REPORT TO THE
COMMITTEE ON COMMERCE
UNITED STATES SENATE

Improvements Needed In Planning And Using Motor Vehicle Safety Research

B-164497(3)

National Highway Traffic Safety Administration
Department of Transportation

BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D C 20548

B-164497(3)

The Honorable Warren G Magnuson
Chairman, Committee on Commerce
United States Senate

Dear Mr. Chairman

As part of our review of major activities of the National Highway Traffic Safety Administration pursuant to your request dated January 22, 1973, we are furnishing you our report on the Safety Administration's planning and use of motor vehicle safety research.

This report is the second of several reports we plan to send you on Safety Administration activities in which you are interested.

We do not plan to distribute this report further unless you agree or publicly announce its contents. In this connection, we want to invite your attention to the fact that this report contains recommendations to the Secretary of Transportation which are set forth on pages 11 and 30. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions he has taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report, and the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report When we obtain your agreement to release the report, we will make it available to the Secretary and the four committees for the purpose of setting in motion the requirements of section 236.

Sincerely yours,

Comptroller General
of the United States

Contents

ABBREVIATIONS

DOT	Department of Transportation
ESV	Experimental Safety Vehicle
GAO	General Accounting Office
MVP	Motor Vehicle Program
NPRM	notice of proposed rulemaking
R&D	research and development

COMPTROLLER GENERAL'S REPORT
TO THE COMMITTEE ON COMMERCE
UNITED STATES SENATE

IMPROVEMENTS NEEDED IN PLANNING AND USING MOTOR VEHICLE SAFETY RESEARCH

National Highway Traffic Safety Administration
Department of Transportation
B-164497(3)

D I G E S T

WHY THE REVIEW WAS MADE

At the request of the Chairman, GAO reviewed major areas of the auto safety program, conducted by the National Highway Traffic Safety Administration. This report discusses research and development activities which support the promulgation of Federal motor vehicle safety standards.

FINDINGS AND CONCLUSIONS

Planning of research projects

GAO's review of planning for fiscal years 1973 and 1974 showed a need for closer coordination between the Research and Development Office (formerly the Research Institute), which is responsible for planning and conducting research, and the Motor Vehicle Program Office, which is responsible for developing safety standards

A properly coordinated research program is necessary to adequately research priority areas for rulemaking within established time frames and available funds
(See p 5)

In fiscal year 1973, certain priority projects were not begun, either because there was disagreement on the approach to be taken to the research problem or because priorities for rulemaking purposes were not adequately communicated to the Research and Development Office (See p. 6)

One disagreement concerned how to undertake research in the important area of crashworthiness GAO questions why this issue was not referred for resolution to an impartial or a higher level in the Safety Administration.

In research to improve motor vehicle operating systems, the Motor Vehicle Program Office did not advise the Research and Development Office of its overall priorities so that a proper choice could be made within 1973 funding limitations

Ten research requirements were not met although they had higher priorities than some which were met. This delayed development of four planned safety standards and limited the coverage of another standard (See p 7)

The research program proposed by the Research and Development Office for fiscal year 1974 did

not meet with the approval of the Motor Vehicle Program Office The proposal was considered too general and not complete and therefore made it difficult to assess whether the proposal was responsive to priorities established for rulemaking purposes (See p 9)

The Research and Development Office did not revise the proposal as requested In view of the program office's nonconcurrence, the Safety Administration's Deputy Administrator tentatively approved the proposal so specific agreed-upon projects could proceed Program officials said they had to be very selective in their concurrences because they had no assurance that high-priority research requirements would be met (See p 9.)

