

Statement

of

Dr. Gerald D. Love  
Associate Administrator  
for  
Research and Development  
Federal Highway Administration

Before

House Subcommittee on Aviation and Transportation  
Research and Development

August 5, 1976

Mr. Chairman, I am very pleased to have the opportunity this morning to meet with this Subcommittee on Aviation and Transportation Research and Development and discuss the Federal Highway Administration's Research and Development Program. Accompanying me is Mr. Charles F. Scheffey, Director, Office of Research.

Although the Federal highway program is one of the oldest Federal-aid programs and the Nation has many decades of experience in building highways, we are fully cognizant of the need to develop and apply new technology in the highway field on a continuing basis. We are totally convinced that the development and application of new technology should play a very important role in the Federal highway program.

The broad objectives of the Federal Highway Administration's Research and Development Program are ~~three~~<sup>four</sup>fold:

- (1) Improved highway safety, design and operation;
- (2) Improved materials utilization and durability;

- (3) Improved environmental compatibility; and
- (4) Economy in highway construction and maintenance.

These objectives are carried out in accordance with the enabling legislation contained in Sections 307 and 403 of Title 23, U.S. Code.

As a means of assuring that all highway research and development are coordinated and duplication of effort is avoided, an overall structure of research categories and projects has been devised which is designated as the Federally Coordinated Program (FCP) of Research and Development for Highway Transportation. The program has been developed and is continually updated to reflect the most urgent problems facing local, State, and Federal highway officials. It is based on the concept that the most productive and efficient method of achieving our national research goals is to coordinate and complement the research efforts of all involved agencies. This overall coordination is accomplished by FHWA Research and Development personnel who review all research and development projects conducted by State highway agencies partially funded with Federal funds. This process also provides a project focal point so that the objective of each research study significantly contributes to the outputs of all other project-related research activities.

The three funding sources for the Highway Transportation Research and Development Program are shown in Table I. The sums shown for the first two sources are the authorized amounts for the Federal Highway Administration in Fiscal Year 1977. The third sum is the anticipated amount of Federal funds that State highway agencies will obligate in

Fiscal Year 1977 for research projects from the 1-1/2 percent Highway Planning and Research (HP&R) funds.

Table I

Highway Transportation Research and  
Development Funds

<u>Funding Source</u>	<u>Amounts</u>
Research Funds Authorized by Sections 307(a) and (b) and 104, Title 23, U.S. Code	\$14 million
Highway Safety Research Funds Authorized by Section 403, Title 23, U.S. Code	9 million
Highway Research Funds for State Highway Agencies Authorized by Section 307(c), Title 23, U.S. Code	*25 million
Total	\$48 million

\*Approximate

It should be noted that the research funds authorized by Section 307(c), Title 23, are administered by State highway agencies. The Federal Highway Administration, however, retains approval authority and in this way assures that research conducted by State highway agencies is not duplicative of research conducted in other States or by FHWA. Under the auspices of the FCP, there has been excellent cooperation with State highway agencies in the administration of the Research and Development Program.

Not included in the funding tabulation is an additional \$400,000 for Fiscal Year 1977 to conduct medium and heavy commercial vehicle

and driver related research for the Bureau of Motor Carrier Safety of the Federal Highway Administration. The Offices of Research and Development assist the Bureau in handling a major portion of this R&D effort. This Bureau's research effort is vital to its assigned responsibility of reducing the risks in commercial motor carrier operations that cause accidents on our highway system today. The primary objective of this R&D activity is to determine what, if any, rulemaking activity in the Federal Regulations area can resolve safety problems that confront the Bureau.

Shown in Attachments 1 and 2 are projects proposed for funding in Fiscal Year 1977. Attachment 1 is the list of highway safety projects to be funded under the Section 403 authorization and Attachment 2 are projects to be funded under the authority contained in Sections 307(a) and (b), Title 23, U.S. Code.

