid highway construction contracts with a total value of $4.6 billion were awarded, of which 1,616 were on the Interstate System, 1,303 were on the Federal-aid primary system (exclusive of Interstate) and 1,468 were on the Federal-aid secondary system. Contracts for urban work are included in these figures. The average size of contracts during the year was approximately $1,049,000 and 76 percent of the contracts were for less than $1 million.

Contract prices on Federal-aid primary highway construction, including Interstate, increased at an annual rate of about 9.1 percent from the end of FY 1967 to the end of FY 1971. The composite indexes of contract prices (1967 calendar year=100) for the four quarters of FY 1971 were 134.0, 130.2, 124.1, and 133.4, respectively.

The costs of labor and materials during the fiscal year amounted to 25 percent and 45 percent, respectively, of the Federal-aid primary highway construction cost (excluding costs of right-of-way and engineering). The remaining 30 percent was for equipment expenses (excluding operators' wages), overhead, and profit.

Average hourly earnings of labor on Federal-aid primary highway construction increased 7.2 percent during FY 1971 which was less than during each of the three previous fiscal years. Since the increase in labor productivity was extremely small, the cost of labor increased 7.0 percent. There was a very sharp rise in the cost of highway construction materials, an increase of 10.3 percent. Equipment expenses rose 4.1 percent. The weighted composite increase of Federal-aid highway construction labor, materials, and equipment costs during FY 1971 was 8.3 percent, the highest increase in a decade.

Other Highway Programs. The Federal Highway Administration, in addition to activities relating to the Interstate and ABC Systems, also administers other road construction programs, either directly, in cooperation with, or for other Federal, State and local agencies. During 1971 the Federal Highway Administration also assisted the Federal Railroad Administration by providing construction supervision for test facilities at the high speed ground transportation test site in Pueblo, Colorado.

Under the direct supervision of the Federal Highway Administration during FY 1971, work was completed on 73 projects with a total length of 254.1 miles which cost $45.8 million in Federal funds. Seventy-one new projects were awarded for construction on 256.9 miles for a total amount of $47.2 million.

At the close of the year, 79 projects were under contract with an obligation of $64.0 million for construction on 344.0 miles. Additional work on 234.3 miles, estimated to cost $38.2 million, was in the programed, plans-approved, or advertised stage.

ALLEVIATING FINANCIAL PROBLEMS OF CARRIERS

The reliability of the transportation system and the quality of service it offers depends in great part on the financial health of carriers. For this reason, the Departmental staff engages in extensive monitoring and analysis of carrier financial data. The results of this activity provide a basis for support of policy recommendations, and make possible an analysis of the effects that regulatory or other kinds of changes may have on carriers and the entire transportation system.

Traffic and earnings of major sectors of the transportation industry are still at low levels, but upturns are apparent. Net scheduled airline industry losses for calendar year 1970 were about $200 million; losses in the first quarter of 1971 were nearly $160 million, but a breakeven year or only $50 million loss in 1971 seems probable now. Net income for major railroads was $127 million in 1970, down from $505 million the year before, but 1971 should produce higher net income, even with the coal and port strikes. Truck industry earnings are an exception with 1971 earnings estimated at $400 million, double those of 1970.

A definite improvement in traffic volume and earnings should be evident by 1972, given an increase in the underlying economic activity which generates business and vacation travel and the shipment of goods. Economic recovery should ease the current crises.

During the year the Department examined several loan applications from railroads that might have been unable to continue operations without further capital resources. Acting under the Emergency Rail Services Act of 1970 the Department provided guarantees of loans made to the Penn Central Railroad and the Central Railroad of New Jersey. A loan application from the Boston and Maine Railroad was denied.

CHAPTER IX

INTERNATIONAL TRANSPORTATION DEVELOPMENTS

INTERNATIONAL COOPERATION

The Department's International Research Cooperation Program involves exchanges of documents, visits and joint research projects designed to combine talents and resources and to eliminate duplicative efforts. This program continued at an active pace with such established cooperative partners as Germany, France, Japan, and Canada. In addition, the program with France was expanded to include work on the methodology and organization of demonstration projects, and local participation in transportation planning. With Germany, a cooperative research project was launched on control systems for alternative routing of freeway traffic.

In connection with the development of a high-speed ground vehicle, the Department completed arrangements with Canada, within the framework of existing cooperative agreement, for task sharing in the area of magnetic levitation. Arrangements were also made with the European Space Research Organization for joint high altitude balloon tests of L-band satellite communications equipment in connection with aeronautical communications by satellite.

An active relationship was also developed with Eastern European countries during the year. Under the U.S.-U.S.S.R. Cultural Exchange Program, DOT led a U.S. delegation to the Soviet Union and hosted return visits by Soviet technicians and scientists in the fields of bridging and tunnelling and urban transportation. As a result of these visits, the Department and the appropriate Soviet Ministries have arranged for an exchange of information and data on these subjects. Exchanges of delegations on railroads and highway safety are expected in 1972.

The Secretary visited Poland and Romania in November and signed memorandums of understanding concerning research cooperation. Concrete project proposals have been exchanged and are under study. Research cooperation in the form of document exchanges with the Hungarians and the Czechs is active and is expected to lead to conclusion of more formal arrangements. The Secretary's visit to Yugoslavia in May featured an exchange of project proposals which, at the year's end, were under review in DOT and in Belgrade. Concrete project activity with the Yugoslavs is expected to commence the first half of FY 1972.

During the year, the Department continued to provide economic technical advisory services to the Agency for International Development (AID) and

other international organizations. Principal emphasis was on multimodal planning, analyses, reviews and appraisals of transport reports and feasibility studies. The Department acted upon over 100 technical inquiries covering such subjects as feeder roads in Jamaica, improvement of road and lake transport facilities in Nicaragua, preparation of a scope of work for the AID-supported CENTO rail project, and transport sector planning in Congo(k).

FACILITATION PROGRAMS

The mission of the Office of Facilitation to provide the means for the Department "to facilitate the development and improvement of coordinated transportation services, to be provided by private enterprise to the maximum extent feasible . . . ," is being fulfilled through facilitation programs to help develop and implement policies, practices, and procedures to expedite, to the maximum degree consistent with the public interest, the flow of domestic and international commerce, including the vitally important movements of passengers, baggage, cargo, and mail.

Activities during FY 1971 included:

- Coordination of efforts within DOT and with other government and industry interests to develop an effective program to reduce cargo loss and damage on an intermodal basis, culminating in a 4-day Cargo Security Conference.
- Development of a standard transportation descriptions and codes system with industry. The anticipated system will reduce existing transportation overhead costs by $1.2 billion.
- Initiation of a study of the concepts of transportation facilitation centers which are advanced to deal with transportation systems problems in the areas of small shipments, delays in cargo flow, lack of intermodal coordination and communication, poor equipment utilization, and terminal congestion.
- A pilot study was completed and a more extensive research study has been undertaken to explore specific traveler service problems confronting the average traveler who utilizes domestic inter-city air, bus, and rail transportation.
- The joint DOT/National Committee on International Trade Documentation effort identifying all transport and transport-related documents utilized in U.S. import and export trade was completed and is being prepared for distribution. The report contains 28 recommendations for industry and government action to simplify documentation and procedures, reduce costs, and expedite shipments.

In addition, more and more industry interests are revising their systems to adopt the format of the U.S. Standard Master for International Trade. All container carriers have adopted the U.S. Standard Master format. In addition to ocean carriers and shippers, the Agency for International De-

velopment has announced a project to align its AID Form 282 (Invoice and Contract Abstract) with the U.S. Standard Master. The same is true regarding Customs documentation, Government bills of lading and Customs drawback forms.

INTERNATIONAL MARITIME ACTIVITIES

SUPPORT AND COORDINATION OF INTERNATIONAL ACTIVITIES. The Coast Guard has continued its mission to support and coordinate activities in international maritime safety, international cooperation and training. Coast Guard is the sponsor of the International Convention for the Safety of Life at Sea (SOLAS) 1960 Subcommittee of the State Department's Shipping Coordinating Committee, the Executive Secretariat for the U.S. National Committee for the Prevention of Pollution of the Seas by Oil, coordinaor of the U.S. representation to the International Association of Lighthouse Authorities (IALA), and provides major support of U.S. involvement with the International Maritime Consultative Organization (IMCO). The Coast Guard's Office of Public and International Affairs successfully coordinated U.S. efforts resulting in the following accomplishments: The transfer of the five-station Philippine Loran Chain and four HU–16 aircraft to host nation command and control; the transfer of the ex-NARCISSUS to the Government of Guyana through the Agency for International Development; hosting the International Life-Boat Conference (May 1971) in New York with representatives from 20 countries; protocol functions for 38 foreign visitors to various Coast Guard facilities; establishing specialized on-the-job training programs for four foreign nations; and preparing the U.S. position put forth by Secretary Volpe at the November 1970 meeting of the Committee on Challenges to a Modern Society (CCMS) which called for efforts to end all intentional discharge of oil at sea by 1975 and a definite cessation of such discharges at least by 1980. This position is expected to be endorsed by IMCO in the near future. Preliminary arrangements have also been made for the sale of one HH–52A helicopter to the Government of Iceland.

IMCO ACTIVITIES. The Coast Guard has been actively engaged in meetings at the International Maritime Consultative Organization Headquarters in London with regard to revision of the International Regulations for Preventing Collisions at Sea (Rules of the Road) in preparation for a Conference tentatively scheduled for November 1972.

The Coast Guard has taken a leading role in the development of an international specification for portable tanks carrying dangerous goods, which became effective in October 1970.

The IMCO Subcommittee on Ship Design and Equipment assigned the task of developing standards for ships transporting liquid gas to the ad hoc Working Group which the Coast Guard chairs. The purpose of this work is to develop specifications for a liquid gas ship which can be adopted internationally to insure the safety of both ships carrying certain gas products and the ports they visit.

The IMCO Subcommittee on Containers and Cargoes met in joint session with the Group of Rapporteurs on Container Transport, of the Economic Commission for Europe, to consider the draft of an International Convention for the Safe Intermodal Transport of Containers.

Recommendations regarding fire safety of mobile offshore oil drilling units, hovercraft, and tank vessels have been prepared by the Subcommittee on Fire Protection and advanced for consideration by the Maritime Safety Committee. Additional work is being undertaken by this Subcommittee aimed at minimizing the possibility of explosions such as those that occurred aboard the super-tankers *Mactra, Marpessa,* and *King Haakon IV.*

During FY 1971, IMCO accomplished two major goals in the field of hazardous materials regulation. The Subcommittee on the Carriage of Dangerous Goods reached a major milestone with the completion of the International Maritime Dangerous Goods Code. This Code will have significant influence on the United States domestic regulations. The Subcommittee on Ship Design and Equipment completed a "Code for Chemical Ships." It is anticipated the "Code for Chemical Ships" will provide the mechanism for improving management of the foreign vessel Letter of Compliance Program.

INTERNATIONAL ICE PATROL. The Coast Guard commenced the 57th season of International Ice Patrol service in the North Atlantic Ocean on March 10, 1971. The International Ice Patrol was conceived for the purpose of protecting North Atlantic shipping from the iceberg hazard encountered annually during the spring and early summer. The patrol utilizes the C–130 aircraft and a Coast Guard oceanographic vessel to observe and study the iceberg conditions. Predictions as to the iceberg danger, recommendations as to the best action to be taken by shipping to avoid such danger, and scientific data concerning the oceanography of the area and the life cycle of the icebergs encountered are the major products of this service. The 1971 season saw slightly below-average concentrations of icebergs in the shipping lanes, and was considered "routine." Airborne reconnaissance operations were conducted from Canadian Forces Base, Summer-side, Prince Edward Island for the first full year since termination of flight operations at Naval Station, Argentia, Newfoundland, in mid-1970.

As dictated by national security consideration, U.S. national policy since 1950 has restricted the entry of vessels under the flag of, or under charter to, certain East European nations. Each request for entry into a U.S. Port by such a vessel had been considered on an individual basis and while, theoretically, a request could be granted for entry to any port, practically speaking, security requirements have limited individual approvals to fourteen coastal ports. A recent review of security needs has resulted in some relaxation of the restrictions to be applied. While each request will still be considered individually, and will be subject to reciprocal procedures by the East European government involved, future requests will be considered

treating all U.S. ports on an equal basis. The practical result will be that many additional ports on all four seacoasts (East Coast, West Coast, Great Lakes and Gulf Coast) will be available for port calls for East European vessels.

Training of Foreign Nationals. Visitors from foreign countries were trained by the Coast Guard in areas such as aids to navigation, LORAN, search and rescue, merchant marine safety, officer candidate school, port security, and law enforcement, and general orientation in the operation of a marine regulatory agency.

Representatives of 18 foreign countries participated in the training offered by the Coast Guard. The Military Assistance Program sponsored 55 visitors. The Agency for International Development and other Department of State activities sponsored 13 visitors, and 37 visitors participated in the LORAN program. In addition, one Philippine national entered the Academy with the Class of 1975.

Oil Spills. The Office of Pipeline Safety participated in the activities of the joint Department of Transportation—Environmental Protection Administration "Task Group for Development of Regulations for Onshore and Offshore Facilities for Pollution Discharge Prevention" and in the Joint Conference on Prevention and Control of Oil Spills held in Washington, D.C. June 15–17, 1971.

ADDITIONAL MEETINGS AND CONFERENCES

Hazardous Materials. Members of the staff of the Office of Hazardous Materials have continued to participate in meetings concerned with the safety in transportation of hazardous materials on an international basis.

During the year they attended a joint meeting of the Economic Commission for Europe and the RID Safety Committee for the purpose of drafting recommended international regulations on the design, construction and use of portable and demountable tanks; the United Nations Committee on Transport of Dangerous Goods; the European Free Trade Association concerning agreements for import/export of compressed gas cylinders; and the International Atomic Energy Agency meeting to discuss future changes to IAEA regulations for international transport of radioactive materials.

Conference on Tunneling. In June 1970, the Organization for Economic Cooperation and Development (OECD) sponsored an Advisory Conference on Tunneling in Washington, D.C. The Department of Transportation took an active role in eliciting the OECD sponsorship and in preparing the U.S. position through representation on the U.S. delegation. The Advisory Conference on Tunneling recommended several actions to bring about greater usage of tunnels to solve some of the problems of urban areas. During FY 1971, the Department of Transportation considered the recommendations of the Conference and started planning a Department-wide program of research and development on tunneling techniques to reduce the costs of tunneling and to make the benefits of tunneling more widely

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available. The Department also took a strong role in the Interagency Committee on Excavation Technology which the Federal Council on Science and Technology established during FY 1971.

INTERNATIONAL AVIATION ACTIVITIES

PARTICIPATION IN ORGANIZATIONS AND MEETINGS. During the reporting period, FAA and OST participated in the following international conferences or meetings either by direct representation or by contributing to the formation of the U.S. position on various technical, legal, and economic problems, or both:

- Conference on the Warsaw Convention, at Guatemala City, in February and March 1971. At this conference, a protocol to the Warsaw Convention was approved raising the liability limit of international air carriers for personal injury or death on international flights from $75,000 to $100,000. The carriers' liability up to this limit would be absolute. The protocol allows individual states to establish supplemental systems of compensation.
- Convention for the Suppression of Unlawful Seizure of Aircraft, at The Hague, in December 1970.
- Convention on Acts of Unlawful Interference with International Civil Aviation Other than Acts of Unlawful Seizure, at London, in October 1970.
- Meeting of the NATO Committee on Challenges to Modern Society, at Brussels, in October 1970. Among other things, the meeting dealt with the need for international cooperation to combat acts of hijacking and sabotage against civil aviation.
- Meeting on International Air Transportation Security, at Washington, D.C., in January 1971. (See Chapter III for details.)
- The first meeting—at Montreal, in January 1971—of an international study group established to guide the work of the International Civil Aviation Organization (ICAO) in developing a security manual for the eventual use of ICAO members.
- An Extraordinary Session of the ICAO Assembly, at New York, in March 1971, at which it was agreed to increase the size of the ICAO Council from 27 to 30.
- Second Meeting of the ICAO Statistical Panel, at Montreal, in May 1971, which took up, among other things, international statistical reporting programs dealing with airports and general aviation operations.
- ICAO Personnel Licensing/Training Practices/Medical Divisional Meeting, at Montreal, in October and November 1970, dealing with the medical aspects of licensing and training flight and ground personnel in flight operations.
- Symposium on Airfield Pavement Design, at London, in November 1970, sponsored by the United Kingdom's Department of Transpor-

tation. The participants discussed current pavement design and construction practices.

- Eighteenth Session of the ICAO Assembly in Vienna in June 1971, which dealt with a variety of international civil aviation issues.

Foreign Assistance and Training. FAA provides technical assistance in aviation to foreign countries and their nationals under reimbursable agreements with a number of agencies, including the State Department's Agency for International Development (AID), the Defense Department's military assistance program, and the International Bank for Reconstruction and Development (World Bank). All told, FAA had approximately $6 million available for this purpose during FY 1971—down from approximately $8 million during FY 1970.

At year's end, FAA was operating 10 aviation assistance groups abroad with a total authorized staff of 66 employees; this compared with nine groups and an authorized staff of 81 employees at the end of the previous reporting period. FAA also operated a U.S.-located Technical Assistance Staff, which was organized during this reporting period to provide short term technical assistance anywhere in the world. This staff replaced the Regional Aviation Assistance Group, which provided assistance primarily to Latin American countries. During the course of the fiscal year, FAA dispatched 44 technicians on short-term assignments to 13 countries; the work performed by these people amounted to 5.3 man-years of service—down 2.7 man-years from the services provided in FY 1970. This decline is primarily attributable to a sharp drop in requests for short-term assistance by AID

Under other reimbursable agreements, FAA trained 247 foreign nationals from 40 countries in various aviation specialties. AID reimbursed FAA for the training of 135 of these participants; ICAO, for 48; individual countries, for 64.

Other International Aviation Developments. Fiscal year 1971 also witnessed a number of other notable developments in international aviation, including:

- Reaching in February-March 1971 of an international agreement, through ICAO, to employ composite separation of aircraft in the heavily trafficked airspace over the North Atlantic. The new separation standard, worked out by the North Atlantic Systems Planning Group, can theoretically accommodate twice as many aircraft as the old standard by staggering aircraft flow both laterally and vertically. Beginning in April 1971, the new standard was being implemented on a limited basis.
- Adoption by ICAO, in April 1971, of international aircraft noise standards patterned after the U.S. standards.
- Completing, in October 1970, of an analysis of sonic boom effects by the ICAO Sonic Boom Committee. At year's end, this committee was

working out a method of describing and measuring sonic boom in terms of its effects on humans, other living things, property, and unstable terrain features.