GAO's review showed, and DOT recognized, that the Safety Administration should prepare a planning document delineating research needed to support future safety standards In March 1974 program officials said that a revised Program Plan for Motor Vehicle Safety Standards containing such information was being developed but that requirements had not yet been coordinated with the Research and Development Office. (See pp 10 and 11)

Use of motor vehicle research

The Safety Administration did not promptly use research contractors' findings to develop safety standards or to contract for additional research when considered necessary

GAO reached this conclusion from its review of 21 research contracts in five major rulemaking areas which the Safety Administration had determined needed improved safety standards These contracts were completed at a cost of $3 1 million in the 6-year period 1967-73. These standards involve rear lighting and signaling, rearview mirrors, seating systems, fuel systems, and motorcycle rider protection (See p 13)

For example, research undertaken since June 1968 to improve the safety standard for rearview mirrors has not yet provided the necessary basis for rulemaking (See p. 16.) Also, development of an improved standard for fuel systems took close to 7 years (See p 22)

Use of research findings in the rulemaking process could be facilitated by adequate evaluations of research reports, as contemplated in a procedure established by the Research and Development Office in fiscal year 1972

This procedure requires analyses of research contractors' final reports to point out the data and conclusions which are sound and which can be used to support rulemaking. Several analyses GAO reviewed were little more than summaries of the contractors' findings and contained few constructive recommendations on rulemaking (See pp 28 and 29)

Experimental Safety Vehicle program

This program seeks to test new ideas of automotive safety incorporated in

a complete vehicle One of its principal objectives is to apply program results to formulating new or improved safety standards However, little progress has been made

Several prototypes of a family sedan have demonstrated higher levels of safety performance than required by the Safety Administration, but the Research and Development Office has not yet made the necessary analyses of test results to identify achievements that could be applied to safety standards

Instead, the Research and Development Office's efforts have focused on determining whether the prototypes met performance specifications and on optimizing these specifications toward the planned fabrication of additional vehicles

However, a contractor is now making an evaluation study which is expected to provide data for consideration in the development of safety standards

In January 1974 the Safety Administration started a project for developing an advanced state-of-the-art, 3,000-pound, compact-size research safety vehicle intended to support safety standards for the 1980s

The project is currently in its first phase--project definition and specification development--of a planned four-phase program However, the Safety Administration said it would not wait for completion of all phases before using worthwhile information to formulate safety standards (See pp 32 to 41)

RECOMMENDATIONS

The Safety Administration should

--Develop a coordinated program plan for establishing safety standards which delineates the research requirements for each standard and periodically update the plan

--Monitor the plan's implementation and resolve any differences that may arise between the offices responsible for research and rulemaking

--Critically evaluate research findings and determine the extent to which they can be used for rulemaking

--Insure that the Motor Vehicle Program Office promptly (1) uses contractors' research findings, if determined to be feasible and desirable, to develop safety standards or (2) obtains any additional research needed on a priority basis to support rulemaking

AGENCY COMMENTS AND UNRESOLVED ISSUES

The Department said it fully recognized the need for a coordinated program plan for motor vehicle safety standards, for its periodic updating, and for monitoring its execution It also recognized the need for evaluating research findings and for using them, when feasible and desirable, to develop standards

It said that this recognition has led to efforts to develop a coordinated program plan with a computer capability for its periodic updating, to repeated internal instructions requiring the review, analysis, and evaluation of research findings, and, most recently, to the issuance of revised procedures for multiyear planning for research and technical support

These actions and plans, if properly implemented, should greatly enhance the future planning of research activities in support of rulemaking

In commenting on the evaluation of research findings, the Department said that detailed evaluations of research effort took place during the multiyear contract cycle which includes various reviews that are monitored very closely by research and standards personnel.

Such reviews have not been fully effective in evaluating research findings More formal efforts are needed

The Department also said that the Safety Administration's plans for an improved program plan, its monitoring and updating, and the new procedures for multiyear research planning are expected to lead to increased use of research in support of rulemaking These changes should result in increased usefulness of research findings

The Department said the Experimental Safety Vehicle program was a long-term advanced research effort which had little direct application to safety standards for near-term production vehicles It also said that, although quantifying the contribution of this program was difficult, the contribution was real

It also said the results of the new Research Safety Vehicle program will be used in establishing future safety standards

CHAPTER 1

INTRODUCTION

In 1966 congressional concern over the increasing number of motor vehicle deaths led to the enactment of the National Traffic and Motor Vehicle Safety Act (15 U.S C 1381). The purpose of the act was to reduce the number of motor vehicle accidents and deaths and injuries resulting from such accidents. To achieve this goal, the Congress directed that

--Federal motor vehicle safety standards be established

--Necessary research and development (R&D) be conducted to support development of safety standards and experimental vehicles be procured for research and testing.