The major thrust of the FHWA research program is enhancing the safety, efficiency and economy of building improved highway and traffic control systems with minimal environmental effects while assuring peak performance and benefits with low construction and maintenance costs. It is a balanced program aimed at providing solutions to current problems facing the highway industry today and longer range research to develop new and innovative transportation improvements. A small research effort now underway to study the practicality of an automated highway system is a good example of

a look at a possible highway system of the future. With recent developments in the microprocessor field, it appears feasible to develop an economical logic unit for installation in automobiles that can conceivably relieve the driver of some of the routine driving operations on an electronically controlled section of highway. The anticipated payoff associated with this type of vehicle-highway control system is improved safety, a twofold increase in capacity, reduced emission of pollutants, a decrease in driver tension, and savings in petroleum energy utilization.

The FHWA Research and Development Program is basically a contract effort with only approximately five percent of our <sup>TOTAL R+D</sup> overall ~~manpower~~ <sup>FUNDING</sup> devoted to in-house staff research. Although we believe it is desirable to continue to accomplish our major research objectives by contract, we also recognize the need for a good staff capability, not only to effectively manage and direct these contractual activities but also for the following reasons. A viable staff research capability is necessary to provide a quick response to high priority problems and to maintain a high degree of professionalism in our research and development staffs. Additionally, a staff capability to implement specific research necessitated by unpredictable but immediate problems, especially those associated with safety, is needed to further enhance the responsiveness to current highway problems.

Contract research is conducted with private research organizations, with universities, with other Federal agencies, and with State highway agencies. We have made a concerted effort in the last year to increase contract work with State highway agencies in the implementation or handoff of research results since the States are in an ideal position to provide this type of service. A good example is the evaluation of a new product performance under actual highway conditions prior to acceptance for standard usage. This practice also has the advantage of providing State personnel with firsthand knowledge of new products thus enhancing the ultimate adoption of new highway materials.

The implementation, handoff or transfer of new technology to the users, is an important part of the Federal Highway Administration's day-to-day operations. In 1976, technology transfer was designated as one of the major program emphasis areas. This has created a higher level of activity between field offices and State highway agencies in the implementation of new technology.

The key factor in FHWA's technology transfer program has been recognition of the fact that implementation activities must be treated as an integral part of the Federal highway program. This implementation has been accomplished by emphasizing and coordinating the activities of all organizational units of the Federal Highway Administration responsible for the development and implementation of new technology. The principal units involved in this overall

effort include: (1) the Offices of Research and Development with primary responsibilities for the development and implementation of new highway technology; (2) the Construction and Maintenance Division of the Office of Highway Operations which has responsibility for administering experimental features on Federal-aid highway projects; (3) the Demonstration Projects Division of Region 15 which demonstrates through the use of new equipment and trained technicians the practical application of new technology; (4) the National Highway Institute which sponsors and conducts training activities for State and local highway agency personnel; and (5) last and probably the most important unit is the individual FHWA Division Office in each State which works very closely on a day-to-day basis with State highway personnel to promote and create an awareness of the potential application of new highway technology.

Another important aspect of the technology transfer program is the dissemination of research information. The Transportation Research Board (TRB), an agency of the National Research Council which serves the National Academy of Science and the National Academy of Engineering provides a valuable service to the entire transportation community in publishing transportation research reports, research abstracts, and input for maintaining an on-line research information system. It is supported by State transportation and highway agencies, the U.S. Department of Transportation, and other organizations interested in the development of transportation.

The Transportation Research Board, through the National Cooperative Highway Research Program (NCHRP) under the administrative direction of State transportation agencies, also administers a contract research program funded by a pro rata contribution of 4-1/2 percent of each State's 1-1/2 percent HP&R funds. The NCHRP, which is funded at approximately \$3.5 million annually, is directed towards providing solutions to some of the highway problems of national significance.

The highway Research and Development Program has always been a cooperative Federal-State effort. Historically, the major emphasis of State sponsored research has focused on improving the durability of highway construction materials. With the exception of a few of the larger States such as California, Texas and New York, little research has been conducted at the State level in such important areas as environmental considerations, structural research and development, traffic management and control, and energy conservation. Because of budgetary and personnel limitations, it is not anticipated that State highway agencies will mount any major effort in these areas in the foreseeable future.