- Concluding of a bilateral airworthiness agreement between the United States and Czechoslovakia, in October 1970.
- Concluding of an agreement with Iceland, in March 1971, providing for the flight inspection of all U.S.-owned air navigation aids by the Icelandic civil aviation agency—on a reimbursable basis, but at a saving to the United States.
- Holding of discussions at Ottawa, in March 1971 between the Chairman of the U.S. Interagency Bird Hazard Committee and Canada's Associate Committee on Bird Hazards to Aircraft on the identification of bird movements by radar and the forecasting of large bird migrations.
- Adoption by ICAO of two resolutions relating to environmental responsibilities; the first is a formal assumption of responsibility for compatability between aviation and environmental quality. The second directs the ICAO Council to expedite programs in environmental protection.

INTERNATIONAL HIGHWAY TRANSPORTATION SAFETY

Progress in international cooperation for safer highway transportation has been outstanding during the past fiscal year. The road safety project for which the U.S. volunteered to act as the principal has enlisted the support of other nations. Five countries have volunteered to be responsible for elements of the project: The Netherlands (Accident Investigation); Canada (Alcohol); France (Road Hazards); West Germany (Vehicle Inspection); and Italy (Emergency Medical Services).

The Experimental Safety Vehicle Program launched by the U.S. in FY 1970 has proven to be of particular interest to other automobile manufacturing nations, whether they are members of NATO or not. In November 1970 agreements were signed with Germany and Japan whereby those countries were to design and construct ESV's in the 2,000-pound class (the U.S. program centers on the 4,000-pound sedan category). The agreement calls for exchange of all technological information resulting from the programs. Similar agreements were signed in May 1971 with Great Britain and Italy. France and Sweden have expressed an interest in entering into equivalent arrangements. Knowledge gained by the participants will prepare them to meet the new safety standards developed as a result of ESV technological developments.

At the first ESV International Conference held in January 1971 in Paris, the extensive discussions centered around the applicability of 4,000-pound ESV specifications to 2,000 pound automobiles.

NHTSA is providing technical leadership under NATO auspices to determine the feasibility of using international procedures and uniform reporting formats in accident investigation. An international workshop on medical and engineering aspects of vehicle crashes was held in Wolfsburg, Germany in October 1970. It was attended by accident investigating teams from several NATO countries whom the U.S. specialists trained in analysis of crashes and identification of the causes. Two 3-week training sessions were held at Cornell Aeronautical Laboratory in Buffalo, New York for 15 members of accident investigating teams from eight countries. Still another workshop meeting was held in Turin, Italy where some 25 European teams are testing the possibility of a standardized system for reporting crash damage and injury.

The cost of these international endeavors to the U.S. is exceedingly small in comparison with the returns in technological advancements and improved methodologies.

HIGHWAY FOREIGN-AID ACTIVITIES

The FHWA continued to provide technical assistance, advice, and consultation to foreign countries in cooperation with the Department of State, Agency for International Development, the Export-Import Bank, the Development Loan Fund (DLF), and the International Bank for Reconstruction and Development (World Bank).

Major highway improvement programs were staffed by FHWA personnel in six countries during FY 1971. The programs in four countries—Laos, Peru, Brazil, and Bolivia—were sponsored by AID, and those in Kuwait and Argentina were direct-country financed through a revolving fund account set up with the Federal Highway Administration. In addition to these major programs, procurement and/or short-term advisory services were provided for the Philippines, Ethiopia, and Chad.

Argentina. Argentina entered into a major highway and construction program. As part of this effort, it requested the FHWA to furnish competent programing and planning engineer advisors. FHWA presently has three planning engineers working in the Highway Department.

Bolivia. One engineer has been detailed to work with the Bolivian staff in monitoring the Cochabamba-Villa Tunari highway construction program and in assisting in contract administration and field operations. Equipment specialists were retained to assist in placing and utilizing the equipment procured by Bolivia in 1969.

Brazil. In the Rio de Janeiro office, one engineer and two equipment specialists carried out technical assistance and monitoring services for the Highway Department. Engineering specifications for the State were reviewed, and an agreement entered into to purchase approximately $15 million worth of heavy construction and maintenance equipment in the United States. Agreements were completed and a high level advisory team

provided to the Brazilian Highway Department (DNER) in a proposed reorganization of the complete department.

Kuwait. FHWA staff in the country consisted of 23 engineers including soil engineers and laboratory technicians. FHWA's primary work has been in operation and training; it has also assumed some responsibility in monitoring construction contracts.

Laos. Although the reconstruction of 275 kilometers of road between the governmental capital of Vientiane and the royal capital of Luang Prabang was completed in 1969, heavy rains during the monsoon season made it necessary to move construction crews back into the mountains to regrade and finish the road. In addition, construction of a dam in the area made it necessary to relocate approximately 13 kilometers of highway. This work was completed during the fiscal year; however, for security reasons the crews were evacuated prior to completion of several permanent bridges.

FOREIGN STUDY PROGRAMS. With the cooperation of the State highway departments, counties, cities, and private industry, the Federal Highway Administration arranged 283 man-months of study during the year for 329 highway officials from 50 countries who came to the United States to study highway engineering techniques. While the majority of the visitors had individual programs arranged to fit their needs, there were 19 groups (from 3 to 27 persons) who observed highway activities. Included in these groups were nine Thailand district engineers assigned to special 10-week programs in three large countries; one Russian group of six bridge and tunnel engineers; three groups of Yugoslav engineers, and one group of six Pakistani engineers for a 6-month program. A special 1-week seminar was held by the Federal Highway Administration for 22 International Road Federation Fellowship trainees.

COOPERATION IN RESEARCH AND DEVELOPMENT. Impact attenuators developed in the United States are now being considered for installation in the Netherlands. One commercially available barrier has already been installed. In turn, a highly promising Dutch-German median barrier has been brought to the attention of FHWA. The Federal Highway Administration is currently evaluating research information on this median barrier to determine how it can be adapted for use in this country.

A cooperative project was initiated during the years between FHWA and the British Road Research Laboratory (RRL) to compare the effectiveness of network traffic signal settings derived from two computer programs, the U.S. developed SIGOP and the British TRANSYT. Experiments in two cities—San Jose, California, and Glasgow, Scotland—are underway. Both SIGOP and TRANSYT settings will be analyzed and recommendations will be reported.

SIGOP, the computer program for optimization of signal timing in networks, has been implemented, with encouraging results, in Kansas City, Missouri. The use of SIGOP in computing signal settings within the CBD

has resulted in reductions of 18.5 percent in total stops and 12.2 percent in total trip times. Further implementations by the remaining five cities in the SIGOP implementation project are anticipated.

HIGHWAY MEETINGS AND CONFERENCES

Tunneling (OECD). The FHWA was one of the most active Government agencies in arranging for the reception and post-conference tour of the 250 delegates and officials from 20 countries attending the OECD Advisory Conference on Tunneling in Washington, D.C. during the year. Those attending were predominantly engineers and administrators concerned with financing, manufacturing, planning, designing, and constructing tunnel structures.

Office of Research staff members also participated during the year in other activities: (1) Delegates to the OECD groups on "Area Traffic Control Systems" and "Electronic Aids for Freeway Operation" enabled the United States to gain the latest information on European developments in urban traffic control systems and freeway control. State-of-the-art reports were produced to provide a basis for future cooperative research projects. (2) An FHWA delegate to the OECD research group on "Road Safety at Junctions in Urban Areas" participated in producing a state-of-the-art report and specific research recommendations. (3) FHWA delegates attended OECD sessions on "Traffic Operation at Sites of Temporary Obstructions," "Road Design Parameters and Traffic Flow on Single Carriageways," "Road Maintenance," "Optimization of Alignments," "Symposium on Quality Control of Road Works," and "Winter Damage to Roads."

U.S. INTERNATIONAL TRANSPORTATION EXPOSITION (TRANSPO 72)

Preparations for a United States International Transportation Exposition to be held between May 27 and June 4, 1972 on a 300-acre site at Washington's Dulles International Airport went into high gear during the reporting period.

In August 1970, Secretary Volpe delegated this responsibility to the FAA Administrator. On February 1, 1971, an International Transportation Exposition Office was established within FAA to "plan, construct, operate and manage" the Exposition.

Although the Exposition had originally been conceived as an aeronautical exposition, it was later concluded that a multimodal exposition would be more appropriate—an exposition reflecting the growing awareness in the United States that integrated and balanced transportation systems, rather than separate, competing systems, are required to meet today's pressing transportation needs. Hence, TRANSPO 72 will exhibit all modes of transportation.

The Exposition's objectives are to—

- Stimulate the domestic and international sale of transportation products by providing manufacturers with a central marketplace to exhibit their wares.
- Strengthen the position of the U.S. transportation industry.
- Improve the U.S. balance of payments.
- Help foster an awareness among Americans of the importance of all transportation systems to their country's progress.

As TRANSPO plans were being developed, the total cost of the Exposition was estimated at $6.3 million. Congress had appropriated $2.8 million and revenues of $3.5 million were anticipated from exhibitor rentals, ticket sales, and concessionaires.

CHAPTER X

EMERGENCY AND NATIONAL DEFENSE TRANSPORTATION

EMERGENCY READINESS

While focusing its major attention on programs to further increase effectiveness of the Nation's transportation system, the Department is continually alert to the potential of disruptions: earthquakes, hurricanes, floods, power blackouts or work stoppages, and of defense emergencies ranging in intensity from international tension to total war.

Awareness of the imminence of an emergency and of the need for prompt response pervades every element of the Departmental headquarters and its operating administration. A small staff group, the Office of Emergency Transportation within the Office of the Secretary, coordinates the Department's readiness, develops and promulgates planning guidance, and provides specialized staff assistance in the implementation of Secretarial responsibility when need arises. It is supported within the DOT headquarters by defense coordinators and emergency planning officers of the respective administrations and offices and, in the field, by Regional Emergency Transportation Coordinators (RETCOs).

One element of the Department—the Coast Guard—is basically a military organization, having both national defense and law enforcement responsibilities. Other elements of the Department also cooperate extensively with elements of the Department of Defense, particularly in time of war, but also routinely in peace time, e.g., FAA air traffic control service is provided to military aircraft as well as to civil aircraft.

Civil Reserve Air Fleet. Allocations of air carrier aircraft for emergency use of the Department of Defense were continued in support of the Civil Reserve Air Fleet Program. As of June 30, 1971, 61 aircraft had been allocated for domestic support of the military and 368 aircraft to the international support of the military. The remainder of the air carrier fleet, approximately 2,350 aircraft, have been allocated to the CAB War Air Service Program.

Continuity of Operations. Every department and agency is charged with assuring the continuity of the Federal Government in any national emergency. Each must provide for its own viability and for performance of its essential functions; specific provision must be made for (1) Succession to office, (2) predelegation of emergency authority, (3) safekeeping of essential records, (4) emergency relocation sites, (5) emergency action

steps, (6) alternate headquarters or command facilities, and (7) protection of Government resources, facilities and personnel. The detailed policies, plans and procedures for achieving these purposes are set forth in the Department of Transportation Continuity of Operations Plan (DOT COOP). It is intended that the complete plan be published during FY 1972. The plan will then be tested and exercised to assure familiarization on the part of those concerned, verification of feasibility, and identification of weaknesses and shortcomings. The plan will be revised and updated periodically.

EMERGENCY RESOURCE MANAGEMENT. The National Plan and related contingency plans contemplate that, under National defense emergency conditions, the Secretary of Transportation would manage the Nation's total transportation resource including the implementation of control systems governing the use of all civil transportation and the allocation of its capacity to meet essential civil and military needs. In coordination with all its operating elements and the external transportation operating and support agencies, the Department has prepared a family of related plans and procedures for executing this responsibility if it is called upon to do so. The principal documents include Emergency Procedures for the Control of Civil Transportation (Order DOT 1940.1 draft), Manual Damage Assessment Procedures for Transportation Systems (Order DOT 1940.3) and the Transportation Annex to the General War Plan. These are supported and developed in further detail by special plans of the respective Federal transportation operating and support agencies both within and outside the Department. This family of plans includes but is not limited to:

- *Interstate Commerce Commission*—Transportation Mobilization Orders, TM–1 through TM–13, applying preference and priority to movement of selected classes of passengers and freight and providing for embargoes, rerouting, disposal and other controls over domestic surface traffic.
- *Civil Aeronautics Board*—War Air Service Program reassigning civil air carrier aircraft (less the Civil Reserve Air Fleet) as required to meet military and civil needs.
- *Maritime Administration*—Plans for control of ocean ports and ocean shipping.
- *Federal Aviation Administration*—State and Regional Defense Airlift plan for control and use of general aviation (other than air carrier); Plan for Security Control of Air Traffic and Navigation Aids.
- *Federal Highway Administration*—Emergency Highway Traffic Regulation plan.

In order to implement prompt and effective transportation controls when needed, the Department assembles data on projected requirements of major claimants for transportation service and on the capabilities of respective modes to provide this service.

EMERGENCY ORGANIZATION AND STAFFING. To assure the capability to implement emergency management of the Nation's transportation resource on short notice, a provisional organization structure has been designated providing for a national headquarters and eight or more regional offices. A detailed Standard Operating Procedure has been drafted. A continuing training program is conducted to maximize readiness of Defense Executive Reserve Officers and to acquaint the assignees with the interrelationships involved.

NON-DEFENSE EMERGENCIES. The Department's capability for emergency response is continually exercised through its involvement in a wide variety of non-defense emergencies. Most frequent are heavy storms and flooding that occur within the Continental United States and its territories, creating local disasters and interrupting transportation. Eight Presidential declarations of major disaster were promulgated during FY 1971 for this cause alone.

The Federal Highway Administration provided funds and assistance in these and many lesser situations under authority of Title 23 U.S.C. Section 125 and provided assistance, in coordination with OEP, under PL 91–606. Other major disasters involving DOT elements included Hurricane Celia in August 1970 and the southern California earthquake of February 9, 1971. Departmental elements also participated in and supported Operation Foresight 1971, a detailed plan of action to avert consequences of flooding threatened by melting of heavy snows. Fortunately, moderate weather permitted the threat to pass without disaster.

Departmental guidance was prepared and published governing its role in disaster assistance. The RETCOs in each region, in coordination with OEP and each of the Federal transportation agencies, developed coordinated regional emergency transportation disaster plans. Five were officially published during FY 1971; plans for the other four regions will be published early in FY 1972.

Strike Emergencies. DOT became involved in monitoring and responding to the effects of two Nation wide shutdowns of the railroads due to two strikes. In each case the President issued an Executive Order (EO 11572 and EO 11594, respectively) establishing priorities of movement on available transportation and designating the Secretary of Transportation to administer application of the priorities and, in coordination with the Director, OEP, to make adjustments as necessary to assure movement of freight essential to the defense, safety, and welfare of the nation. In each case the Secretary designated the Federal Railroad Administrator as his Strike Emergency Plan Coordinator and delegated to the Chairman, Interstate Commerce Commission, the Chairman, Civil Aeronautics Board, and the Maritime Administrator responsibility to assure implementation of the priorities by the modes under their respective authorities, and the DOT Regional Emergency Transportation Coordinators acted as his field agents.

Full coordination of all Federal agencies involved was achieved and a system established for imposition of transportation priorities and allocations to the extent necessary.

INTERNATIONAL EMERGENCY TRANSPORTATION COORDINATION. The Department maintains continuing coordination on international aspects of emergency transportation planning. Within NATO it provides U.S. representation on the Civil Aviation Planning Committee and provides backstopping support to the U.S. representatives on the Planning Board for European Inland Surface Transportation and on the Planning Board for Ocean Shipping. It also participates in across-the-border emergency planning activities with Mexico and Canada. In the natural disaster area, in coordination with DOS/AID, it prepared guidelines on DOT assistance in foreign disasters; it also participated in a NATO sponsored international seminar on earthquakes.

COAST GUARD DEFENSE ACTIVITIES. As a part of the Coast Guard operational readiness program, 46 ships participated in naval refresher training during the past fiscal year. This represents an 84% increase in training from the previous fiscal year. This increase is attributable to the expansion of the program to include vessels previously exempted and to the training of some vessels which were not scheduled last fiscal year. Shipboard application digital data processing techniques to improve mission effectiveness and military readiness of High Endurance Cutters by optimization of the flow of operational information is being evaluated. OASIS (Operational Automated Shipboard Information System) has been developed and installed aboard CG Cutter *Chase* to meet these needs. OASIS makes possible the rapid and accurate processing, transmission, and display of the large volume of complex and inter-related information essential to the proper conduct of the operational mission of a Coast Guard cutter by automating many traditionally manual functions. In addition to speeding information flow, OASIS provides for reduction in manning and personnel skill levels, improved and more extensive training, increases Coast Guard capability in both Search and Rescue and Anti-Submarine Warfare, provides a precision navigation capability, and improves safety at sea.

Coast Guard Operations in Vietnam. On August 12, 1970, the Coast Guard turned over to the Vietnamese Navy the last of 26 patrol boats (82 ft.) thus completing the program to furnish the South Vietnamese Government with its own patrol ships.

Coast Guard Division Thirteen and Coast Guard Squadron One were decommissioned and Coast Guard Activities, Vietnam was disestablished. A reorganization then established the Senior Coast Guard Officer Vietnam as a subunit of the organization designated Commander, Southeast Asia Section. The Coast Guard's current level of operation in Vietnam includes the Senior Coast Guard Officer and his staff; the Commander, Coast Guard Squadron Three and his staff; Squadron Three (two high endurance cut-

ters); an Aids to Navigation Coordinator (with a small staff); a Merchant Marine Detail in Saigon; and a Port Security and Waterways Detail (4 officers, 21 enlisted men).

In furthering the President's "Vietnamization" policy, the U.S. commitment of five high endurance cutters to "Market Time" Operations was reduced to four cutters on July 1, 1970 with a further reduction to two cutters on January 1, 1971 upon the turnover of two HEC's to the Vietnamese Navy based on approval granted in October 1969. Currently, two Coast Guard vessels are assigned to "Market Time" and will continue to be assigned through FY 1972.

Although "Market Time" operations have been reduced, the Coast Guard's presence is still quite evident; thus "Market Time" surveillance activities, carried out mainly by high endurance cutters, continued with 23,417 vessels being detected. Of these, 11,775 were visually inspected and an additional 2,785 were boarded and searched. The cutters and patrol boats fired 384 gunfire support missions, accounting for an estimated 22 enemy troops killed or wounded and damaging or destroying 206 structures and 28 bunkers. There were no Coast Guard casualties during the period.