These responsibilities are carried out by the National Highway Traffic Safety Administration, Department of Transportation (DOT).

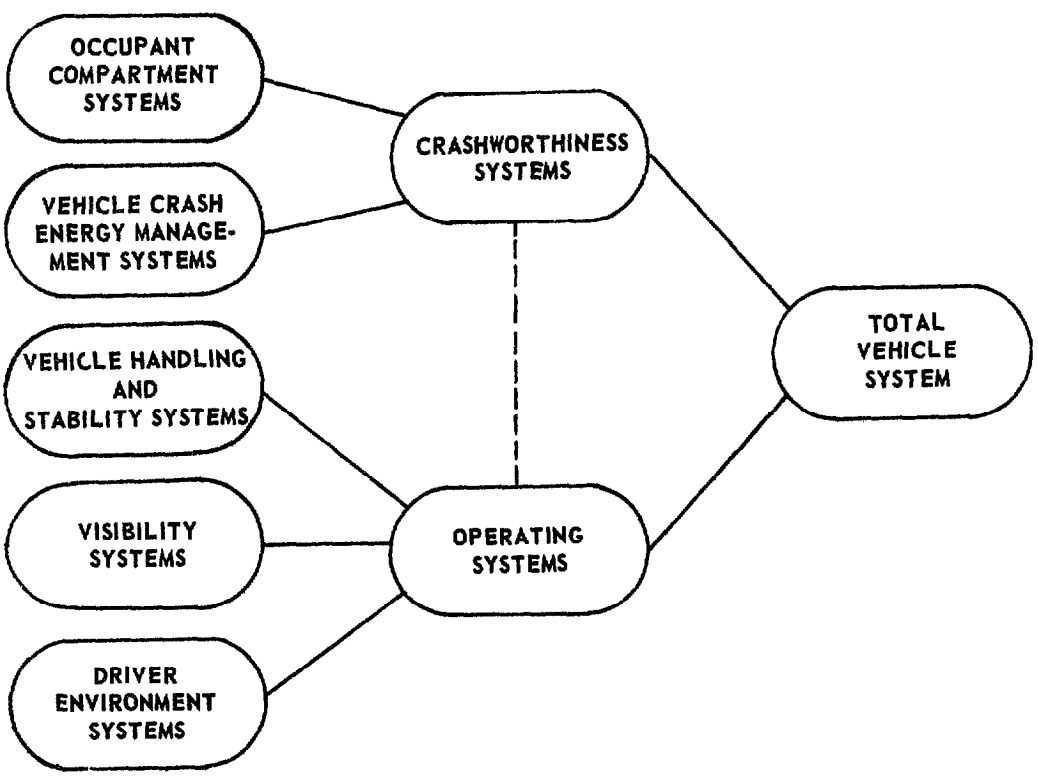
DEVELOPMENT OF SAFETY STANDARDS

The Safety Administration's Motor Vehicle Program (MVP) Office is responsible for developing performance standards for motor vehicles. These standards establish levels of vehicle safety performance intended to reduce driver, passenger, and pedestrian fatalities and injuries on the Nation's highways.

Rulemaking action for establishing safety standards is begun when the Safety Administration publishes a notice of proposed rulemaking (NPRM) in the Federal Register. An NPRM contains all relevant data on the proposed rule and allows for comment by interested parties After considering comments received, the Safety Administration issues a final rule which either implements or modifies its proposal

Motor vehicle safety standards are developed not only for a vehicle's individual equipment or subsystems (such as tires, fuel systems, lighting, and signaling) but also for broader vehicle systems The Safety Administration distinguishes

betweeen two major systems--crashworthiness systems and operating systems. Safety standards applicable to crashworthiness systems establish requirements for optimum crash and postcrash protection of vehicle occupants, pedestrians, and cyclists. Safety standards for operating systems try to avoid crashes and to reduce impact speeds when accidents occur. The two major vehicle systems and related system elements are shown in the following diagram contained in the Safety Administration's Program Plan for Motor Vehicle Safety Standards, dated October 1971



As of April 1974, the MVP Office had 156 employees, of whom 69 were involved in rulemaking activities in three offices--standards for vehicles in use, crashworthiness, and operating systems.