It seems important, therefore, to recognize the continuing long term need to support Federal transportation research and development in areas of national significance. The Federal Highway Administration has a demonstrated capability of fulfilling this role and has received sufficient funds from Congress in recent years to continue a viable and responsive research and development program.

HIGHWAY SAFETY RESEARCH AND DEVELOPMENT  
FUNDING LEVELS BY PROJECT

<u>FY 1977 Projects</u>	(In thousands of dollars)			
	<u>FY 1975*</u>	<u>FY 1976*</u>	<u>Transition Quarter**</u>	<u>FY 1977</u>
Coping with Adverse Environ- mental Conditions	1,155	688	100	640
Traffic and Pedestrian Safety Improvements	2,150	2,025	650	1,530
Increased Safety by Improving Highway Design	1,665	2,005	700	2,480
Dealing with Disorder in Freeway Traffic	1,250	685	100	450
Research Fellowships for Highway Safety Engineers	250	235	...	235
Railroad-Highway Grade Crossing Research	...	75	...	350
Improved Protection Against Natural Hazards of Earthquake and Wind	<u>1/</u>	<u>1/</u>	<u>1/</u>	350
Safety Aspects of Increased Size and Weight of Heavy Vehicles	...	550	100	800
Highway Maintenance Technology for a Safer Transportation System	<u>1/</u>	<u>1/</u>	...	500
Detection and Communications for Traffic Surveillance Systems	<u>1/</u>	<u>1/</u>	...	850
Implementation of Results from Safety Projects	<u>750</u>	<u>2,037</u>	<u>600</u>	<u>815</u>
TOTAL	<u>7,220</u>	<u>8,300</u>	<u>2,250</u>	<u>9,000</u>

\*Appropriations for fiscal years 1975 and 1976 were \$8,685,000 and \$9,000,000, respectively. These columns list only those projects which will be continued through FY 1977 and excludes projects which have been or will be completed by that fiscal year.

\*\*Assumes enactment of FY 1976 supplemental request.

1/ Previously funded under Research and Development, Highways.

RESEARCH AND DEVELOPMENT, HIGHWAYS  
OBLIGATIONS BY PROJECT

(In Thousands of Dollars)

<u>FY 1977 Projects</u>	<u>FY 1975*</u>	<u>FY 1976*</u>	<u>Transition Quarter**</u>	<u>FY 1977</u>
Improved Operational Efficiency of Freeways	1,540	1,000	310	700
Pollution Reduction and Improv- ing the Highway Environment	1,275	1,005	415	1,445
Use of Waste Products and Sub- stitute Materials in Highways	580	615	270	990
Improvement of Soil Conditions and Remote Sensing of Ground Conditions	445	785	100	620
Protection of Highway Structures from Hazards Attributed to Flooding	1,035	595	185	585
Tunneling Technology for Future Highways	1,900	1,965	264	1,900
Improved Highway Pavements	730	1,186	300	1,285
Development of New Test Procedures	150	365	70	380
Metropolitan Intermodal Traffic Management System	---	550	345	1,220
Practicality of Automated Highway Systems	15	250	150	300
Implementation of Results from Completed Highway Research Projects	295	2,255	384	1,075
New Concepts Development and System Characterization	---	900	99	946
Measuring and Improving System Performance	---	587	146	555
Improving Planning Methodology	1,230	1,237	312	1,169
Research and Development Support and Overhead	<u>875</u>	<u>875</u>	<u>200</u>	<u>1,000</u>
	10,070	14,170	3,550	14,170

\*Appropriations for fiscal years 1975, 1976, and 1976 TQ were \$13,600,000, \$15,000,000 and \$3,750,000, respectively. These columns list only those projects which will be continued through FY 1977 and excludes projects which have been or will be completed by that fiscal year. Also excluded are three projects which will be funded under Highway Safety Research and Development beginning in F.Y. 1977. Those projects are "Improved Protection Against Natural Hazards of Earthquake and Wind," "Highway Maintenance Technology for a Safer Transportation System," and "Detection and Communications for Traffic Surveillance Systems."

\*\*Assumes enactment of 1976 supplemental request.