Other Coast Guard units in Vietnam continue to carry a heavy workload. The buoy tender *Blackhaw* continued to service aids to navigation during her short in-country deployment. *Blackhaw's* workload was further increased by an unusual number of aids to navigation requiring servicing due to inclement weather conditions. The Merchant Marine Advisory Detail continued to encounter many and varied merchant seaman problems whose solution required their full time. The Port Security and Waterways Detail was selected to receive the National Defense Transportation Association Award for transportation safety in a combat zone for 1969. During the past year, units of the detail supervised the unloading of 1.1 million tons of ammunition from 367 ships, constituting a decrease of .6 million tons from the previous year with a 26% decrease in the number of vessels unloaded.

Coast Guard Reserve. The function of the Coast Guard Reserve is to provide trained units and qualified persons prepared for active duty with the Coast Guard in time of war or national emergency and at such other times as the national security requires.

The Coast Guard Reserve operates under the same laws which govern all Reserve components. In order to insure maximum uniformity, the Coast Guard has adopted and adheres closely to the regulations, policies and directives promulgated by the Department of Defense.

The Coast Guard Reserve is composed of the Ready, Standby, and Retired Reserve. The Ready Reserve represents the principal source of trained units and personnel available for call to active duty to fill the mobilization needs of the Coast Guard.

The Standby Reserve is composed of personnel who are available for active duty only in the event of war, national emergency declared by the Congress, or when, pursuant to law, it has been determined that there are not enough of the required types of units or personnel available in the Ready Reserve.

In addition to undertaking classroom and practical training during drills and annual 2-week training duty, Reservists perform a wide variety of tasks which serve a dual purpose of furthering their training and simultaneously providing assistance to the Coast Guard, the public at large, and other Government agencies. Activities of these types included service at lifeboat stations, servicing of aids to navigation, inspections of pier and waterfront facilities, harbor and waterways patrols, vessel boardings and surveillance, investigation and reporting of oil pollution incidents, and a wide variety of other activities. Reservists also provided assistance in search and rescue and law enforcement incidents.

FAA and National Defense

Defense Readiness. Fiscal year 1971 saw a change in the organization of FAA's emergency readiness activity. The Defense Coordination Staff, which had functioned under FAA's Deputy Administrator, was abolished (May 1971), and the Associate Administrator for Plans assumed responsibility for coordinating defense matters with the Department of Defense (DOD) and for monitoring significant DOD-FAA programs and plans. At the same time, a Defense Readiness Staff was established and assigned to the Associate Administrator for Operations. The new staff will direct its efforts to maintaining FAA's defense readiness and operational contingency plans, its postattack and follow-on readiness plans, and liaison between FAA and other civil and military agencies regarding defense readiness.

FAA is responsible for the defense readiness of civil aviation and for its own readiness as an agency to meet defense emergencies. The more significant defense-related developments during this reporting period included:

- Working out final details with the Civil Aeronautics Board for the Board's collocation with FAA at the FAA emergency relocation site in the event of a national emergency.
- Bringing to the last stage of coordination a revised DOD-DOT Memorandum of Understanding concerning the implementation of Executive Order 11161. This Executive Order directs and provides broad guidelines for DOD-FAA planning for a coordinated response to a war emergency or a lesser national emergency. The objective of the memorandum is to define the specific military support to be provided by FAA in the event of such emergencies.
- Supporting the military services in the Joint Chiefs of Staff exercise High Heels 71.

- Bringing to the final stages of coordination a revised FAA Headquarters Defense Readiness Plan and a revised FAA Handbook for Emergency Resource Management.
- Participating in a meeting sponsored by the Office of Emergency Preparedness and presenting data concerning FAA's medical capabilities and resources.

Aviation War Risk Insurance. As required by statute and a delegation of authority from the Secretary of Transportation, FAA continued to administer an aviation war risk insurance program. The current program includes:

- A standby insurance binder plan that would make aviation war risk insurance available upon the outbreak of war between any of the Four Great Powers to U.S. civil aircraft and foreign-flag civil aircraft engaged in operations deemed to be in the interest of national defense or the national economy. At the end of the reporting period, 58 aircraft were covered under this plan by premium insurance binders representing a maximum contingent liability of $4,602,636,400.
- A nonpremium aviation war risk insurance plan covering U.S. air carrier aircraft under contract to the Department of Defense or otherwise committed to the Civil Reserve Air Fleet. On June 30, 1971, 567 aircraft in this category were covered under this plan by nonpremium policies representing a maximum contingent liability of $58,080,225,000.
- A nonpremium aviation war risk insurance plan covering U.S. air carrier aircraft under contract to the State Department. At year's end, 81 aircraft in this category were covered under this plan by nonpremium policies representing a maximum contingent liability of $11,045,000,000.
- A premium hull and liability deductible-coverage plan made available to U.S.-flag carriers upon determination by the Secretary of Transportation that aviation war risk insurance adequate to the needs of the air commerce of the United States is unobtainable on reasonable terms and conditions. The Secretary of Transportation made such a determination in June 1970 and, on July 31, 1970, the first policy under this plan was issued. By the end of the reporting period, 382 aircraft were covered under the plan by premium policies representing a maximum contingent liability of $3,168,527,183.

The number of aircraft covered by all plans at the end of the reporting period totaled 681; the program's total maximum contingent liability came to $60,432,053,197. (Note: Because most aircraft insured under one plan are also insured under one or more other plans, adding the maximum contingent liability of each plan [or the aircraft insured under each plan] will not produce a true measure of the program's exposure).

Fiscal year 1971 gross revenues from all plans came to $4,940,229.20. Of this, $4,924,929.20 came from premiums earned by the premium hull

and liability deductible-coverage plan; $15,300.00 was generated by binder and nonpremium plans. Net adjusted administrative expenses chargeable to these programs were $36,340.56. At the beginning of the reporting period, net retained earnings stood at $28,177.20; at the end of the period, at $4,932,065.84.

One claim was made under the premium hull and liability deductible-coverage program. The claim involved the destruction of a hijacked Boeing 747 (a jumbo jet) in Cairo, Egypt, on September 6, 1970 (see "Aviation Safety" in chapter III for details). By year's end, however, the responsibility for the payment of this claim had not been settled. Still pending was a suit filed by the insured requesting a court determination of the liability of all interested insurers. The Government's maximum possible liability for this loss is $9,763,709.54.

HIGHWAYS AND NATIONAL DEFENSE

EMERGENCY RELIEF. Natural disasters caused extensive damage to the Federal-aid highway systems during FY 1971. The Los Angeles earthquake of February 1971 was by far the most devastating on record in terms of damage to highways. This quake caused an estimated $20 million in damage to the Interstate highway system alone.

During FY 1971, a total of $34 million was approved for use by the States for the repair or reconstruction of highways and bridges on the Federal-aid systems. In addition, $12,625,000 was allocated for the repair or reconstruction of roads and bridges under the jurisdiction of other Federal agencies, and $16,860,000 was allocated for the repair or reconstruction of bridges permanently closed during calendar years 1968, 1969, and 1970 because of imminent danger of collapse.

DISASTER ASSISTANCE. During FY 1971, a total of 17 disasters were declared in 14 States, Puerto Rico, and the Virgin Islands. FHWA field personnel expended approximately 15,000 manhours in providing such assistance to the Office of Emergency Preparedness. Nearly half of this effort was spent in connection with the October 1970 floods in Puerto Rico and the Virgin Islands.

EMERGENCY PREPAREDNESS. During the year, the Federal Highway Administration designed, conducted, and evaluated a Readiness Exercise-HIREX-71, the first nationwide exercise readiness procedures. The results of this exercise will be useful in improving the emergency preparedness posture of the FHWA.

Agreements were obtained with 47 States to develop plans for implementing the national emergency preparedness program for highway transportation. These agreements provide for the accomplishment of the highway-oriented operations that would be necessary in a national emergency.

The Joint United States/Canada Emergency Planning Committee for Civil Transportation was reactivated. This committee hopes to develop the

full coordination of across-the-border emergency preparedness activities by the two Nations.

The development of the FHWA National Defense Executive Reserve continued with 94 designated members. Another 15 candidates are being processed for appointment by the Secretary of Transportation and efforts are under way to increase the membership to its full complement of 155 by the recruitment of a well-qualified transportation executives.

DEFENSE ACCESS ROADS. During the year, the Defense Department transferred more than $5 million, in addition to previously transferred funds, making it possible for the FHWA to obligate over $14 million for defense access road projects. Nevertheless, at the close of the year, nine projects, having a total estimated cost of over $6 million, were unfinanced; an additional eight projects, estimated to cost $2.4 million, were awaiting certification by the Department of Defense; and the Federal Highway Administration was in the process of evaluating the need and feasibility of highway access improvements at four additional defense installations.

SAFEGUARD IMPACT ASSISTANCE. The Military Authorization Act, 1971, authorizes the Secretary of Defense to assist communities located near the Safeguard installations in Montana and North Dakota to provide additional facilities needed as a direct result of the construction or operation of the Safeguard ABM System. During FY 1971, the FHWA reviewed and evaluated three applications from Montana counties for assistance in the funding of 67 miles of highway improvements estimated to cost a total of $4,850,00. Five high-priority applications were received from communities in North Dakota to improve local roads and streets at an estimated cost of $1,391,000. At the close of the fiscal year, these applications were awaiting approval and funding by the Department of Defense.

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CHAPTER XI

ORGANIZATIONAL AND ADMINISTRATIVE DEVELOPMENTS

OFFICE OF THE SECRETARY

ORGANIZATIONAL CHANGES. One of the most difficult tasks for the Secretary of Transportation was the continuing effort to improve the administrative arrangements of his Department—to restructure it so that it will perform its tasks most effectively. During the year, the Department was constantly in the process of restructuring itself; experience of operating the Department convinced the Secretary that new arrangements were necessary in part because the administrative units inherited from older organzations when the Department was assembled did not fit together with precision. Some elements had well established administrative functions; some did not. Quality of performance of the functions varied widely within the Department; evaluation and changes were therefore necessary. Many of the changes made followed the recommendations of studies prepared within the Office of the Assistant Secretary for Administration.

Internal Audits. Responsible administration of a highly decentralized organization such as the Department of Transportation requires that the Secretary have appropriate information-gathering and organizational control techniques to be able to assure himself of good performance by the Department, even though he does not directly manage all elements of the organization, he must know that each element is performing its mission. He derives that assurance from the process of internal auditing which checks performance constantly and detects operating deficiencies before they become serious. During the fiscal year, the Secretary consolidated within his own Office the entire process of internal auditing for the Department. The Office of Audit has five field offices geographically located in conformance with the standard Federal cities concept. Amalgamating the internal auditing sections of the several elements did not, of course, deprive the Administrators or other supervisors of the benefits of the evaluations since the audits are still done with the cooperation of the units being audited and interim reports are prepared for the Administrators.

The Transportation Systems Center. The year also witnessed the beginning of the operation of the Transportation Systems Center in Cambridge, Mass. The Center was transferred from NASA to the DOT on July 1, 1970 by President Nixon after it had been declared surplus to NASA's needs. The Department was able to retain the Center Director

and to employ many of the highly skilled NASA workers; thus when the Center began its work for the DOT it included some 425 former NASA workers who had been rehired to work for the DOT. These employees were carefully chosen because the Center would need their knowledge and skills for the research projects that it would undertake for the DOT. By the end of the fiscal year its staff numbered about 575 employees. The Center consists of six buildings providing over 350,000 square feet of work space. Current total capital investment is approximately $41.7 million, consisting of $21.8 million worth of facilities and $19.9 million worth of equipment.

The Center operated in effect as a research contractor for the elements of the DOT. Since the Center was transferred too late in the budget cycle for it to be provided for in the DOT budget, each of the Department's elements assigned to the Center certain of the research projects for which the element would otherwise have to contract with non-Government research organizations, paying for the research from its own funds.

By the end of the fiscal year, progress had been made on numerous projects and the Center was already providing essential information to help the Department serve the public. Important work was being done to upgrade the air-traffic control system, and to improve instrument landing equipment. Projects having to do with vortex effects of aircraft, and with the interaction of wheels and rails in ground transportation were undertaken. A portable device for measuring the amount of alcohol in a driver's system, a crash sensor to trigger a protective device, or apply an automobile's brakes automatically, or avoid airplane collisions—many such projects were under way. Most important services were performed for the Department in managing research contracts outside the Government and also in coordinating the research programs of the several elements of the Department. The Center was also helpful in the preparation of the Department's Report on Research and Development which was forwarded to the House of Representatives Committee on Appropriations at its request.

Within the Department, the Center is controlled by the Secretary/Under Secretary, but its program activities are guided by the Assistant Secretary for Systems Development and Technology.

Transfer of the SST Project. Another organizational rearrangement was the shift of the SST project from the control of the FAA Administrator to the Office of the Secretary. This transfer was undertaken because it seemed likely that the prototype SST would be ready for testing relatively soon.

Since the FAA would have to test the aircraft for certification, it was clearly undesirable for the same organization to be responsible for the construction of the planes. For that reason, the Secretary shifted the location in the Department of the SST Program. Since the program came under intensive Congressional challenge later in the year, the Office of the

Secretary was intimately involved in the effort to obtain a Congressional appropriation for completion of the two prototype planes. On May 19 Congress denied the Department a further appropriation for work on the supersonic transports.

Assistant Secretary for Safety and Consumer Affairs. In a further attempt to bring resources intensively to bear on the problem of safety in transportation, Secretary Volpe, as reported last year, established the Office of the Assistant Secretary for Safety and Consumer Affairs. He thus placed under unitary direction two major units that already existed within the Office of the Secretary—the Office of Pipeline Safety and the Office of Hazardous Materials; in addition he created a new Office of Consumer Affairs and an Office of Safety Program Coordination. To these was added on June 17, the Office of Transportation Security, a unit to deal with the problems of safety and security of passengers and cargo within the total transportation system. This new office has three principal areas of emphasis: Civil Aviation Security, Cargo Security, and Program Development. The Office of Civil Aviation Security was disestablished and its functions were transferred to the new office.

Both the Office of Hazardous Materials and the Office of Pipeline Safety had been given greatly expanded regulatory authority during the latter part of 1970, and during FY 1971, they had adequate power vigorously to pursue their respective missions. The problem of guaranteeing civil aviation security against highjackings was a still newer safety assignment for the Department. To administer the Department's attack on the highjacking problem the Secretary enlisted retired Air Force Lt. General Benjamin O. Davis, Jr. Somewhat later when retired Adm. Williard Smith resigned from the post of Assistant Secretary for Safety and Consumer Affairs, the Secretary selected General Davis as his nominee to be Assistant Secretary.

Pipeline Safety Field Office. Recognizing the fact that a major portion of the country's gas pipeline activities are concentrated in the area of Houston, the Department established a field office for pipeline safety there. Location of the office in that pipeline center should foster more effective administration and coordination of programs of the Office of Pipeline Safety in Texas, Louisiana, Arkansas, Oklahoma, and New Mexico. The region has 444 gas system operators and 22 percent of the Nation's gas pipeline mileage. The region also has 48 percent of the oil and products pipeline mileage in the country. The Department plans to use the field office to establish and evaluate procedures and compliance techniques for other field offices when they are established.

Office of Public Affairs. Another major organizational change in the Department was the consolidation of the public information functions of several elements of the Department under the control of the Director of Public Affairs in the Office of the Secretary. For reasons similar to

those that persuaded Secretary Volpe to unify the internal audits functions of the Department and place them under his immediate control, he also unified control of the public information functions. He could thus be certain that all public affairs officers of the Department would use the same public affairs guidance to the Department's business and that news releases, for example, would not be in conflict with one another.

Office of Congressional Relations. A similar consolidation of Congressional relations officers was also undertaken. At the time of the establishment of the Department, some elements had been sufficiently autonomous so that they retained individual responsibility for dealings with Congress. While it was thought at first that allowing individual units autonomy in Congressional relations would be helpful, experience convinced the Secretary that this function, too, would contribute to his control of his Department if it were centralized in the Office of the Secretary.

Facilities Management. In FY 1971, a facilities management capability was established in the Office of the Secretary under the Assistant Secretary for Administration, through transfer of facilities personnel from the National Safety Bureau to the Office of Installations and Logistics. In addition to duties in Departmental facilities management and planning, the group was given the responsibility of providing technical assistance to those elements of the Department which do not require a full-time facilities organization.

This organizational concept has proven successful in accomplishing facilities-related tasks at the Departmental level, and concurrently can provide technical expertise as required by the operating administrations and other organizational elements of the Department.

Departmental activities and accomplishments include the following:

- Implementation of the President's statement of March 17, 1970, on Combating Construction Inflation and Meeting Future Construction Needs.
- Development of the first integrated Departmental R&D Facilities Plan.
- Development of improved Real Property Inventory and Equipment Maintenance Management Systems.

Technical support provided to other organization elements of DOT included:

- Transfer of real property and equipment from the NASA Electronics Research Center, Cambridge, Mass., to the DOT Transportation Systems Center.
- Technical and management assistance to the Director of the 1972 International Transportation Exposition.
- Development of technical requirements and documentation required for Congressional approval of the NHTSA Compliance Test Facility.

- Engineering support of the UMTA Morgantown, West Virginia Area Rapid Transit System (MARTS), with inputs in design improvement, cost effectiveness and procedural matters resulting in significant cost savings.
- Support of design and construction at the FRA High Speed Ground Test Center, Pueblo, Colo.

FEDERAL-STATE COOPERATION. Convinced that the Department can play an effective and significant part in President Nixon's efforts to take the Government's programs to the people, the Secretary has attempted to improve the quality of Federal-State cooperation stimulated by the very extensive field programs of the Department. He has insisted that the administrations' Regional Directors exercise the powers he has delegated to them to make decisions locally concerning program issues and he has increased pressures to have DOT regional officials rely more and more upon State and local officers. The Department recognizes that such reliance presupposes improved capabilities for planning and coordination on the part of the local officers and it is prepared to sponsor training for State and local employees as they require it.

Elements of the Department continue to relocate their regional headquarters to the ten cities designated by President Nixon for the co-location of field offices of Federal agencies. More than 90 percent of the Department's personnel are stationed at posts away from Washington.

The Department has participated fully as a member of each of the ten Regional Councils; within them it coordinates its field programs with those of the other government agencies. To the extent that he has been permitted to do it, the Secretary has provided for both a Regional Representative in each of the ten designated cities and a small staff to help him act as the "eyes and ears of the Secretary". The Secretary has not been permitted to supply the staff for each of his representatives because of restrictions placed upon his employment of personnel. Because of the autonomous status of the administrations and their field offices, the Secretarial Representative has no "command" functions with respect to them. He is a coordinator and reporter. Permanent Regional Representatives are assigned in Boston, Dallas, Chicago, and Seattle. In each of the other six regional-center cities, a senior officer of one of the elements of the Department serves as Interim Representative of the Secretary for Regional Council business.