RESEARCH AND DEVELOPMENT IN SUPPORT OF SAFETY STANDARDS

The R&D Office (formerly the Research Institute) is responsible for conducting or sponsoring the R&D program required to support rulemaking activities and to advance the state of the art in motor vehicle safety The R&D Office has similar responsibilities for traffic safety As of April 1974, it had about 170 employees, of whom approximately 80 percent were concerned with motor vehicle safety It generally conducts its R&D through contracts with non-Government organizations.

The R&D Office also conducts an Experimental Safety Vehicle program which involves the development of total vehicle design and which is intended to demonstrate the feasibility and practicability of integrating individual safety subsystem requirements into complete vehicle system requirements.

The amounts DOT allocated for contracts in vehicle safety R&D programs in fiscal years 1973 and 1974 were as follows

	Fiscal years	
	1973	1974
	(000 omitted)	
Crashworthiness systems		
Vehicle structures	$ 2,300	$ 2,275
Occupant packaging	1,000	1,000
Biomechanics	1,100	1,100
Fleet testing	500	500
Operating systems		
Brakes and handling	900	1,700
Tires	1,200	1,050
Driver-vehicle interaction	1,200	850
Experimental safety vehicle	5,500	3,500
Vehicles in use	545	(a)
Total	14,245	11,975
Accident investigation and data analysis	2,436	2,168
Total	$16,681	$14,143

[a]As of April 23, 1974, funds had not yet been allocated for vehicle-in-use research.

CHAPTER 2

PLANNING FOR MOTOR VEHICLE SAFETY RESEARCH PROJECTS

The usefulness of motor vehicle safety research depends on whether it provides the data which the Safety Administration needs to develop new or improved safety standards. Our review of research planning for fiscal years 1973 and 1974 showed a need for closer coordination between the R&D and MVP Offices. Such coordination is necessary to adequately and promptly research priority areas within established time frames and available funds The lack of a planning document which would coordinate supporting research with rulemaking objectives has been a major impediment to achieving these goals.

RESEARCH PLANNING AND CONTROL SYSTEM

Research planning is a part of the program planning and control system which the Safety Administration began in September 1971 in recognition of the increasing complexity of its programs and the need for a systematic procedure for reviewing and approving projects.

After completing a congressional budget submission which establishes tentative funding levels for each research area, the MVP Office draws up specific research requirements needed to support the planned issuance of motor vehicle safety standards. Research requirements for individual rulemaking areas within the MVP Office are assigned priorities and are forwarded to the R&D Office which is responsible for developing research projects to satisfy requirements. In addition to responding to the MVP Office's research requirements, the R&D Office draws up research projects intended to advance certain broader aspects of motor vehicle safety.

Within the constraints of requested funding levels, the R&D Office develops a plan for each research area outlining its proposed research projects, and forwards the plans to the Safety Administration's Associate Administrator for Planning and Evaluation who coordinates the plans with the MVP Office. After the Associate Administrators for Planning and Evaluation and for MVP agree to the plan and the Safety Administration's Deputy Administrator approves the plan, the R&D Office prepares work statements

detailing the tasks necessary to fulfill each research project The MVP Office must agree to the work statements before research can be done in-house or by contract

NEED FOR IMPROVED COORDINATION IN RESEARCH PLANNING

In fiscal years 1973 and 1974, problems were experienced in planning research projects because of inadequate coordination between the MVP Office and the R&D Office In 1973 certain priority research projects were not begun, either because the MVP and R&D Offices disagreed on the approach to be taken to the research problem or because the MVP Office did not adequately communicate its priorities to the R&D Office. Therefore, certain rulemaking objectives were delayed

Furthermore, progress in carrying out the fiscal year 1974 research program was hindered because the MVP Office did not concur in the R&D Office's research proposal and because agreements had to be reached on a project-by-project basis throughout the fiscal year

Research priorities not met in fiscal year 1973

The R&D Office did not meet several important 1973 research requirements in the rulemaking areas of vehicle structures and operating systems.

Vehicle structures is a research area within the broader category of crashworthiness, which is the MVP Office's foremost priority for rulemaking purposes The MVP Office had established 15 research requirements in the area of vehicle structures for 1973 Because of ongoing research funding limitations and an inability to agree on the project approach with the MVP Office, the R&D Office was able to meet only 6 of the 15 requirements. Although the R&D Office tried to meet the MVP Office's high-priority requests, it could not meet priority 5--which concerned safety research in crashes between vehicles of different sizes--due to a disagreement with the MVP Office on the approach to take in carrying out the project

The R&D Office proposed to approach the project analytically, whereas the MVP Office believed that sufficient analytical data was available to develop structures for testing and thereby start with a more advanced phase of research The MVP Office's vehicle structures program manager told us that postponing this research would either delay rulemaking in this area or would put the MVP Office in a weaker position to support a rulemaking action It seems that this issue, because of its impact on rulemaking actions, should have been submitted for resolution to the Associate Administrator for Planning and Evaluation or to a higher level in the Safety Administration.

In the research areas of operating systems, the R&D Office did not fund several MVP Office research requirements which appeared to be of higher priority than other requirements that were funded in 1973. This situation arose because the MVP Office of Operating Systems had assigned separate priorities to each of its four rulemaking areas and had advised the R&D Office of these priorities. However, because of funding limitations, the R&D Office had to choose from the four priority lists, projects which had not been assigned priorities on an overall basis The MVP Office of Operating Systems had prepared an overall list of 37 priorities for internal purposes but had not communicated these priorities to the R&D Office.

We noted that 10 of the overall requirements were not met, even though some requirements with lower priorities were met. This resulted in delays in establishing timetables for four planned safety standards and limited the coverage of another standard.

The requirements not met by the R&D Office included priority 1 (collection of performance data of the relationship between vehicle-handling characteristics and accidents) R&D officials told us they could not satisfy priority 1 because it had not been adequately defined The MVP Office had identified this project as a high priority in the previous fiscal year, and the Safety Administration's program plan of October 1971 had stated that the development of performance requirements to insure safe vehicle handling and stability was the Safety Administration's second highest priority However, the R&D Office did not seek clarification and the MVP Office did not determine why the priority was not met In November 1973 the two offices reached agreement on a fiscal year 1974 work statement that that would meet this important research requirement.

Two other unmet requirements concerned spray protectors and defog/defrost systems which were assigned overall priorities 12 and 16, respectively Planned safety standards in these areas were to be combined with the requirement for an upgraded windshield wiper and washer system into one standard relating to adverse weather visibility In March 1973 hearings held by the Subcommittee on Department of Transportation and Related Agencies Appropriations, House Committee on Appropriations, Safety Administration representatives said that the adverse weather visibility standard could reach a benefit-cost ratio of 4 to 1. The Safety Administration estimated that the spray protector standard alone would prevent 100 deaths, 5,200 injuries, and 31,000 accidents annually.

Several lower priority requirements were funded, including two dealing with the effects of toxic gases on driver performance. These requirements were assigned overall priorities 28 and 29. In-house research had already concluded that the safety problem associated with toxic gas penetration into the vehicle compartment was remote. The R&D official responsible for this research had recommended in December 1972 that research on toxic gases not be continued and that funds be used on more cost-effective programs. Furthermore, in March 1973 the MVP Engineering Systems Staff, whose functions include priority evaluation and management overview, recommended that a proposed safety standard on toxic gas penetration be canceled because of the minimal safety problem involved.