Five of the Department's programs lend themselves especially well to the Federal Assistance Review plan: The Airport Development Aid program; the Federal-aid Highway Program; the State and Community Highway Safety Programs; and UMTA's Capital Grants and Technical Studies Programs. The Department has carefully reviewed all of its grants and contract procedures to simplify each to the maximum degree possible to reduce the processing time for applications and to make the programs responsive

to the needs and wishes of citizens. The Department has devised computer programs with which it can supply information about these grants and contracts almost instantaneously.

MANAGEMENT IMPROVEMENT. When the Department of Transportation was created by assembling parts of other Government agencies that dealt in some manner with transportation, it was recognized that the meshing and reconciliation of units and the realignment of functions necessary to establish a Department that operated smoothly would take some time. For that reason, a management improvement program has had a significant role in the Department since its inception. A review of a few of the management changes made last year is sufficient testimony to the effectiveness of the management improvement effort.

Personnel of the Office of the Secretary are involved in planning management techniques in OST, the Administrations and other elements of the Department. By means of audits and other special studies, the Office of the Secretary evaluates the benefits of management techniques anywhere in the whole Department and makes plans and suggestions for raising the quality of the work. For several of the smaller administrations, the Office of the Secretary provides management services directly; thus the Urban Mass Transportation Administration, the Federal Railroad Administration, and the National Transportation Safety Board all receive assistance in this way.

Improvements in personnel management and training are introduced regularly. Labor-management relations have consumed a considerable amount of administrative time this year; particularly important was the follow-up to the air traffic controllers' strike. After extensive planning conducted by FAA and the Office of the Secretary, legislation was proposed to Congress to establish a career pattern for the controllers which, if adopted, will afford them both professional and financial benefits.

Financial management is another of the Department's generalized concerns, and the Office of Management Systems is in the process of developing a computerized financial management system—one of a series of computerized information and management systems the Department is installing to facilitate the work of its senior officials. Another example—the Department was, last year for the first time, able to consolidate and publish its proposed procurement regulations to simplify the efforts of those vendors who wish to do business with the Department. Making further use of its working capital fund, the Department last year placed under its management such facilities as warehousing, chauffer services, some office services, messenger services, and visual services. The working capital fund technique assures the availability of such services to Department elements too small to maintain their own separate services economically, and at the same time allocates the proportionate shares of cost for the services equitably among users.

The Department last year completed the consolidation of its headquarters in two buildings in the Southwest sector of Washington; all elements except the printing plant are now relocated. Related to the consolidation was the successful effort to obtain for the use of Department employees the very extensive parking facilities in the three underground floors of the Nassif Building which supplemented the space already in use below FOB 10A.

Another highly useful result of the consolidation of the Department is the opportunity it offers to co-locate the Department's computer resources; though control of the computers is not unified as yet, studies looking to unified management are under way. In addition, improvements have been made in the consolidation of requirements for computer time-sharing. Large sums will now be saved by reducing the number of contracts which the Department will need for supplemental computer service.

FEDERAL AVIATION ADMINISTRATION

Improving Agency Decisionmaking. The Administrator moved in FY 1971 to improve the effectiveness and timeliness of decisionmaking within FAA. He found the agency's organizational structure—administratively decentralized, with Washington heads of offices and services functioning as staff officers to the Administrator and with regional directors exercising line authority directly from the Administrator and Deputy Administrator for operational decisionmaking on most agency activities in the field—to be sound. The primary thrust for improvement, he felt, was needed in the delegation of authority and its effective use by supervisors at all levels. In short, what was needed was better implementation of "management by exception." (Under this principle, a supervisor delegates as much authority to subordinates as they can competently exercise, intervening personally in their management of delegated responsibilities only when special situations or deviations from norms or planned results arise.)

As a step in the desired direction, the Administrator in May 1971 announced that he intended to delegate to associate administrators collectively the responsibility for managing the agency. This and other steps in an action program announced at the same time were designed to insure:

- That the operation of the office of the Administrator/Deputy Administrator on a "management by exception" basis was facilitated.
- That corresponding delegation of authority downward throughout the agency took place.
- That excessive use of high-level coordinating mechanisms was avoided in favor of greater delegation to individuals having principal responsibility.
- That, in case of controversy between principals, the issues were defined precisely and laid before the appropriate higher-level official or coordinating body.

- That the Agency Review Board, the Executive Committee, and the Executive Personnel Board were used primarily for establishing or changing basic, major policy, or dealing with other matters deserving the attention of this executive level.
- That ambiguity about responsibility was identified and eliminated.
- That necessary staff work and coordination were accomplished by the cognizant officer.
- That efforts of associate administrators and service directors were oriented toward producing a system that would (1) set forth program results expected, (2) provide means for key managers to objectively portray results achieved, and (3) fix accountability for results.

ORGANIZATIONAL CHANGES

Regional Reorganization. On April 2, 1971, FAA realigned its regional field structure in the contiguous 48 States to conform generally with President Nixon's plan for a common pattern of Federal regional boundaries and regional headquarters. For FAA, this involved establishing four new regions—New England, Great Lakes, Rocky Mountains, and Northwest—and realigning the boundaries of four of its five pre-existing regions in the contiguous 48 States.

The nine FAA regions in the contiguous United States, their regional headquarters, and the States each encompasses follow:

- New England (Boston): Maine, New Hampshire, Rhode Island, Massachusetts, Connecticut, and Vermont.
- Eastern (New York City): New York, Pennsylvania, Virginia, Maryland, West Virginia, Delaware, New Jersey, and the District of Columbia.
- Southern (Atlanta): North Carolina, South Carolina, Georgia, Florida, Mississippi, Alabama, Tennessee, and Kentucky. (The last-named State was transferred from the Eastern Region to the Southern Region in January 1971).
- Great Lakes (Chicago): Illinois, Indiana, Minnesota, Michigan, Ohio, and Wisconsin.
- Southwest (Fort Worth): Louisiana, Oklahoma, Texas, New Mexico, and Arkansas.
- Central (Kansas City, Mo.): Iowa, Missouri, Nebraska, and Kansas.
- Rocky Mountain (Denver): Colorado, Wyoming, Utah, Montana, North Dakota, and South Dakota.
- Western (Los Angeles): California, Arizona, and Nevada.
- Northwest (Seattle): Washington, Oregon, and Idaho.

In this reorganization, FAA was authorized several deviations from the President's plan, which called for 10 regions encompassing all 50 States. FAA's plan omits the Philadelphia region of the President's plan, com-

bining the States allocated to that region with those allocated to New York, with a resulting nine regions in the contiguous 48 States. In other deviations, FAA excluded Alaska (which continues as FAA's Alaskan Region) from the region headquartered at Seattle in the President's plan, and Hawaii (which continues as the main part of FAA's Pacific Region) from the region headquartered at San Francisco in the President's plan; the last-mentioned region is headquartered at Los Angeles in FAA's plan. Thus, FAA has 11 regions for the 50 States. (It continues also to have a Europe, Africa, and Middle East Region, for a total of 12 regions in its worldwide field organization.)

On the same date that FAA's nine-region organization superseded the former five-region organization in the contiguous 48 States (April 2), FAA's area offices in those States ceased to exist, the duties and responsibilities of the area managers being transferred to the appropriate regional directors. Area coordinators without line authority are stationed at seven locations formerly having area offices (one of these is at San Francisco, where the area coordinator also provides liaison for FAA's Western Region with the Secretary's Representative); in addition, Cleveland and Minneapolis each have a local coordinator with responsibility limited to the city's metropolitan jurisdiction.

Besides simplyifying and facilitating the process of serving the public in matters cutting across departmental or agency lines—the basic purpose in the President's plan—FAA's field reorganization is expected to improve the agency's internal supervision and control over field operations.

Other Organizational Changes. The following were changes in the FAA Headquarters organizational structure during the reporting period:

- The functions of the Central Flow Control Facility, the Central Altitude Reservation Facility, the Airport Reservation Office, and the Air Traffic Service Contingency Post were consolidated in one new facility, the Air Traffic Control Systems Command Center, on July 29, 1970. (See "Airspace Management" in chapter VIII for details.)
- The responsibility for administering the aviation war risk insurance program was transferred from the General Counsel to the Assistant Administrator for International Aviation Affairs, on February 4, 1971. On March 12, an Aviation Insurance Staff was established in the Office of International Aviation Affairs and entrusted with the day-to-day management of the program.
- The Office of Investigations and Security was renamed the Office of Air Transportation Security, on August 3, 1970. At the same time, an Air Operations Security Division was established within the new office and given responsibility for dealing with hijacking, bomb threats, aircraft and cargo security, and for developing and implementing deterrent systems for the prevention of criminal acts against air transportation.

- The Office of Noise Abatement was renamed the Office of Environmental Quality, on December 22, 1970. The name change reflected FAA's expanding responsibilities in such areas of environmental quality as aircraft noise abatement, sonic boom, smoke emission, and other aircraft pollution. (See chapter IV).
- The Office of Labor Relations, which had been established in March 1970 by the Administrator as an interim organization, was established on a permanent basis by formal written order, on January 8, 1971.
- The Office of the Associate Administrator for Personnel and Training was renamed the Office of the Associate Administrator for Manpower on permanent basis by formal written order, on January 8, 1971.
- A V/STOL Special Projects Office was established under the Associate Adminitrator for Engineering and Development, on April 29, 1971, to stimulate and encourage the private development of V/STOL systems that are safe and convenient for the passenger, economically profitable to operate, and environmentally acceptable to the public, and at the same time to provide a focus within FAA for all the agency's V/STOL development activities. The new office will formulate and maintain a comprehensive agency V/STOL development plan compatible with National Aviation System policies and plans and national transportation goals and objectives. (See "Other Aviation Program Developments" in Chapter VIII.)
- A Defense Readiness Staff was established in the Office of the Associate Administrator for Operations on December 31, 1970; at the same time, the Defense Coordination Staff under the Deputy Administrator was abolished.
- An International Transportation Exposition Office was established, on February 1, 1971.
- A Behavioral Sciences Division was established in the Office of the Federal Air Surgeon, on June 8, 1971; the functions of the Psychology Staff and the Psychiatric Assistant were transferred to the new office.
- The Office of General Aviation was established on May 21, 1971; at the same time, the Office of General Aviation Affairs, which formed the nucleus of the new office, was abolished. Thus restructured, the new office will have a greater voice in FAA management and better represent the largest segment of aviation.
- The Supersonic Transport Staff in the Flight Standards Service was renamed the Special Projects Staff, on June 14, 1971. The staff's mission was broadened to include special projects relating to certification standards for V/STOL and other advanced aircraft, as well as supersonic aircraft.
- The agency hearing officers were transferred from the jurisdiction of the Regulatory Council to the Assistant Administrator for Appraisal, on August 6, 1970.

- The Office of Systems Engineering Management was established in the Office of the Associate Administrator for Engineering and Development, on December 23, 1970; at the same time, the Systems Engineering Management Staff, which formed the nucleus of the new office was abolished.

In addition, at year's end the Bureau of National Capital Airports was in process or reorganization, following the decision to abolish it as a bureau and attache its functions to the Airports Service.

Personnel Administration

Employment. Bolstered by hiring in air traffic control and electronic technician specialties, the FAA work force continued a recent trend by registering another year-to-year increase. On June 30, 1971, the FAA work force stood at 54,550, an increase of 5.96 percent over the June 30, 1970, figure of 51,477. Nearly half (46.6 percent) of the 3,073 net increase in the total work force was accounted for by an increase in the number of air traffic control specialists, whose ranks rose from 23,752 at the end of FY 1970 to 25,186 at the end of FY 1971. ATC specialists continued to comprise the largest single work force component—roughly 46.2 percent of the total work force. Electronic technicians, who make up the next largest component in the work force, also showed a substantial increase, rising 8.34 percent, from 8,292 at the end of FY 1970 to 8,984 at the end of FY 1971.

Air Traffic Controller Career Legislation. On April 29, 1971, the Nixon Administration proposed legislation to Congress providing for the early retirement of air traffic controllers. (Flight service specialists are not covered by the bill's provisions.) This bill grew out of the recommendations made in January 1970 by the Air Traffic Controller Career Committee (popularly known as the Corson Committee).

Among other things, the bill—

- Authorizes the Secretary of Transportation, with the concurrence of an agent to be designated by the President, to fix "the maximum limit of age within which an original appointment to a position as an air traffic controller may be made."
- Establishes a maximum retention age in a position of active control duty (age 56, with exemptions at the Secretary's discretion up to age 61).
- Permits an air traffic controller to voluntarily retire at age 50 with 20 years' service as a controller, or at any age with 25 years' service.
- Provides for up to 2 years' training for a career controller who must be displaced from his controller position (1) in order to protect his health or (2) for reasons of safety or efficiency.
- Authorizes the involuntary retirement in certain circumstances of a controller eligible for retirement.

- Empowers the Secretary of Transportation to "assign, reassign, demote, or release for transfer an air traffic controller who has achieved career tenure" if the Secretary determines the controller is medically disqualified for his duties, is otherwise incapable of performing those duties, or for other specified reasons.

Several employee unions took issue with certain provisions of the proposed legislation; hence, at year's end, the bill was expected to emerge from Congresional committee with some modifications.

OTHER PERSONNEL DEVELOPMENTS. In addition to the foregoing, the following other developments in personnel administration were noteworthy:

- *Professional Air Traffic Controllers Organization (PATCO):* In the aftermath of the 17-day air traffic controller strike of early 1970, the Department of Labor held hearings on PATCO's status as a labor organization. In January 1971, the Assistant Secretary of Labor for Labor-Management Relations, basing his decision on the findings and recommendations of the hearing examiner, found that PATCO had indeed called a strike against the Government in March 1970 and had therefore lost its status as a labor organization under Executive Order 11491. The Assistant Secretary required PATCO to affirm its commitment to Executive Order 1491—namely, to post a notice declaring it would not call for or engage in a strike, work stoppage, or slowdown against the Government—before it could be considered eligible for recognition as a labor organization under the Executive Order. PATCO took this and other steps to comply with the decision. Accordingly, on June 4, 1971, the Department of Labor ruled that PATCO was eligible to seek recognition; on June 7, PATCO filed a petition for exclusive recognition as the national representative for virtually all air traffic controllers.
- *Management Training School:* On April 5, 1971, FAA opened a school at Cameron College, Lawton, Okla., to provide specialized training for agency supervisors and middle managers. All FAA supervisors and middle managers are required to attend an appropriate 3-week course. As a follow-up, they will return to the school each year for a 1-week refresher course. A total of 3,000 supervisors and 600 middle managers are expected to attend the school annually. The school's establishment had been recommended by the Corson Committee in January 1970.
- *National Enroute Air Traffic Training Program:* This program, also established in response to a Corson Committee recommendation, was inaugurated in November 1970. The program uses the FAA Academy for qualification training and FAA facilities for proficiency training. Its objectives include (1) shortening the term of controller training, (2) reducing the high attrition rate among controller trainees, and (3) making more efficient use of existing training resources. From

November 1970 through June 1971, 880 students entered training under the new program at the FAA Academy.

- *ATC Specialists and Stress:* A statistical study of FAA disability retirements between FY 1967 and FY 1969 revealed that out of a total of 610 employees retiring beacuse of disability, 151 retired with psychiatric or anxiety problems. Of these, 90 (or 60%) were ATC specialists. (ATC specialists make up 46.2% of the total FAA workforce.) Moreover, 69% of ATC specialists retiring for psychiatric reasons were under age 49; only 41% of all other FAA employees retiring for similar reasons were under that age.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Significant organizational realignments have been undertaken to strengthen the safety efforts of the National Highway Traffic Safety Administration and to emphasize those activities with the greatest lifesaving potential. Some examples are:

- Some research activities, such as manpower development, had reached a stage of maturity where they could function more effectively as part of the operating unit to which their work applied.
- An Office of Consumer Affairs and Public Information was established in order to bring about close cooperation between the two functions and with counterpart offices throughout the Department.
- The importance of research in vehicle structures and in vehicle operating systems and driver performance was recognized by elevating them to offices.
- The increasing workload in defects investigation and standards enforcement necessitated dividing the functions into separate offices.
- An engineering systems staff was established to analyze the relationships and interactions between existing and proposed motor vehicle standards and insure their compatibility.

Regional Administrators. Steps were taken during the reporting period to carry out the President's policies with respect to Federal Regions. NHTSA regional headquarters were shifted to ten cities specified by the President. The authority of the Administrators was greatly increased; they were given authority to approve the States' Annual Highway Safety Work Plans and to work closely with the highway safety representatives of the Governors in formulating plans and in smoothing the way to carry them out.

To assist the Regional Administrators and the Governors' Representatives, a series of seminars was conducted to explain the annual work plan; they were given by NHTSA staff and attended by the Governors Representatives and other interested State and local officials.

The workshops emphasized the need for nationwide uniformity in development of the annual work plans and the need to maintain open lines of communication betwen Federal, State, and local officials.

FEDERAL HIGHWAY ADMINISTRATION

FHWA Reorganization. Following the organizational separation of the National Highway Safety Bureau, the FHWA Washington Headquarters was officially reorganized, effective August 10, 1970. The reorganization consolidated a number of areas of responsibility, shortening lines of authority, and placing greater emphasis on high priority areas. As a result, the FHWA should be enabled to make better use of its resources and professional capabilities in meeting new program requirements, i.e., those generated by new legislation or resulting from added emphasis in areas such as urban systems, conservation, environment, safety, relocation assistance, civil rights, and research and development.

FEDERAL RAILROAD ADMINISTRATION

On July 1, 1970, the Federal Railroad Administration established Region 8 with headquarters in Kansas City, Mo. This action aligned regional boundaries with the standard region concept in keeping with the President's plans to streamline the structure and processes of Federal agencies in the field.

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TABLE 1.—Worldwide hijacking incidents, 1930–1971.