Notwithstanding the low-priority status and the prior in-house research, in June 1973 the MVP and R&D Offices initiated the award of a $78,000 contract for research on the effects of toxic gases on driver performance. The research was to focus on the effects of carbon monoxide levels on pregnant women, infants, and those suffering from pulmonary emphysema as passengers or drivers of vehicles operated in adverse environmental conditions, such as high altitudes. MVP officials told us that, although planned rulemaking on toxic gases had been canceled, the contract could possibly form the basis for future rulemaking

Lack of coordination in establishing research program for fiscal year 1974

The MVP Office transmitted its fiscal year 1974 research requirements to the R&D Office in February 1973. The R&D Office responded in April 1973 with a research program--comprising separate proposals for each research area--which was general, compared with prior years, because it believed the details could be worked out later with the MVP Office. However, the MVP Office did not concur and requested that the proposals be revised. The MVP Office cited, among others, the following deficiencies.

--The proposals did not provide a complete picture of the research program and made it difficult to assess the response to the priorities the MVP Office had assigned to its research requirements.

--There was a lack of detail (level of effort, priority, and project description), especially in the areas of vehicle structures and biomechanics and to a lesser extent in occupant packaging.

--In the operating systems area, the MVP Office was concerned that several high-priority research requirements had been omitted, and there was no breakdown of funding to show what level of effort was planned in the areas specified by the MVP Office's research requirements.

The R&D Office did not revise the proposals. But in October and November 1973, the Safety Administration's Deputy Administrator approved the proposals so that funds could be alloted and specific projects, on which agreement could be reached, could proceed.

At the time of our review, the R&D Office had prepared and submitted to the MVP Office numerous work statements outlining the tasks of specific projects. MVP officials said they had to be selective in their concurrences because they did not know what the total research program would contain and had no assurance that their high-priority research requirements would be met.

The delay in establishing a workable 1974 research program that would meet the requirements of both the R&D Office and the MVP Office indicates the need for an organizational arrangement that would quickly resolve any disagreements between these offices. The Associate Administrator for Planning and Evaluation concurred in, and the Deputy Administrator approved, the R&D Office's proposals for 1974, but apparently neither succeeded in reconciling the differences between the two offices

The need for such an organizational arrangement was recognized by DOT's Office of Systems Engineering in March 1974. That office pointed out that there was a need either for organizational changes to eliminate disagreements as have occurred in the past or for a mechanism that would promptly resolve such issues when normal MVP-R&D coordination efforts break down.

NEED FOR COORDINATED RESEARCH PLAN

The Safety Administration's Program Plan for Motor Vehicle Safety Standards could provide a basis for coordinating the MVP Office's rulemaking functions with the R&D Office's supporting research functions Since 1970 the Safety Administration has issued this plan which serves to advise the automotive industry of its intentions and which describes the anticipated schedule of rulemaking actions for several years. The most recent edition of the plan, dated October 1971, did not address in detail the planned supporting research activities. The introduction to the plan, however, stated that such details would be included in the next edition

The need for a planning document delineating the research requirements needed to support future safety standards has also been recognized by the Assistant Secretary for Systems Development and Technology, DOT. In providing guidance on the Safety Administration's fiscal year 1975 research program, he stated that the current program plan is a useful reference for manufacturers and suppliers but that an internal planning document is needed to relate rulemaking plans to agency goals and objectives and to delineate the research requirements for each planned safety standard. Furthermore, he said documenting research requirements is necessary for determining research program adequacy and is helpful in measuring its effectiveness

The MVP Office had intended to issue a revised program plan before the end of calendar year 1973 but did not meet this target date. In March 1974 MVP officials told us that they were developing a revised plan and the research requirements to satisfy the objectives of the plan but that they had not yet coordinated such requirements with the R&D Office. As a pilot project, the MVP Office is trying to develop a computer capability for updating its program plan on a continuing basis.

Although an updated plan would be useful for research planning, it must be developed in close cooperation with the R&D Office. Funding limitations, priorities for individual research projects, and the feasibility of solutions should be considered by both the MVP Office and the R&D Office and included in the plan.