Fiscal Year (FY) ending June 30

Calendar Year (CY) ending December 31 [1]

1930–1960 [2]	61		62		63		64		65		66		67		68		69		70		71 [1]		Totals	
	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY
Incidents	8	10	12	3	0	1	2	2	2	5	6	5	6	6	12	35	66	87	85	81	71	28	270	263
U.S.-registered acft	1	5	5	1	0	0	1	1	0	4	4	0	0	1	6	22	42	40	26	27	30	14	115	115
Air carrier acft	1	5	4	0	0	0	0	0	0	4	4	0	0	0	4	17	38	40	25	26	29	13	105	105
Successful	1	3	2	0	0	0	0	0	0	1	1	0	0	0	3	13	31	33	19	18	18	7	75	75
Unsuccessful	0	2	2	0	0	0	0	0	0	3	3	0	0	0	1	4	7	7	6	8	11	6	30	30
Gen. aviation acft	0	0	1	1	0	0	1	1	0	0	0	0	0	1	2	5	4	0	1	1	1	1	10	10
Successful	0	0	1	1	0	0	1	1	0	0	0	0	0	1	2	5	4	0	1	1	1	1	10	10
Unsuccessful	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuba diversions	1	4	4	1	0	0	0	1	0	2	2	0	0	1	5	20	41	37	17	16	19	8	90	90
Successful	1	3	3	1	0	0	1	1	0	0	0	0	0	1	5	18	35	31	15	14	15	6	75	75
Unsuccessful	0	1	1	0	0	0	0	0	0	2	2	0	0	0	0	2	6	6	2	2	4	2	15	15
Foreign-registered acft	7	5	7	2	0	1	1	1	2	1	2	5	6	5	6	13	24	47	59	54	41	14	155	148
Air carrier acft	7	4	6	2	0	1	1	1	2	1	2	5	5	4	5	12	24	46	56	51	40	14	148	141
Successful	4	3	3	0	0	1	1	0	0	0	0	2	4	4	5	11	21	36	40	34	23	6	101	97
Unsuccessful	3	1	3	2	0	0	0	1	2	1	2	3	1	0	0	1	3	10	16	17	17	8	47	44
Gen. aviation acft	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	3	3	1	0	7	7
Successful	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	3	3	1	0	6	6
Unsuccessful	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Cuba diversions	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	9	18	34	37	21	0	4	70	70
Successful	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	8	15	26	29	17	3	0	53	53
Unsuccessful	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	8	8	4	6	4	17	17

TABLE 1.—Worldwide hijacking incidents, 1930–1971—Continued.

Fiscal Year (FY) ending June 30

Calendar Year (CY) ending December 31 [1]

1930–1960 [2]	61		62		63		64		65		66		67		68		69		70		71 [1]		Totals	
	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY	FY	CY
Number of foreign countries with acft involved in hijacking incidents	3	4	6	2	0	1	1	1	1	1	2	3	6	4	3	7	10	18	27	29	29	12	—	—

[1] Calendar year figures for 1971 are shown only through June 30.

[2] There were 26 incidents during fiscal years 1930–60, and 33 during calendar years 1930–60; these totals are not included in the totals (200 and 193) shown in the table. All these incidents of 1930–60 involved foreign-registered aircraft except for a Pan American-Grace Airways aircraft successfully hijacked in Peru in 1930. Thus, the incidents involving foreign-registered aircraft during fiscal years 1930–60 numbered 25 (21 successful and 4 unsuccessful), and during calendar years 1930–60 numbered 32 (25 successful and 7 unsuccessful). Aircraft of 11 foreign countries were involved in the incidents of fiscal years 1930–60, and of 13 countries in the incidents of calendar years 1930–60.

TABLE 2.—Aircraft models certificated, fiscal year 1971.

Category	Make	Model	Make	Model
BUSINESS and GENERAL (Except Helicopters)	American Aviation	AA–1A 58A C90 A99, A99A A100	Maule	M–4–180C –180S
			Mitsubishi	MU–2B–35
			Morane-Saulnier	MS 892A–150 MS 893A
	Bellanca	7ACA	Piper	PA–34–200
	Britten-Norman	BN–2A–2 –6 –8	Pitts	S–2 –2A
			Reims Aviation S.A.	Cessan F150L FA150L FR172H F172K F177RG F337F FT337F
	Cessna	R172H 177RG 337F, T337F		
	Champion	8KCAB		
	Evangel-Air	4500–300		
			Swearingen	SA–226T –226AT
BALLOON	Raven	S–60A		
GLIDER	Glasflugel	Kestrel	Schleicher	AS12 –W12 –W15
	Schempp-Hirth	Standard Cirrus		
			Schweizer	SGS 1–26E
HELICOPTER	Bell	212	Sikorsky	S58E –64F
	Messerschmitt-Bolkow-Blohm	BO 105A	S.N.I.A.S.	SA 316B Alouette III SA 330F

TABLE 2.—Aircraft models certificated, fiscal year 1971.—Continued

Category	Make	Model	Make	Model
TRANSPORT	Beechcraft Hawker	BH. 125–400A	Gates Learjet	24D–A
	Boeing	707–346C		25B, 25C
		–347C	Lockheed	382G
		737–200	Nihon	YS–11A–600
		–293		
		–2A8		
		–2E1		
		–205C		
		–287C		
		747–127		
		–129		
		–132		
		–133		
		–135		
		–148		
		–156		
		–206B		
		–230B		
		–237B		
		–246B		
		–251B		
		–257B		
		–258B		
		–283B		

TABLE 3.—Federal Aviation Administration certification statistics.

[*Airman certificates held in 1969 and 1970 (as of December 31)*]

Category	Dec. 31, 1970	Dec. 31, 1969	Percent change
Total pilots	732,729	720,028	1.8
Key categories:			
Student pilots	195,861	203,520	−3.9
Private pilots	303,779	299,491	1.4
Commercial pilots	186,821	176,585	5.8
Airline transport pilots	34,430	31,442	9.5
Total nonpilot airmen	289,681	269,775	7.4
Key categories:			
Mechanics	184,647	170,716	8.2
Control tower operators	21,032	19,851	5.9

(*Certification of aircraft and aircraft components, fiscal years 1970 and 1971*)

	Fiscal year 1971	Fiscal year 1970
New aircraft models certificated	77	101
New aircraft engine models certificated	33	0
New propeller models certificated	5	13
Original airworthiness certificates, export certificates, and related approvals issued	20,600 (approx.)	14,000 (approx.)

TABLE 4.—Accidents, fatalities, rates—U.S. general aviation—1960–1970.

Calendar year	Accidents		Fatalities	Aircraft hours flown (000) [1]	Aircraft miles flown (000) [1]	Accident rates			
						Per 100.000 aircraft hours flown		Per million aircraft miles flown	
	Total	Fatal				Total	Fatal	Total	Fatal
1960	4,793	429	787	13,121	1,768,704	36.5	3.27	2.71	0.243
1961	4,625	426	761	13,602	1,857,946	34.0	3.13	2.49	0.229
1962	4,810	430	857	14,500	1,964,586	33.4	2.97	2.46	0.219
1963	4,690	482	893	15,106	2,048,574	31.0	3.19	2.29	0.235
1964	5,069	526	1,083	15,738	2,180,818	32.2	3.34	2.32	0.241
1965	5,196	538	1,029	16,733	2,562,380	31.1	3.22	2.03	0.210
1966	5,712	573	1,149	21,023	3,336,138	27.2	2.73	1.71	0.172
1967	6,115	603	1,228	22,153	3,439,964	27.6	2.72	1.78	0.175
1968 [3]	[2] 4,968	692	1,399	24,053	3,740,000	20.6	2.86	1.33	0.184
1969	4,767	647	1,495	25,351	[4] 3,773,000	18.8	2.55	1.26	0.171
1970 (Prelim.)	4,927	621	1,270	[4] 25,500	[4] 3,927,000	19.3	2.44	1.25	0.158

[1] Source: FAA.

[2] Commencing January 1, 1968, the definition of "substantial damage" was changed; therefore, fewer accidents were reported. Care should be used in comparing with similar data for prior years.

[3] Three suicide/sabotage accidents are included in all computations except rates.

[4] Estimate.

Source: National Transpirtation Safety Board, Annual Report to Congress, 1970.

TABLE 5.—Accidents, fatalities, fatality rates—U.S. certificated route air carriers: scheduled domestic and international passenger service—1960–1970.

Calendar year	Accidents		Fatalities				Passengers carried [3]	Passenger-miles flown	Passenger fatality rate per 100 million passenger-miles flown
	Total	Fatal	Passg.	Crew	Other	Total			
1960	67	[1] 12	336	42	11	389	57,886,566	40,484,908,000	0.758
1961	58	5	124	11	1	136	58,411,977	41,701,560,000	0.298
1962	43	5	158	25	0	183	62,548,399	45,853,343,000	0.264
1963	49	5	121	24	0	145	71,437,828	52,703,333,000	0.230
1964	53	9	200	26	1	227	81,762,273	61,022,488,000	0.261
1965	63	7	226	27	0	253	94,662,314	71,796,399,000	0.315
1966	53	4	59	13	0	72	109,390,556	83,142,197,000	0.071
1967	51	8	226	24	5	255	132,088,038	103,381,996,000	0.219
1968	53	[1] 13	305	34	6	345	150,162,701	119,612,578,000	0.255
1969	48	7	132	17	3	152	159,221,082	132,168,783,000	0.100
1970 (Prelim.)	41	2	2	0	1	3	[2] 170,500,000	[2] 139,200,000,000	0.001

[1] Includes 2 midair collisions, nonfatal to Air Carrier occupants.

[2] Estimated by CAB.

[3] Beginning in 1970, carriers were required to report *revenue passenger enplanements,* whereas prior to 1970 *revenue passenger originations* were reported.

NOTE: Passenger deaths occurring in sabotage accidents are included in the passenger fatality column, but excluded in the computation of Passenger Fatality Rates; 1960–29; 1962–37; 1964–41.

Source: National Transportation Safety Board, Annual Report to Congress, 1970.

TABLE 6.—Accidents, accident rates, and fatalities—U.S. supplemental air carriers (all operations)—1960–1970.

Calendar year	Number of accidents		Fatalities				Aircraft—miles flown	Accident rate per million aircraft-miles flown	
	Total	Fatal	Passg.	Crew	Others	Total		Total accidents	Fatal accidents
1960	8	[1] 4	93	11	2	106	52,324,000	0.152	0.057
1961	6	3	151	11	0	162	47,983,000	0.125	0.062
1962	7	1	0	3	0	3	53,270,000	0.131	0.019
1963	11	3	1	4	0	5	[2] 50,692,000	0.217	0.059
1964	9	1	2	2	0	4	[2] 50,838,000	0.177	0.020
1965	10	1	0	5	0	5	[2] 62,651,000	0.160	0.016
1966	6	2	78	7	1	86	[2] 84,911,000	0.071	0.024
1967	4	1	0	3	0	3	[2] 96,071,000	0.042	0.010
1968	9	1	1	0	0	1	[2] 113,540,000	0.079	0.009
1969	2	0	0	0	0	0	[2] 115,811,451	0.017	0.000
1970 (Prelim.)	6	3	46	15	0	61	[2 3] 93,900,000	0.064	0.032

[1] Includes 1 midair collision, nonfatal to Air Carrier occupants, excluded in fatal accident rates.

[2] Nonrevenue miles not reported.

[3] Estimate.

Source: National Transportation Safety Board, Annual Report to Congress, 1970.

TABLE 7.—Number of major air navigation facilities in civil-military common system at end of fiscal years 1970 and 1971. [1]

Major Facility	Number							
	June 30, 1971				June 30, 1970			
	FAA	Military	Non-Fed	Total	FAA	Military	Non-Fed	Total
Air route traffic control center (ARTCC) [2]	27			27	27			27
Air route surveillance radar (ARSR)	70	22		90	68	22		90
Remote communications air/ground site (RCAG)	387			387	379			379
VOR/VORTAC (all combinations)	907	29	39	975	888	32	31	951
Airport traffic control tower (ATCT)	295	10	33	338	286	8	27	321
Combined station/tower (CS/T)	46			46	48			48
Airport surveillance radar (ASR)	82	37		119	88	37		125
Military radar approach control facility (RAPCON or RATCC)	29			29	31			31
Instrument landing system (ILS) [3]	316		3	319	298	1	3	302
Approach light system with sequence flashing (ALS/SFL)	286			286	282	7	1	290
Flight service station (FSS)	332			332	335			335
International flight service station (IFSS) [4]	11			11	9			9

[1] Source: FAA Air Traffic Service Fact Book and monthly supplements.

[2] Both fiscal 1970 and 1971 figures include two center/radar approach control facilities (CERAP's).

[3] Figures include partial ILS's.

[4] Figures include three international aeronautical telecommunications switching centers (IATSC's).

TABLE 8.—Federal Aviation Administration statement of financial condition. (In thousands of dollars)

Assets	June 30 1971	June 30 1970
Cash (on hand and in transit):	$ 1,010	
Funds in U.S. Treasury	867,567	$ 741,867
Trust, deposit, and general funds	4,750	26,133
Allocations from other agencies	7,540	3,080
	$ 880,867	$ 771,080
Accounts receivable:		
Federal agencies	$ 12,236	$ 5,311
Other	13,968	6,543
	26,204	11,854
Inventories:		
Operating materiel and facilities equipment	$ 106,445	$ 94,557
Other inventories	17,357	16,598
	123,802	111,155
Fixed assets (net):		
Real property	$ 541,992	$ 517,409
Equipment in-use	731,092	698,284
	$1,273,084	$1,215,693
Work-in-process	284,260	222,542
	1,557,344	1,438,235
Other:		
Investment in supersonic transport	----	$ 601,268
Intangible assets	952	1,017
Deferred charges	----	6
	952	602,291
Total assets	$2,589,169	$2,934,615

Liabilities and equity	June 30 1971	June 30 1970
Liabilities:		
Accounts payable & accrued liabilities	$ 129,293	$ 95,661
Advances from other agencies	8,799	6,432
Funds held for others	6,875	26,141
Annual leave—employees	76,834	67,754
Assets on loan to agency	11,271	8,928
Deferred credits	9	49,985
Lease-purchase contracts	4,716	5,293
Total liabilities	$ 237,797	$ 260,194
Equity:		
Invested capital, 1 July	$2,674,421	$1,925,156
Change in invested capital	−323,049	749,265
Invested capital, 30 June	2,351,372	2,674,421

	FY 1971	FY 1970
Unapportioned	$ 729,335,000	$201,960,000
Unallotted	124,858,000	12,647,000
Unobligated	63,380,000	33,503,000
Unliquidated	771,048,000	522,006,000
	$1,688,621,000	$770,116,000
Total liabilities and equity	$2,589,169	$2,934,615

REMARKS: The above statement includes financial data for the National Capital airports. It excludes the following contingent liabilities: (1) $76,897,000,000 in insurance in force and commitments to insure under the aviation war risk insurance program; (2) $4,000,000 in unadjudicated claims; (3) $639,650,000 in undelivered orders and contract commitments.

The Federal Government's total investment in the civil supersonic aircraft development program of $855,714,000 (including accrued interest of $69,839,000 recorded as a deferred credit pending recovery of the Government's investment through sales of SST aircraft, engines, and parts) was written off during fiscal year 1971. Cash deposits of $22,400,000 for 112 SST delivery positions reserved by domestic and foreign air carriers were returned to depositors.

The "Intangible assets" figure of $952,000 under "Other assets" represents the unamortized research and development costs of building the prototype mobile lounge at Dulles International Airport and the cost of a feasibility study on expanding the terminal building at Washington National Airport.

Inventories at FAA's centralized depot at Oklahoma City have been valued at standard prices; inventories at other locations have been valued at cost.

Unexpended funds as of June 30, 1970, were transferred from general funds to the Airport and Airway Trust Fund, created by the Airport and Airway Revenue Act of 1970; however, fiscal year 1971 operations were funded from both general funds and the Trust Fund. The 1972 appropriations act, approved August 10, 1971, provided funding from the Trust Fund for purposes authorized by the Airport and Airway Development Act of 1970. The appropriation act further provided that unexpended balances in related general funds be transferred to the Trust Fund. Funding for purposes other than those authorized by the Airport and Airway Development Act is derived from general fund appropriations.

TABLE 9.—Federal Aviation Administration statement of financial resources by appropriation.
(In millions of dollars)

	Fiscal year 1971			Fiscal year 1970		
	Carryover of unobligated appropriations	Appropriations and authorizations	Unobligated balance	Carryover of unobligated appropriations	Appropriations and obligations	Unobligated balance
International Aeronautical Exposition	$	$ 2.8	$ 2.4	$	$	$
Safety regulation		1.0				
Research & development		69.0	1.2	.6	41.3	
Operations		[2] 1,026.1	[3] 3.3		[2] 845.4	[3] 1.3
Facilities & equipment	167.0	238.0	156.8	103.6	224.0	167.0
Operation & maintenance National Capital airports		11.1	[3] .1		10.2	
Construction, National Capital airports	6.4	4.0	8.0	5.7	1.9	6.4
Grants-in-aid airports	51.1	[4] 850.0	730.0	21.6	80.0	51.1
Civil supersonic aircraft	23.5	[5] 254.8	14.3	99.0	85.0	23.5
Total	$248.0	$2,456.8	[6] $916.1	$230.5	$1,287.8	[6] $249.3
Percent of available funds unobligated at 30 June			33.9%			16.4%

[1] Total financial resources derived from general appropriations and Airport and Airway Trust Fund.
[2] Excludes appropriation transfers to other agencies ($100,000, fiscal year 1971; $200,000, fiscal year 1970).
[3] Returned to Treasury Department, not available for carryover.
[4] Includes unfunded contract authority of $780,000,000.
[5] Includes $97,300,000 for civil supersonic transport development termination.
[6] Excludes $4,932,000 aviation war risk insurance in fiscal year 1971, $28,000 in fiscal year 1970.

TABLE 10.—Summary of merchant marine safety activities.

Materiel Safety Activities	FY 1969	FY 1970	FY 1971
Vessels certificated	9,360	9,341	9,737
Vessels issued original certificates	764	337	536

Inspected Vessels

Type	FY 1969	FY 1970	FY 1971
Cargo and miscellaneous*	2,170	2,104	2,075
Tank ships*	395	378	378
Tank barges	2,987	3,024	3,129
Passenger (over 100 gross tons)*	160	153	146
Small passenger	3,648	3,682	4,009
Total	9,360	9,341	9,737

*Vessels in these categories over 1,000 gross tons, exclusive of Great Lakes and Public vessels were 1,581 in 1969; 1,391 in 1970; and 1, 218 in 1971.

Marine Personnel Activities	FY 1969	FY 1970	FY 1971
Licenses issued	18,111	18,451	21,399
Merchant mariners' documents issued	25,805	23,026	21,343
Seamen discharged from voyage articles	529,781	527,953	381,293
Personnel investigations completed	36,850	17,527	15,522
Security checks for employment	28,085	23,910	23,781

TABLE 11.—U.S. Coast Guard—Fianancial statement for inclusion in Annual Report for Fiscal Year 1971.

Funds Available, Obligated, and Balances

The following table shows the amount of funds available for the Coast Guard during fiscal year 1971 and the amounts of obligations and unobligated balances.