CONCLUSIONS

In planning motor vehicle safety research activities, the MVP Office's rulemaking functions and the R&D Office's supporting research functions have not had adequate coordination. Such inadequate coordination in fiscal year 1973 was evidenced by the failure to meet certain high-priority research requirements while meeting lower priority requirements Planning of research activities for fiscal year 1974 was impeded by the MVP Office's inability to agree with the R&D Office's proposed research program. Improved coordination between the two offices is essential to insure that limited resources are directed to priority requirements. Such coordination should be monitored by an impartial organization, such as the Associate Administrator for Planning and Evaluation or a higher level in the Safety Administration.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

We recommend that the Safety Administration

--Develop a coordinated plan for establishing motor vehicle safety standards which delineates the research requirements for each planned standard and periodically update the plan.

-- Monitor the plan's implementation and resolve any differences that may arise between the offices responsible for research and rulemaking

AGENCY COMMENTS AND OUR EVALUATION

DOT stated (see app II) that it fully recognized the need for a coordinated program plan for motor vehicle safety standards, for its periodic updating, and for monitoring its execution It said that this recognition led to the efforts, mentioned in the report, to develop a coordinated program plan with a computer capability to monitor and update the plan as new developments and information dictate Recently, a new multiyear procedure was developed which complements this plan DOT said this procedure will help to resolve any differences within the Safety Administration by assigning specific responsibilities to program managers, by establishing fixed schedules for the coordination and clearance of work statements for research requirements, and by providing for the Administrator to resolve any issues that cannot be cleared within the prescribed coordination schedule.

Finally, DOT said that the foregoing efforts are directly complemented by the Safety Administration's reorganization on May 15, 1974 This reorganization was undertaken to improve coordination among organizational units, promote greater teamwork in developing research requirements, increase cohesiveness within the total organization, and place greater emphasis on planning and evaluation

These actions and plans, if properly implemented, should greatly enhance the Safety Administration's future planning of research activities in support of rulemaking.

CHAPTER 3

USE OF MOTOR VEHICLE RESEARCH

More effective evaluations of research findings and recommendations are needed to promptly identify their usefulness. If recommendations are accepted, they should be applied in the development of safety standards or supplemented by further research. If not accepted, the reasons why should be adequately documented Until fiscal year 1972, the Safety Administration had no procedure for making such evaluations. The evaluations made since 1972 have not resulted in analyses and decisions of maximum benefit to the rulemaking process.

We reviewed 21 research contracts completed in the following five major rulemaking areas, i.e , areas concerned with five vehicle safety systems or subsystems deemed to require improved safety standards

Rulemaking area	Number of contracts	Period of research	Accumulated contract cost
Standard 108--rear lighting and signaling	8	1967-70	$1,317,000
Standard 111--rearview mirrors	4	1968-73	297,000
Standard 207--seating systems	2	1968-71	978,000
Standard 301--fuel systems integrity	5	1967-71	296,000
Proposed standard--motorcycle rider protection	2	1969-73	256,000
Total	21		$3,144,000

REAR LIGHTING AND SIGNALING

Safety standard 108, effective January 1, 1968, contains requirements for exterior vehicle lighting and signaling In view of accident statistics showing the frequency of rear-end collisions, the Safety Administration planned to upgrade the standard and in June 1967 awarded four research contracts to develop improved vehicle rear-lighting display systems. A fifth contract was to study problems in the changeover from existing to improved lighting systems. Another contract was awarded to evaluate the practicality of proposed systems.

As a result of this research, standard 108 was amended in October 1970 to incorporate certain requirements concerning the prescribed color and intensity of brake lights. Aside from these minor amendments, no benefits have been realized to date, and 9 years will have elapsed before more important research findings can be translated into improved safety standards planned to become effective in 1977

The first four contractors completed their work between April and September 1968 and presented similar findings on the desirability of physically separating brake lights from tail lights and turn signals. Three of the contractors also recommended using amber or some other color distinguishable from the brake light color for rear turn signals on all motor vehicles. Currently standard 108 permits either red or amber

The contractors presented additional alternatives to improve rear-lighting systems but recommended that some of them be considered for followup research

In October 1972 the Safety Administration issued an NPRM proposing separation of rear-lighting functions and the use of red as the sole color for rear turn signals. After considering industry comments received during 1973, the Safety Administration planned to issue the amendments to the standard in the fall of 1974. The amendment would be fully effective in September 1977.