	Funds[1] *available*	*Net Total Obligations*	*Unobligated Balances*[2]
Appropriated Funds:			
Operating Expenses	$445,814,511	$445,694,359	$ 120,152
Reserve Training	25,900,000	25,010,117	889,883
Retired Pay	65,850,000	65,346,085	503,915
Acquisition, Construction and Improvements	125,822,928	51,900,699	73,922,229
Oil Pollution Fund	20,047,675	287,531	19,760,144
Research, Development, Test and Evaluation	12,919,170	9,327,858	3,591,312
Total Appropriated Funds	$696,354,284	$597,566,649	$ 98,787,635
Reimbursements:			
Operating Expenses	$ 8,571,305	$ 8,347,950	$ 223,355
Acquisition, Construction and Improvements	2,991,691	1,199,527	1,792,164
Research, Development, Test and Evaluation	90,000	88,023	1,698
Total Reimbursements	$ 11,652,996	$ 9,635,779	$ 2,017,217

TABLE 11.—U.S. Coast Guard—Financial Statement for Inclusion in Annual Report for Fiscal Year 1971—Continued.

	Funds [1] *available*	*Net total obligations*	*Unobligated balances* [2]
Trust Fund:			
U.S. Coast Guard Gift Fund	45,898	27,038	18,860
Grand Total	$708,053,178	$607,229,446	$100,823,712

[1] Funds available include unobligated balances brought forward from prior year appropriations as follows:

Acquisitions, Construction and Improvements	
Appropriated Funds	$ 31,822,928
Reimbursements	2,779,556
Research, Development, Test and Evaluation	
Appropriated Funds	3,419,170
Reimbursements	20,000
U.S. Coast Guard Gift Fund	26,311
Operating Expenses-Reimbursements	220,056

[2] Unobligated balance of $223,355 under Operating Expense appropriation represents accounts receivable for costs of repairs or replacement of Coast Guard property damaged by private parties, proper for credit to fiscal year appropriation current at time collections are realized, as authorized in 14USC642.

Unobligated balance of $19,760,144 under Oil Pollution Fund, remains available for obligation in fiscal year 1972.

Unobligated balance of $75,714,393 under Acquisition, Construction and Improvements appropriation remains available for obligation in fiscal year 1972. These funds are programmed for obligation in fiscal year 1972 for the following purposes:

	Coast Guard Projects	*Dept. of Defense Projects*
For projects deferred in Fiscal Year 1971 to be subsequently accomplished	$ 577,000	
For completion of projects started in Fiscal Year 1971 and prior years	73,345,229	$1,792,164
Total	$73,922,229	$1,792,164

Unobligated balance of $3,593,010 under Research, Development, Test and Evaluation appropriation remains available for obligations in fiscal year 1972.

	Total expenditures	*Direct expenditures*	*Reimbursable expenditures*
Expenditures Incurred:			
Operating expenses	$452,884,752	$443,966,895	$ 8,917,857
Reserve training	25,295,096	25,295,096	
Retired pay	65,346,085	65,346,085	
Acquisition, construction and improvements	65,354,536	64,020,659	1,333,877
Research, development, test and evaluation	10,447,534	10,421,211	26,323
Oil Pollution fund	282,384	282,384	
Sub-Total	$619,610,387	$609,332,330	$ 10,278,057
Trust Fund, U.S. Coast Guard Gift Fund	21,502	21,502	
Grand Total	$619,631,889	$609,353,832	$ 10,278,057

TABLE 12.—Railroad accidents and resulting casualties, years ended December 31, 1968, 1969, and 1970.

	1968	1969	1970
Number of train accidents:			
Collisions	1,727	1,810	1,756
Derailments	5,487	5,960	5,602
Other	814	773	737
Total train accidents	8,028	8,543	8,095
Number of train accidents with casualties	435	489	453
Number of Casualties [1]			
Trespassers killed	628	627	593
Trespassers injured	663	674	646
Passengers killed in train accidents	2	5	3
Passengers injured in train accidents	683	291	81
Passengers killed in train-service accidents	9	1	5
Passengers injured in train-service accidents	646	571	408
Employees on duty killed	146	178	155
Employees on duty injured	17,600	16,758	15,743
All other persons killed	1,574	1,488	1,469
All other persons injured	5,016	5,062	4,449
Total number of persons killed	2,359	2,299	2,225
Total number of persons injured	24,608	23,356	21,327
Highway grade crossing accidents [2]	3,835	3,792	3,571
Persons killed	1,547	1,492	1,442
Persons injured	3,807	3,691	3,351

[1] Accidents of all types.
[2] Included in totals above.

TABLE 13.—Enforcement activities—Accident Reports Act.

Activities	FY 1970	FY 1971
Number of regular inspections	235	270
Accident and casualty cases investigated	29,577	33,795
Infractions disclosed by regular inspection	74	62
Number of complaints investigated	15	10
Infractions disclosed by complaints investigated	6	4
Violation cases transmitted for prosecution [1]	15	23

[1] Includes cases pending at close of preceding fiscal year.

TABLE 14.—Serious accidents investigated under the Accident Reports Act (45 U.S.C. 38–43), fiscal years 1967–71.

Fiscal Year	Number of accidents investigated				Persons	
	Collisions	Derailments	Other	Total	Killed	Injured
1967	34	20	----	54	35	534
1968	23	22	----	45	25	428
1969	35	22	----	57	34	874
1970	60	55	2	117	67	621
1971	52	37	1	90	80	335

TABLE 15.—Accidents at highway grade crossings, years ended December 31, 1968, 1969, and 1970.

Accidents and casualties	1968			1969			1970		
	Number of accidents	Number of persons		Number of accidents	Number of persons		Number of accidents	Number of persons	
		Killed	Injured		Killed	Injured		Killed	Injured
Total rail-highway grade crossing accidents and resulting casualties [1]	3,816	1,546	3,774	3,774	1,490	3,669	3,559	1,440	3,336
Accidents at highway grade crossings involving motor vehicles	3,603	1,448	3,665	3,572	1,381	3,578	3,377	1,362	3,237
Derailments of trains at highway grade crossings involving motor vehicles [1]	53	20	49	61	28	49	67	37	48
Miscellaneous other train accidents as a result of collision between trains and motor vehicles [2]	228	101	135	243	107	108	245	120	113
Railroad casualties: [2]									
Passengers		1	26			1			
Employees on duty		4	123		6	121		8	98
Total		5	149		6	122		8	98

[1] Excludes nontrain.
[2] Included in totals.
Source: Highway Grade Bulletin

TABLE 16.—Accidents and casualties caused by failure of some part or appurtenance of steam locomotives, locomotive units other that steam, and multiple-operated electric locomotive units, fiscal years 1966–71.

Accidents and casualties	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971
Number of accidents	65	121	128	78	66	48
Percent increase or decrease from previous year	25.3	*86.0	*5.8	-39.1	-15.4	-27.3
Number of persons killed	0	0	0	0	0	0
Percent increase or decrease from previous year	0	0	0	0	0	0
Number of persons injured	68	140	141	109	72	52
Percent increase or decrease from previous year	26.9	*105.9	*0.7	-22.7	-33.9	-27.8

* Increase

TABLE 17.—Accidents and casualties resulting from failure of steam locomotives, tenders, locomotives other than steam, multiple-operated electric locomotive units, and their appurtenances, fiscal year 1971.

Part or appurtenance which caused accident	Accidents	Killed	Injured
Air compressors [1]	1	0	1
Air reservoirs, fittings, safety and check valves [2]	0	0	0
Air hose coupling, train line [2]	0	0	0
Boiler:			
Explosions [2]	0	0	0
Fuel explosion in firebox [2]	0	0	0
Draft equipment—adjustment [2]	0	0	0
Steam valves, piping and blowers [1]	0	0	0
Brakes and brake rigging [1]	2	0	2
Cabs:			
Doors and windows [1]	9	0	9
Seats [2]	8	0	8
Control equipment—mechanical, electrical, pneumatic, or electro-pneumatic [1]	0	0	0
Couplers, draft and drawgear	2	0	2
Electrical equipment:			
Armature journals and bearings [2]	0	0	0
Energized electrical parts	3	0	3
Insulation, short circuits, or electrical flashes	5	0	6
Pantographs, trolleys or third rail shoes [1]	0	0	0
Fans and shutters [2]	2	0	2
Fires due to liquid fuel or debris	1	0	1
Floors, steps, and passageways [1]	5	0	6
Handholds [1]	0	0	0
Internal combustion engines and turbines:			
Crankcase or air-box explosions [1]	3	0	5
Exhaust and cooling systems	1	0	1
Fuel injectors and connections [1]	1	0	1
Unguarded moving parts [2]	2	0	2
Miscellaneous [1]	3	0	3
Total [1]	48	0	52

[1] Decrease [2] Increase

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TABLE 18.—Reports and inspections—steam locomotives, locomotive units other than steam, and multiple-operated electric locomotive units, fiscal years 1966–71.

	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971
Number of locomotives for which reports were filed	34,048	33,916	33,475	33,158	33,043	33,011
Number inspected	95,840	107,932	103,703	104,281	[1]95,004	82,299
Number found defective	11,447	13,243	13,017	13,117	[1]11,988	10,609
Percent of inspected found defective	11.9	12.3	12.6	12.6	[1]12.6	12.9
Number ordered out of service	666	768	755	700	[1]672	595
Number of defects found	36,556	42,609	44,918	46,439	[2]44,616	[2]41,612

[1] Based on estimated totals for the final quarter of the fiscal year.
[2] Based on estimated totals for the second half of the fiscal year.

TABLE 19.—Number of freight cars, passenger train cars, and locomotives inspected; and the number found with defective safety appliances each year for the past 10 years.

Fiscal Year	Inspected [1]	Defective [2]	Percentage defective
1962	1,562,067	86,121	5.51
1963	1,405,624	83,221	5.92
1964	1,506,729	96,099	6.37
1965	1,495,890	102,707	6.87
1966	1,646,299	111,096	6.74
1967	1,673,738	113,642	6.78
1968	1,307,863	92,579	7.10
1969	1,224,483	94,205	7.69
1970	998,837	88,110	8.82
1971	[3] 876,820	[3] 79,182	[3] 9.0

[1] These figures include locomotives which were inspected for defective safety appliances during the year by inspectors of the Locomotive Branch.
[2] These figures include defective locomotives which are also included in Table 18.
[3] These figures do not include locomotives which were inspected for defective safety appliances during the year by inspectors of the Locomotive Branch.

TABLE 20.—Inspections of safety appliances for fiscal years 1967 thru 1971.

	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971
Freight cars inspected	1,520,162	1,176,166	1,094,149	883,164	862,618
Percent defective	7.2	7.5	8.3	9.6	9.1
Passenger train cars inspected	29,304	16,377	12,738	10,855	5,431
Percent defective	6.9	7.4	7.2	8.1	7.7
Locomotives inspected	[1] 124,272	[1] 115,320	[1] 117,596	[1] 104,818	8,771
Percent defective	[1] 2.1	[1] 2.4	[1] 2.5	[1] 2.5	5.1
Number of defects per 1,000 units inspected	[1] 78.37	[1] 81.01	[1] 89.16	[1] 90.93	96.19

[1] Includes locomotives which were inspected for defective safety appliances during the year by inspectors of the Locomotive Branch.

TABLE 21.—The classes of offices, and the cause of instances in which operators, train dispatchers, or other employees who by the use of the telephone or telegraph handled orders affecting the movement of trains remained on duty longer than the statutory periods, as indicated by the carrier's monthly reports for fiscal years 1967–71.

Classes of Offices	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971
At continuously operated offices	3,616	3,020	4,083	4,978	4,773
At offices operated only during the daytime	31	10	40	29	19
Total	3,647	3,030	4,123	5,007	4,792
Causes					
Train accidents	126	78	89	89	66
Weather conditions, floods, fire, landslides	642	112	358	278	199
Delayed trains, and held to handle train orders	26	6	20	91	45
Misunderstanding of instructions or arrangements	103	132	85	105	125
Station or clerical work	3	11	1	3	13
Sickness, death, or personal injury	1,948	1,764	2,535	2,900	2,396
Relief operator arrived late	112	158	261	450	396
Labor shortage	600	716	710	1,044	1,514
Miscellaneous	87	53	64	47	38
Total	3,647	3,030	4,123	5,007	4,792

TABLE 22.—The cause of excess service involving train and engine employees subject to the 14–16 hour provision of the law, for fiscal years 1967 thru 1971.

Cause	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971
On duty longer than 14–16 consecutive hours					
Collisions and derailments	117	134	139	140	400
Weather conditions, track defects, floods, obstructions	251	108	278	312	571
Congestion of traffic	26	29	40	74	172
Mechanical defects, engines and cars	100	56	41	79	120
Wrecking and relief service	33	25	53	90	56
Miscellaneous	48	83	59	69	134
Others					
On duty longer than 14–16 hours in the aggregate in a 24-hour period	102	115	136	94	41
Returned to duty without required 10 hours off duty	4	2	14	0	13
Returned to duty without required 8 hours off duty	0	1	1	16	29
Total	681	553	761	874	1,536

During the year, 535 counts involving violations of the Hours of Service Law (45 U.S.C. 61–64) forwarded to the Chief Counsel for consideration.

TABLE 23.—Instances of excess service performed by railroad employees covered by the Hours of Service Act for the Fiscal Year 1971.

Name of railroad	Train dispatchers, operators, and levermen	Train and engine service employees		Total
	On duty more than 9 or 13 hours	On duty more than 16 hours	Returned to duty without required time off duty	
Akron, Canton & Youngstown	6	0	0	6
Ann Arbor	4	5	0	9
Atchison, Topeka & Santa Fe	111	92	2	205
Atlanta Joint Terminals	2	0	0	2
Atlanta & West Point Co	2	0	0	2
Baltimore & Ohio	191	20	5	216
Baltimore & Ohio Chicago Terminal	2	0	0	2
Bangor & Aroostook	0	5	0	5
Belfast & Moosehead Lake	0	14	6	20
Belt Railway of Chicago	10	0	0	10
Berlin Mills	0	10	0	10
Bessemer & Lake Erie	0	9	0	9
Boston & Maine	22	5	0	27
Boston Terminal	68	0	0	68
Burlington Northern	148	59	0	207
Camas Prairie	1	0	0	1
Canadian Pacific	1	11	14	26
Cedar Rapids & Iowa City	2	0	0	2
Central of Georgia	0	1	0	1
Central Railroad of New Jersey	151	4	0	155
Central Vermont	1	0	0	1
Chesapeake & Ohio	92	8	0	100
Chicago & Eastern Illinois	46	5	0	51
Chicago & North Western	66	90	0	156
Chicago & Western Indiana	104	0	0	104
Chicago, Milwaukee, St. Paul & Pacific	113	30	1	144
Chicago, Rock Island & Pacific	88	111	3	202
Chicago Union Station	1	0	0	1
Clinchfield	11	61	0	72
Colorado & Southern	2	0	0	2
Conemaugh & Balck Lick	0	0	2	2
Davenport, Rhode Island & North Western	0	5	0	5
Dayton Union	2	0	0	2
Delaware & Hudson	13	6	0	19
Denver & Rio Grande Western	11	18	0	29
Detroit & Toledo Shore Line	4	0	0	4
Detroit, Toledo & Ironton	42	0	0	42
Duluth, Missabe & Iron Range	7	5	0	12
Duluth, Winnipeg & Pacific	2	0	0	2
Elgin, Joliet & Eastern	62	0	0	62
Erie-Lackawanna	47	45	0	92
Georgia Railroad	7	4	0	11
Grand Trunk Western	64	0	0	64
Greenwick & Johnsonville	0	5	0	5
Gulf Mobile & Ohio	58	13	4	75
Houston Belt & Terminal	54	0	0	54
Illinois Central	121	0	0	121
Jacksonville Terminal Co	2	0	0	2
Kansas City Southern	27	5	0	32

TABLE 23.—Instances of excess service performed by railroad employees covered by the Hours of Service Act for the Fiscal Year 1971—Continued.

Name of railroad	Train dispatchers, operators, and levermen	Train and engine service employees		Total
	On duty more than 9–12 or 13 hours	On duty more than 14 16 hours	Returned to duty without required time off duty	
Kansas City Terminal	4	0	0	4
Lehigh Valley	14	8	0	22
Long Island	22	4	0	26
Los Angeles Union Passenger Terminal	4	0	0	4
Louisiana & Arkansas	7	0	0	7
Louisville & Nashville	35	6	0	41
Maine Central	7	9	0	16
Manufacturers Railway	0	2	0	2
Missouri Kansas Texas	16	6	0	22
Missouri Pacific	74	110	0	184
Monon	1	0	0	1
New Orleans Union Passenger Terminal	4	0	0	4
New York & Long Branch	39	0	0	39
Norfolk & Western	344	16	0	360
Norfolk Southern	0	1	0	1
Pacific & Artic Railway & Navigation	1	45	0	46
Patapsco & Back Rivers	0	9	0	9
Pearl River	0	3	0	3
Penn Central Transportation Co	1,586	397	0	1,983
Peoria & Pekin Union	2	0	0	2
Port Authority Trans Hudson	388	0	0	388
Portland Terminal (Maine)	5	1	0	6
Portland Terminal (Oregon)	2	0	0	2
Reading Company	32	8	0	40
Richmond, Fredericksburg & Potomac	101	0	0	101
St. Louis San Francisco	46	17	0	63
St. Louis Southwestern	0	10	0	10
St. Paul Union Depot	1	0	0	1
Seaboard Coast Line	13	37	0	50
Soo Line Railroad	12	1	2	15
Southern Pacific	134	71	1	206
Southern Railway	18	0	1	19
Staten Island Rapid Transit	2	0	0	2
Texas & Pacific	34	26	0	60
Toledo, Peoria & Western	38	1	0	39
Toledo Terminal	20	1	0	21
Union Pacific	9	31	0	40
Union Terminal Company	4	0	0	4
Washington Terminal	4	0	0	4
Western Maryland	0	0	1	1
Western Railway of Alabama	1	0	0	1
White Pass & Yukon Route	0	20	0	20
Youngstown & Northern	0	4	0	4

*The term "instances" as used in the table refers to individual employees. For example, in a case involving two or more members of a train or engine crew, the excess service of each member is classed and counted as a separate instance.

TABLE 24.—Applications; block signal.

Period	Number	Pending at beginning of year	Acted upon	Pending at close of year
Year 1967	172	83	222	33
Year 1968	197	33	162	68
Year 1969	183	68	185	66
Year 1970	164	66	194	36
Year 1971	139	36	138	37
Rules, Standards, and Instructions				
Year 1967	53	11	59	5
Year 1968	43	5	36	12
Year 1969	48	12	47	13
Year 1970	51	13	53	11
Year 1971	31	11	37	5

During the year inspections were made as follows:

	Number of inspections	Signals	Switches	Other appliances	Devices on locomotives	Record of tests
Automatic block signal	758	6,136	5,127	2,061	----------	21,168
Interlockings	1,764	11,440	7,624	9,651	----------	24,328
Traffic control	1,166	9,022	5,546	8,335	----------	30,630
Automatic train stop	378	----------	----------	1,195	2,598	7,715
Automatic train control	199	----------	----------	640	2,518	4,494
Automatic cab signal	308	----------	----------	778	1,452	6,749
Total	4,537	26,598	18,297	22,660	6,568	95,084

TABLE 25.—Status of State Adoption of Federal Motor Carrier Safety and Hazardous Materials Regulations as of June 30, 1971

State	Motor Carrier Safety Regulations Adopted			Hazardous Materials Regulations Adopted			Public Law 89–170
	Toto	Part	None	Toto	Part	None	
Alabama		x			x		x
Alaska			x		x		x
Arizona	x			x			x
Arkansas	x			x			x
California			x	x			x
Colorado	x			x			x
Connecticut	x					x	x
Delaware			x			x	x
Florida		x			x		x
Georgia			x			x	x
Hawaii			x			x	
Idaho	x			x			x (2)
Illinois			x			x	x
Indiana	x			x			x
Iowa		x				x	x (2)
Kansas	x			x			x (2)
Kentucky		x		x			x (2)
Louisiana			x			x	x
Maine		x				x	x
Maryland		x		x			x (2)
Massachusetts			x			x	x
Michigan		x				x	x
Minnesota	x			x			x (2)
Mississippi		x				x	x
Missouri	x			x			x (2)
Montana			x			x	x
Nebraska			x			x	x
Nevada	x			x			x
New Hampshire			x			x	x
New Jersey		x				x	x (2)
New Mexico	x			x			x (2)
New York	x			x			x
North Carolina	x			x			x
North Dakota		x				x	x (2)
Ohio			x	x			x
Oklahoma			x			x	x
Oregon			x		x		x
Pennsylvania	x			x			x (3)
Rhode Island			x	x			x (2)
South Carolina		x				x	x
South Dakota		x				x	x (2)
Tennessee		x		x			x
Texas			x	x			x (2)
Utah	x				x		x
Vermont			x			x	x (2)
Virginia			x			x	x
Washington	x			x			x
West Virginia		x		x			x (2)
Wisconsin			x	x			x (2)
Wyoming	x			x			x
District of Columbia			x		x		
Puerto Rico			x			x	
	17	14	21	27	6	22	49 (67)

TABLE 26.—Summary of Relocation Assistance and Payments Statistics
For Period From 1-1-70 to 12-31-70

Number	Total	White (Estimates)	% total	Non-white (Estimates)	% total	Owners	% total	Tenants	% total	Below $6,000 value or $60 rental	% total	$6,001 to $15,000 value or $61 to $110 rental	% total	Over $15,000 value or $110 rental	% total
a. Dwelling units	19,844	16,676	84	3,168	16	9,634	49	10,210	51	5,931	30	8,380	42	5,533	28
b. Furn'ed req'ed assist. (units)	10,485	8,526	81	1,959	19	4,661	44	5,824	56	3,207	31	4,581	44	2,697	25
c. Total no. of people	57,686	47,224	82	10,462	18	28,117	49	29,569	51	16,592	29	24,097	42	16,997	29
d. Farms	332	327	98	5	2	261	79	71	21						
e. Businesses	3,034	2,887	95	147	5	1,757	58	1,277	42						
f. Non-profit organization	124	104	84	20	16	101	81	23	19						

TABLE 26.—Summary of Relocation Assistance and Payments Statistics
For Period From 1-1-70 to 12-31-70—Continued

	Dwelling						Farms			Businesses			Non-Profit Organ.		
	No. of units	No. of people	Amount	Avg. amt. unit	Avg. amt. peo.	Avg. peo. unit	No. of units	Amount	Avg. amt. unit	No. of units	Amount	Avg. amt. unit	No. of units	Amount	Avg. amt. unit
g. Moving payments	19,152	54,989	4,835,247	252	87	2.8	337	205,050	608	3,080	8,498,041	2,759	124	103,272	832
h. Rep'mnt housing owner occupied	6,821	19,536	16,221,327	2,378	830	2.8									
i. Rep'mnt housing rental	10,028	26,522	9,419,643	939	355	2.6									
j. Incidental payments	7,728		671,318	86			582	28,902	49	644	217,068	337	43	5,387	125
Total payments			31,147,535					233,952			8,715,109			108,659	
Grand Total—All Payments $40,205,255															

NOTES TO THE FINANCIAL STATEMENTS

1. Title 23, United States Code, Sections 125/320 allows payment for disaster assistance and construction of roadways over Federal Dams prior to appropriation. The unappropriated expenditures for Emergency Relief and Roadways over Dams are $116,634,172.

2. The fixed assets are stated at cost. Depreciation is taken on Equipment Depot fixed assets. Office furniture and equipment are utilized for administrative operations and are replaced as needed. Office furniture and equipment are not depreciated.

3. The Congress grants contracting authority to the Federal Highway Administration in advance of appropriations in order to permit it and the States to plan highway construction and highway related safety programs. This authority is apportioned to the States and FHWA records the obligations as the States are permitted to proceed. Funds are appropriated by the Congress annually to cover estimated needs for liquidating the obligations maturing within the current fiscal year.

4. The available balance of contracting authority shown in the Statements of Operations includes both obligated and unobligated balances of contracting authority plus unliquidated obligations for administration and research.

5. Funds returned to Treasury are derived from liquidations of obligations in a lesser amount than originally obligated.

TABLE 27.—Federal Highway Administration—summary statement of operations July 1970 through June 1971.

APPROPRIATIONS

For Contracting Authority		*For Working Capital*	
New	$ 5,832,081,000	New	$ 4,719,185,000
From last year	12,129,785,692	From last year	156,171,063
Reimbursable earnings	29,038,557	Reimbursable collections	28,297,036
Available	$ 17,990,905,249	Available	$ 4,903,653,099

OPERATING EXPENSES

	Payments	*Change in Accruals*
	$ 4,719,860,483	$ −27,923,224
Decrease in accruals	−27,923,224	
	$4,691,937,259	

DEDUCT		DEDUCT	
Accrued expenses	$ 4,691,937,259	Payments	$ 4,719,860,483
Lapsing of authority	2,532,064	Increase in advances	36,428,087
Advances	98,484	Restoration of funds	+7,535
Obligational transfer	15,132	Net change in receivables	115,491
		Transfer of assets from lapsed accounts	+77,210
		Disbursements in transit	+597
		Unobligated funds returned to Treasury	1,785,195
		Obligational transfer	15,132
Used	$ 4,694,582,939	Used	$ 4,758,119,046

AVAILABLE BALANCES AT JUNE 30, 1970

Contracting authority [1]	$13,296,322,310	In Treasury	$ 145,534,053

TABLE 28.—Federal Highway Administration—summary balance sheet at June 30, 1971.

ASSETS		
Current Assets:		
Funds in U.S. Treasury	$ 3,731,890,339	
Less: Unappropriated Receipts	−3,586,356,287	
Available fund balance with treasury		$ 145,534,052
Accounts receivable:		
Repayments receivable to fund	$ 7,286,544	
Emergency relief	116,634,172	
Advanced to travelers	428,365	
Other advances	36,853,128	
Materials and supplies	122,993	
		161,325,202
Fixed assets: [2]		
Office furniture and equipment	$ 5,282,587	
Machinery and equipment	2,303,486	
Land	1,303,975	
Buildings and structures	17,597,454	
		26,469,502
Contracting authority [3]		13,621,276,549
Total Assets		$13,954,605,305
LIABILITIES AND U.S. GOVERNMENT INVESTMENT		
Current liabilities:		
Disbursements in transit		$ 5,319
Accounts payable and accrued liabilities for States completed work		608,293,111
Accrued liabilities—other		23,392,070
		$ 631,690,500
Accrued annual leave of employees		7,172,888
U.S. Government investments:		
Unobligated contracting authority—		
Federal-Aid	$ 5,782,547,689	
Emergency relief and others	503,062,938	
		6,285,610,627
Undelivered orders and contracts—		
Federal-Aid	$ 6,788,956,490	
Emergency relief and others	221,755,193	
		7,010,711,683
Invested capital	$ 19,501,344	
Retained earnings	−81,737	
		19,419,607
Total liabilities and U.S. Government investment		$13,954,605,305

TABLE 29.—Federal Highway Administration, Office of the Administrator—Salaries and Expenses statement of operations July 1970 through June 1971.

APPROPRIATIONS

For obligational authority		*For working capital*	
Appropriation	$ 543,500	New	$ 543,500
From last year	420,031	Reimbursable collections	15,787,731
Reimbursable authority	15,832,500		
Available	$ 16,796,031	Available	$ 16,331,231

OPERATING EXPENSES

	Payments	*Change in Accruals*
Salaries and Expenses	$ 16,296,957	0

DEDUCT		DEDUCT	
Accrued expenses	$ 15,296,957	Payments	$ 16,296,957
Lapsed reimbursable authority	183,092	Disbursements in transit	+597
		Increase from prior year liquidation of obligations	+7,435
		Increase in advances	+3,410
		Net decrease in receivables	−115,491
		Net transfer of assets from lapsed accounts	+77,210
Used	$ 16,480,049	Used	$ 16,323,796

AVAILABLE BALANCES AT JUNE 30, 1970

Obligational authority	$ 315,982	In Treasury	$ 7,435

TABLE 30.—Federal Highway Administration, Office of the Administrator—Salaries and Expenses—balance sheet June 30, 1971.

ASSETS			
Current assets:			
Funds in U.S. Treasury		$ 7,435	
Accounts Receivable—			
Advances to travelers	$ 49,531		
Other advances	265		
Accounts receivable	2,844,887		
		2,894,683	
			$ 2,092,118
Fixed assets: [2]			
Office furniture and equipment			56,862
Total assets			$ 2,958,980
LIABILITIES AND U.S. GOVERNMENT INVESTMENT			
Current liabilities:			
Disbursements in transit		$ 397	
Accounts payable and other accrued liabilities		2,585,739	
			$ 2,586,136
Accrued annual leave of employees			1,504,529
U.S. Government investment:			
Undelivered orders and contracts			315,982
Invested capital			−1,447,667
Total liabilities and U.S. Government investment			$ 2,958,980

TABLE 31.—Federal Highway Administration, Office of the Administrator, salaries and expenses—U.S. Government investment July 1970 through June 1971.

U.S. Government investment at July 1, 1970		$ −1,063,787
Increases:		
Obligating authority	$ 16,376,000	
Increase in fixed assets	8,446	
Leave reserve earned not used	27,704	
Total increases		16,412,150
Decreases:		
Salaries and expenses	$ 16,296,957	
Lapsed reimbursable authority	183,092	
Total decreases		16,480,049
U.S. Government investment at June 30, 1971		$ −1,131,686

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital	$ −1,447,667
Obligated:	
Undelivered orders and contracts	315,982
U.S. Government investment at June 30, 1971	$ −1,131,686

TABLE 32.—Federal Highway Administration, Office of the Administrator, salaries and expenses—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriation	$ 543,500	
Reimbursable collections	15,787,731	
Total funds provided		$ 16,331,231
Funds applied to:		
Salaries and expenses	$ 16,296,957	
Reduction in reimbursable income	138,323	
Total funds applied		$ 16,435,280
Decrease in working capital		$ 104,049

TABLE 33.—Federal Highway Administration, Office of The Administrator, salaries and expenses—change in working capital.
(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds with U.S. Treasury	$ 7,435	0	$ 7,435	
Advances to travelers	49,531	46,121	3,410	
Other receivables	2,845,152	3,579,672		$ 734,520
			$ 10,845	$ 734,520
Current liabilities:				
Disbursements in transit	$ 398	$ 994	$ 597	
Accounts payable and accrued liabilities	2,585,739	3,204,768	619,029	
			$ 619,626	0
Sub-totals			$ 630,471	$ 734,520
Decrease in working capital			104,049	
Totals			$ 734,520	$ 734,520

TABLE 34.—Federal Highway Administration, summary statement of operations July 1979 through June 1971.

APPROPRIATIONS

For Contracting Authority		*For Working Capital*	
New	$ 5,703,761,000	New	$ 4,661,365,000
From last year	11,920,193,030	From last year	89,322,587
Reimbursable earnings	9,624,634	Reimbursable collections	8,865,811
Available	$17,633,578,664	Available	$ 4,759,553,398

OPERATING EXPENSES

	Payments	*Changes in Accruals*
Federal-aid		
Primary	$ 511,376,624	$ −2,131,775
Secondary	318,495,507	−3,425,907
Urban	273,989,846	−8,874,534
Highway planning research	86,076,175	+512,915
Interstate	3,329,574,260	−21,195,005
Administration	77,016,082	+4,407,594
Purchase of fixed assets	488,207	0
	$ 4,597,016,701	$ −30,706,712
Emergency relief	51,412,809	+1,481,686
Roadways over dams	0	0
Pentagon road network	17	−17
Reimbursable	9,452,394	+172,239
Totals	$ 4,657,881,921	$ −29,052,804
Decrease in accruals	−29,052,804	
	$4,628,829,117	

DEDUCT		DEDUCT	
Accrued expenses	$ 4,628,829,117	Payments	$ 4,657,881,921
Lapsing authority		Increase—advances	36,332,215
Emergency relief	563,878		
Used	$ 4,629,392,995	Used	$ 4,694,214,136

AVAILABLE BALANCES AT JUNE 30, 1970

Contracting authority [1]	$13,004,185,669	In Treasury	$ 65,339,262

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TABLE 35.—Federal Highway Administration, summary balance sheet at June 30, 1971.

ASSETS

Current assets:			
Funds in U.S. Treasury	$ 3,651,695,549		
Less unappropriated receipts	−3,586,356,287		
Available fund balance with Treasury		$	65,339,262
Accounts Receivable			
Repayments receivable to fund	4,304,658		
Emergency relief [1]	116,634,172		
Advanced to travelers	354,609		
Other advances	36,524,931		
			157,818,370
Fixed assets: [2]			
Office furniture and equipment	2,219,672		
Machinery and equipment	2,828,733		
Land	485,014		
Buildings and structures	2,736,908		
			8,270,327
Contracting authority unfunded [3]			13,398,526,549
Total assets			$13,629,954,508

LIABILITIES AND U.S. GOVERNMENT INVESTMENT

Current liabilities:			
Disbursements in transit		$	4,828
Accounts payable and accrued liabilities for States completed work			608,293,111
Accrued liabilities—other			9,200,573
			617,498,512
Accrued annual leave of employees			5,304,606
U.S. Government investment			
Unobligated contracting authority			
Federal-aid	$ 5,782,547,689		
Emergency relief and others	307,456,395		
	$ 6,090,004,084		
Undelivered orders and contracts—			
Federal-aid	$ 6,788,956,490		
Emergency relief and others	125,225,095		
	6,914,181,585		
Invested capital	2,965,721		
			$13,007,151,390
Total liabilities and U.S. Government investment			$13,629,954,508

TABLE 36.—Federal Highway Administration, highway trust fund—statement of operations July 1970 through June 1971.

Funds provided by:		
Appropriation	$4,661,365,000	
Reimbursable collections	8,865,811	
		$4,670,230,811
Funds applied to:		
Federal-aid	$4,484,398,106	
Administration and research	81,911,883	
Bridges over dams	0	
Emergency relief	52,894,495	
Reimbursable work	9,624,633	
Total funds applied		4,628,829,117
Increase in working capital		$ 41,401,694

TABLE 37.—Federal Highway Administration, highway trust fund—balance sheet at June 30, 1971.

U.S. Government investment at July 1, 1970		$11,923,604,863
Increases:		
Contracting authority	$ 5,703,761,000	
Reimbursable earnings	9,624,634	
		5,713,385,634
Total increases		$17,636,990,497
Decreases:		
Expenses	$ 4,628,829,117	
Property dispositions, net	202,902	
Lapsing contract authority	563,878	
Leave earned but not used	243,209	
Total decreases		4,629,839,106
U.S. Government investment at June 30, 1971		$13,007,151,391

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital		$ 2,965,721
Obligated:		
Federal-aid	$ 6,788,956,491	
Emergency relief	44,176,128	
Roadways over dams	0	
Pentagon roadway network	48,966	
Right-of-way revolving fund	81,000,000	
		6,914,181,585
Unobligated:		
Federal-aid	$ 2,989,752	
Emergency relief	17,452,066	
Roadways over dams	908,089	
Pentagon roadway network	206,408	
Right-of-way revolving fund	0	
		21,556,315
Reserved—not available		6,068,447,770
U.S. Government investment at June 30, 1971		$13,007,151,391

TABLE 38.—Federal Highway Administration, highway trust fund—change in working capital.
(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds with U.S. Treasury	$ 65,339,262	$ 89,322,587		$ 23,983,325
Accounts receivable—				
Repayments to fund	4,304,658	3,530,626	$ 774,032	
Advances to travelers	354,609	321,326	33,283	
Other advances	36,524,931	3,911,824	32,613,107	
			$ 33,420,422	$ 23,983,325
Current liabilities:				
Disbursement in transit	$ 4,828	$ 70,241	$ 65,413	
Accounts payable and accrued liability for States completed work	608,293,111	640,632,075	32,338,964	
Other accrued liabilities	9,200,573	8,760,793		439,780
			$ 32,404,377	$ 439,780
Sub-totals			65,824,799	24,423,105
Increase in working capital				41,401,694
Totals			$ 65,824,799	$ 65,824,799

TABLE 39.—Federal Highway Administration, miscellaneous funds—summary statement of operations July 1970 through June 1971.

APPROPRIATIONS

For contracting authority		*For working capital*	
New	$ 19,500,000	New	$ 5,000,000
From last year	22,534,685	From last year	23,117,668
Reimbursable earnings	359,614	Reimbursable collections	368,676
Available	$ 42,394,299	Available	$ 28,486,344

OPERATING EXPENSES

	Payments	*Change in Accruals*
Inter-American highway	$ 2,356,763	$ −751,838
Consolidated working funds	683	
Advances from state cooperating agencies	41,625	−1,923
Chamizal Memorial Highway	541,420	+233,200
Alaskan assistance	3,019,534	+260,211
Totals	$ 5,960,025	$ −260,350
Decrease in accruals	−260,350	
	$ 5,699,675	

DEDUCT		DEDUCT	
Accrued expenses	$ 5,699,675	Payments	$ 5,960,025
Lapsing authority	264,940	Unobligated funds returned to Treasury	264,940
Obligation transfer Chamizal	15,132	Transfer—Chamizal	15,132
Advances from State cooperating agencies	98,484	Advances from State cooperating agencies	98,484
Used	$ 6,078,231	Used	$ 6,338,581

AVAILABLE BALANCES AT JUNE 30, 1970

Contracting authority [4]	$ 36,316,068	In Treasury	$ 22,147,763

TABLE 40.—Federal Highway Administration, miscellaneous funds—balance sheet at June 30, 1971.

ASSETS		
Current assets:		
Funds in U.S. Treasury		$ 22,147,763
Accounts receivable		
Advances to travelers	$ 75	
Other advances	249,062	
		249,137
Fixed assets: [2]		
Office furniture and equipment	$ 41,217	
Equipment—depreciable	11,737	
Less—allowance for depreciation	−10,492	
Land	818,961	
Building and structures	14,842,546	
		15,703,969
Contracting authority [3]		14,500,000
Total assets		$ 52,600,869
LIABILITIES AND U.S. GOVERNMENT INVESTMENT		
Current liabilities:		
Accounts payable and other liabilities	$ 29,417	
Accrued liabilities for uncompleted work	551,415	
		$ 580,832
Accured annual leave of employees		41,617
U.S. Government investment:		
Unobligated contract authority	$ 18,848,538	
Undelivered orders and contracts	17,467,530	
		36,316,068
Invested capital		15,662,352
Total liabilities and U.S. Government investment		$ 52,600,869

TABLE 41.—Federal Highway Administration, miscellaneous funds—U.S. Government investment July 1970 through June 1971.

U.S. Government investment at July 1, 1970		$ 38,195,841
Increases:		
Contracting authority	$ 19,500,000	
Reimbursements—Alaskan assistance	358,627	
Reimbursements—Inter-American highway	987	
Leave reserve earned not used	1,565	
Total increases		19,861,179
Decreases:		
Transfer of obligation—Chamizal	$ 15,132	
Fixed assets	368	
Expenses	5,699,675	
Unobligated funds returned to Treasury	264,940	
Advances from State cooperating agencies	98,484	
Total decreases		6,078,599
U.S. Government investment at June 30, 1971		$ 51,978,421

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital		$ 15,662,353
Obligated:		
Undelivered orders and contracts		
Inter-American highway	$ 5,513,920	
Consolidated working funds	6,557	
Advances from State cooperating agencies	5,000	
Darien Gap Highway	4,700,000	
Chamizal Memorial Highway	6,193,485	
Alaskan assistance	1,048,568	
		17,467,530
Unobligated contracting authority:		
Inter-American highway	$ 2,448,961	
Highway related safety grants	10,000,000	
Territorial highway program	4,500,000	
Advances from State cooperating agencies	113,176	
Darien Gap Highway	300,000	
Chamizal Memorial Highway	861,122	
Alaskan assistance	625,279	
		18,848,538
U.S. Government investment at June 30, 1971		$ 51,978,421

TABLE 42.—Federal Highway Administration, miscellaneous funds—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriation	$ 5,000,000	
Reimbursable earnings	359,614	
Total funds provided		$ 5,359,614
Funds applied to:		
Inter-American highway	$ 1,604,924	
Consolidated working funds	683	
Advances from State cooperating agencies	39,703	
Chamizal Memorial Highway	774,620	
Alaskan assistance	3,279,745	
Funds returned to Treasury—		
Access roads	112,317	
Woodrow Wilson Memorial Bridge	152,623	
Funds returned to State cooperating agencies	98,484	
Transfer obligation—Chamizal	15,132	
Total funds applied		$ 6,078,231
Decrease in working capital		$ 718,617

TABLE 43.—Federal Highway Administration, miscellaneous funds—change in working capital.
(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds with U.S. Treasury	$ 22,147,763	$ 23,117,668		$ 969,905
Accounts receivable	249,062	381,692		132,630
Advances to travelers	75	325		250
			$	$ 1,102,785
Current liabilities:				
Accounts payable	$ 29,417	$ 13,178		$ 16,239
Accrued liabilities	551,415	837,407	$ 285,992	
Disbursements not cleared by Treasury		114,415	114,415	
			$ 400,407	$ 16,239
Sub-totals			$ 400,407	$ 1,119,024
Decrease in working capital			718,617	
Totals			$ 1,119,024	$ 1,119,024

TABLE 44.—Federal Highway Administration, forest highways program—statement of operations July 1970 through June 1971.

APPROPRIATIONS

For contracting authority		*For working capital*	
New	$ 33,000,000	New	$ 17,500,000
From last year	84,138,987	From last year	1,208,276
Reimbursable earnings	3,221,809	Reimbursable collections	3,274,818
Available	$ 120,360,796	Available	$ 21,983,094

OPERATING EXPENSES

	Payments	*Change in Accruals*
Forest highway program	$ 18,255,785	$ +1,261,758
Reimbursables	3,221,809	
	$ 21,477,594	$ +1,261,758
Increase in accruals	+1,261,758	
	$ 22,739,352	

DEDUCT		DEDUCT	
Accrued expense	$ 22,739,352	Payments	$ 21,477,594
		Travel advance	798
Used	$ 22,739,352	Used	$ 21,478,392

AVAILABLE BALANCES AT JUNE 30, 1971

Contracting authority [4]	$ 97,621,444	In Treasury	$ 504,702

TABLE 45.—Federal Highway Administration, forest highways program—balance sheet at June 30, 1971.

ASSETS			
Current assets:			
Funds in U.S. Treasury		$ 504,701	
Accounts receivable—			
Advances to travelers	$ 1,500		
Other receivables	78,749		
		80,249	
Repayments to fund		136,999	
Materials and supplies		122,993	
			$ 844,942
Fixed assets:			
Equipment depreciable		$ 6,350,833	
Less allowance for depreciation		−4,055,595	
Equipment and work-in-process		7,003	
			2,302,241
Contracting authority [3]			101,450,000
Total assets			$ 104,597,183
LIABILITIES AND U.S. GOVERNMENT INVESTMENT			
Current liabilities:			
Accounts payable		$ 692,543	
Accrued liabilities for uncompleted work		3,857,962	
			$ 4,550,505
Accrued annual leave of employees			1,115
U.S. Government investment:			
Unobligated contracting authority		$ 71,318,358	
Undelivered orders and contracts		26,303,086	
			97,621,444
Invested capital		$ 2,505,856	
Retained earnings		−81,737	
			2,424,119
Total liabilities and U.S. Government investment			$ 104,597,183

TABLE 46.—Federal Highway Administration, forest highways Program—U.S. Government investment July 1970 through June 1971.

U.S. Government investment at July 1, 1970		$ 86,726,692
Increases:		
Contracting authority	$ 33,000,000	
Materials and supplies	31,004	
Leave reserve earned not used	48,032	
Reimbursable earnings	3,221,809	
Total increases		36,300,845
Decreases:		
Expenses	2,739,352	
In fixed assets	242,622	
Total decreases		22,981,974
U.S. Government investment at June 30, 1971		$ 100,045,563

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital	$ 2,424,119
Obligated:	
Undelivered orders and contracts	26,303,086
Unobligated contracting authority	71,318,358
U.S. Government investment at June 30, 1971	$ 100,045,563

TABLE 47.—Federal Highway Administration, forest highways program—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriation	$ 17,500,000	
Reimbursable earnings	3,221,809	
Total funds provided		$ 20,721,809
Funds applied to:		
Forest highway program	19,517,543	
Reimbursable programs	3,221,809	
Total funds applied		22,739,352
Decrease in working capital		$ 2,017,543

TABLE 48.—Federal Highway Administration, forest highways program—change in working capital.
(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds in U.S. Treasury	$ 504,701	$ 1,208,275		$ 703,574
Accounts receivable—				
Advances to travelers	1,500	702	$ 798	
Other	78,749	0	78,749	
Repayment to fund	136,999	268,757		131,758
			$ 79,547	$ 835,332
Current liabilities:				
Accounts payable and accrued liabilities	$ 4,550,505	$ 3,288,747		$ 1,261,758
			0	$ 1,261,758
Sub-totals			$ 79,547	$ 2,097,090
Decrease in working capital			2,017,543	
Totals			$ 2,097,090	$ 2,097,090

TABLE 49.—Federal Highway Administration, public lands program—statement of operations July 1970 through June 1971.

APPROPRIATIONS

For Contracting Authority		*For Working Capital*	
New	$ 16,000,000	New	$ 14,000,000
From last year	48,037,667	From last year	2,358,156
Available	$ 64,037,667	Available	$ 16,358,156

OPERATING EXPENSES

	Payments	*Change in Accruals*
Administration	$ 196,886	
Construction	4,916,229	$ +56,104
Total	$ 5,113,115	$ 56,104
Increase in accruals	$ +56,104	
	$ 5,169,219	

DEDUCT		DEDUCT	
Accrued expenses	$ 5,169,219	Payments	$ 5,113,115
Used	$ 5,169,219	Used	$ 5,113,115

AVAILABLE BALANCES AT JUNE 30, 1970

Contracting authority [1]	$ 58,868,448	In Treasury	$ 11,245,042

TABLE 50.—Federal Highway Administration, public lands program—balance sheet at June 30, 1971.

ASSETS

Current assets:		
Funds in U.S. Treasury		$ 11,245,042
Contracting authority		48,300,000
Total assets		$ 59,545,042

LIABILITIES AND U.S. GOVERNMENT INVESTMENTS

Current liabilities:			
Accrued liabilities for uncompleted work			$ 676,594
Accrued annual leave of employees			−287
U.S. Government investments:			
Unobligated contracting authority	$ 42,700,494		
Undelivered orders and contracts	16,167,954		
			58,868,448
Invested capital			287
Total liabilities and U.S. Government investments			$ 59,545,042

TABLE 51.—Federal Highway Administration, public lands program—U.S. Government investment July 1970 through June 1971.

U.S. Government investment at July 1, 1970		$ 48,019,129
Increases:		
Contracting authority	$ 16,000,000	
Leave reserve earned not used	18,825	
Total increases		16,018,825
Decreases:		
Expenses		5,169,219
U.S. Government investment at June 30, 1971		$ 58,868,735

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital	$ 287
Obligated:	
Undelivered orders and contracts	16,167,954
Unobligated contracting authority	42,700,494
U.S. Government investment at June 30, 1971	$ 58,868,735

TABLE 52.—Federal Highway Administration, public lands program—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriation		$ 14,000,000
Total funds provided		$ 14,000,000
Funds applied to:		
Administration	$ 196,885	
Construction	4,972,334	
Total funds applied		$ 5,169,219
Increase in working capital		$ 8,830,781

TABLE 53.—Federal Highway Administration, public lands program—change in working capital.
(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds with U.S. Treasury	$ 11,245,042	$ 2,358,157	$ 8,886,885	
Advances to travelers	0	105		$ 150
			$ 8,886,885	$ 150
Current liabilities:				
Accounts payable and accrued liability for States completed work	$ 650,237	$ 600,038		$ 50,199
Other accrued liabilities	26,356	20,601		5,755
			0	$ 55,954
Sub-totals			$ 8,886,885	$ 56,104
Increase in working capital				8,830,781
Totals			$ 8,886,885	$ 8,886,885

TABLE 54.—Federal Highway Administration, highway beautification program—statement of operations July 1970 through June 1971.

APPROPRIATIONS

For Contracting Authority		*For Working Capital*	
New	$ 55,526,000	New	$ 17,026,000
From last year	54,435,965	From last year	39,950,404
Available	$ 109,961,965	Available	$ 56,976,404

OPERATING EXPENSES

	Payments	*Change in Accruals*
Administration	$ 565,542	$ −37,481
Outdoor advertising	806,231	+411,699
Junkyards	530,562	−152,570
Landscaping and scenic enhancement	8,019,642	−181,226
	9,921,977	$ +40,422
Increase in accruals	+40,422	
	$ 9,962,399	

DEDUCT		DEDUCT	
Accrued expenses	$ 9,962,399	Payments	$ 9,921,977
Lapsing program authority	1,407,190	Unobligated funds returned to Treasury	1,407,191
Used	$ 11,369,589	Used	$ 11,329,168

AVAILABLE BALANCES AT JUNE 30, 1970

Contracting authority	$ 98,592,376	In Treasury	$ 45,647,236

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TABLE 55.—Federal Highway Administration, highway beautification program—balance sheet at June 30, 1971.

ASSETS			
Current assets:			
Funds in U.S. Treasury			$ 45,647,236
Accounts receivable—			
Advances to travelers	$ 1,526		
Other advances	25		
			1,551
Fixed assets:[2]			
Office furniture and equipment			7,730
Contracting authority unfunded [3]			58,500,000
Total assets			$ 104,156,517
LIABILITIES AND U.S. GOVERNMENT INVESTMENT			
Current liabilities:			
Accounts payable	$ 513,664		
Accrued liabilities for uncompleted work	5,042,747		
			$ 5,556,411
Accrued annual leave of employees			48,732
U.S. Government investment:			
Unobligated contracting authority	$ 62,739,153		
Undelivered orders and contracts	35,853,223		
		98,592,376	
Invested capital		−41,002	
			98,551,374
Total liabilities and U.S. Government investment			$ 104,156,517

TABLE 56.—Federal Highway Administration, highway beautification program—U.S. Government investment July 1970 through June 1971.

U.S. Government investment at July 1,1970		$ 54,346,014
Increases:		
Contracting authority	$ 55,000,000	
Leave reserve earned not used	45,681	
Increase in fixed assets	3,268	
Obligational authority, administration	526,000	
		55,574,949
Decreases:		
Expenses	9,962,399	
Unobligated funds returned to Treasury	1,407,191	
Total decreases		11,369,590
U.S. Government investment at June 30, 1971		$ 98,551,373

ANALYSIS OF U.S. GOVERNMENT INVESTMENT

Invested capital		$ −41,002
Unobligated		
Outdoor advertising	$ 40,174,531	
Junkyards	7,512,300	
Landscaping and scenic enhancement	15,052,322	
		62,739,153
Undelivered orders and contracts:		
Outdoor advertising	$ 6,833,145	
Junkyards	4,366,267	
Landscaping and scenic enhancement	24,653,810	
		35,853,222
U.S. Government investment at June 30, 1971		$ 98,551,373

TABLE 57.—Federal Highway Administration, highway beautification program—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriation	$ 17,026,000	
Unobligated funds returned to Treasury	−1,407,191	
Total funds provided		$ 15,618,809
Funds applied to:		
Administration	$ 528,061	
Outdoor advertising	1,217,929	
Junkyards	377,992	
Landscaping and scenic enhancement	7,838,416	
Total funds applied		9,962,398
Increase in working capital		$ 5,656,411

TABLE 58.—Federal Highway Administration, highway beautification program—change in working capital.

(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds with U.S. Treasury	$ 45,647,235	$ 39,950,403	$ 5,696,832	
Accounts receivable	25	43		$ 18
Advances to travelers	1,526	5,111		3,585
			$ 5,696,832	$ 3,603
Current liabilities:				
Disbursements in transit		$ 511	$ 511	
Accounts payable and accrued liabilities	$ 5,556,411	5,519,082		$ 37,329
			$ 511	$ 3e,329
Sub-totals			$ 5,697,343	$ 40,932
Increase in working capital				5,656,411
Totals			$ 5,697,343	$ 5,697,343

TABLE 59.—Federal Highway Administration, Bureau of Motor Carrier Safety statement of operations July 1970 through June 1971.

APPROPRIATIONS

For Obligational Authority		*For Working Capital*	
New	$ 3,750,500	New	$ 3,750,500
From last year	25,327	From last year	213,971
Available	$ 3,775,827	Available	$ 3,964,471

OPERATING EXPENSES

	Payments	*Change in Accruals*
Administration	$ 3,208,894	$ +31,646
Increase in accruals	+31,646	
	$ 3,240,540	

DEDUCT		DEDUCT	
Accrued expenses	$ 3,240,541	Payments	$ 3,208,894
Unobligated balance of administration	113,064	Unobligated funds returned to Treasury	113,064
Restoration	+100	Restoration of prior year funds	+100
Used	$ 3,353,505	Used	$ 3,321,858

AVAILABLE BALANCES AT JUNE 30, 1970

Obligational authority	$ 422,323	In Treasury	$ 642,613

TABLE 60.—Federal Highway Administration, Bureau of Motor Carrier Safety balance sheet June 30, 1971.

ASSETS		
Current assets:		
Funds in U.S. Treasury		$ 642,613
Accounts receivable	$ 96	
Advances to travelers	21,124	
		21,220
Fixed assets: [2]		
Office furniture and equipment		128,373
Total assets		$ 792,206
LIABILITIES AND U.S. GOVERNMENT INVESTMENTS		
Current liabilities:		
Disbursements in transit	$ 94	
Accounts payable and other liabilities	241,416	
		$ 241,510
Accrued annual leave of employees		272,576
U.S. Government investment:		
Undelivered orders and contracts	$ 422,323	
Invested capital	−144,203	
		278,120
Total liabilities and U.S. Government investment		$ 792,206

TABLE 61.—Federal Highway Administration, Bureau of Motor Carrier Safety U.S. Government investments July 1970 through June 1971.

U.S. Government investment at July 1, 1970		$ −92,624
Increases:		
Appropriated	$ 3,750,500	
Restoration of prior year funds	100	
Fixed assets	22,601	
Total increases		3,773,201
Decreases:		
Expenses	3,240,540	
Leave reserve earned not used	48,853	
Unobligated funds returned to Treasury	113,064	
Total decreases		3,402,457
U.S. Government investment at June 30, 1971		$ 278,120
ANALYSIS OF U.S. GOVERNMENT INVESTMENT		
Invested capital		$ −144,203
Obligated		
Undelivered orders and contracts		422,323
U.S. Government investment at June 30, 1971		$ 278,120

TABLE 62.—Federal Highway Administration, Bureau of Motor Carrier Safety—statement of application of funds July 1970 through June 1971.

Funds provided by:		
Appropriations	$ 3,750,500	
Restoration of prior year funds	100	
Total funds provided		$ 3,750,600
Funds applied to:		
Administration	3,240,541	
Unobligated funds returned to Treasury	113,064	
Total funds applied		3,353,605
Increase in working capital		$ 396,995

TABLE 63.—Federal Highway Administration, Bureau of Motor Carrier Safety—change in working capital.

(accounted for as follows)

	June 30, 1971	*July 1, 1970*	*Increase*	*Decrease*
Current assets:				
Funds in U.S. Treasury	$ 642,613	$ 213,971	$ 428,642	$ 94
Accounts receivable	96	190		
Advances to travelers	21,124	11,324	9,800	
			$ 438,442	$ 94
Current liabilities:				
Disbursements in transit	$ 94	$ 72		
Accounts payable and accrued liabilities	241,416	200,085		41,331
			0	$ 41,353
Sub-totals			$ 438,442	$ 41,447
Increase in working capital				396,995
Totals			$ 438,442	$ 438,442

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