To further study the other alternatives presented by the research contractors, the Safety Administration awarded a follow-on contract in June 1973. The results of this contract are expected by September 1974. MVP officials told us that funding limitations did not permit earlier award of this contract.

Separation of rear lighting

The MVP Office determined that, before rulemaking action could be taken on the proposed separation of lighting and signaling functions, additional research was needed to evaluate driver response The first of two follow-on contracts, completed in January 1970, evaluated the use of various lighting configurations and confirmed that separation of the functions is a most effective technique The second follow-on contract, completed in May 1970, showed that separation could increase message accuracy by as much as 75 percent

MVP officials told us that a draft NPRM had been prepared in 1970 but that processing it through administrative channels and including certain requirements on front-lighting systems--on which research work had been submitted in July 1971--had delayed its issuance until October 1972. They said, however, that it would have been possible to incorporate the front-lighting requirements in a separate NPRM to expedite the rear-light improvements.

Turn signal color

Several contractors concluded that amber or a color other than red was the preferred color for rear turn signals, whereas another contractor recommended red for all rear lights and emphasized array and shape coding in preference to color coding.

The recommended use of amber or some other color distinguishable from the brake light color was supported largely by reference to the Europeans who have used amber for a number of years. Also, it is the color generally accepted for signaling caution. A position paper prepared by the MVP Office acknowledged the advantages of using amber, such as (1) standardizing rear turn signals internationally, (2) avoiding the confusion between flashing brake and turn signal lights, (3) simplifying the electrical arrangement, and (4) reserving the color red for more critical signals

MVP officials, however, told us they did not consider the safety advantages of amber turn signals sufficient for adopting their use in the standard They mentioned the added cost to the consumer, estimated at $8 a vehicle This figure was admittedly only a rough estimate applicable to high-volume domestic passenger cars, and possible benefits associated with the change to amber were not quantified.

Industry reaction to an advance notice of amending the standard showed general agreement that a single color should be required for rear turn signals on all motor vehicles, but domestic manufacturers preferred red whereas foreign manufacturers preferred amber.

In view of the weight of opinions expressed by research contractors, the decision to prescribe red as the sole color for rear turn signals does not seem adequately supported in the Safety Administration's rulemaking process.

REARVIEW MIRRORS

Safety standard 111, effective January 1, 1968, specifies requirements for rearview mirrors on passenger cars and multipurpose passenger vehicles to provide the driver with a clear and reasonably unobstructed view to the rear of the vehicle. The research considered necessary for upgrading this standard has not been completed.

Research done under several contracts awarded since June 1968 confirmed that drivers' rear vision under the present standard has been unsatisfactory and that the standard needs upgrading. The research contractors suggested improved devices, such as periscope systems or convex mirrors but pointed out the need for further research before these could be adopted.

In recognition of the present unsatisfactory standard, the Safety Administration issued an NPRM in January 1971 but withdrew it in March 1973, primarily because of adverse comments from industry.

Further upgrading of the present standard must await the outcome of follow-on research contracts which the Safety Administration awarded in July 1973 to fully investigate all feasible alternatives. Additional recommended research for commercial vehicles has not been started

Proposed use of periscope or convex mirrors

The first research contract was awarded in June 1968 and completed in September 1969 It was to delineate requirements for the driver's rear field of view and help develop standards for rearview mirrors and their location on passenger and commercial vehicles within the current state of the art. The contractor concluded that the 20-degree field of view required in the present standard was unsatisfactory and pointed out the advantage of a wide-angle, 90- to 100-degree, over-the-top (periscope) rearview system The contractor did not recommend adoption of a periscope system because it would involve radical vehicle redesign but recommended further development and tests

The contractor's report proposed as an immediate solution the use of convex side mirrors which are widely used on passenger cars outside the United States. It also said that convex side mirrors are the only presently tested means of eliminating the blind spots of commercial vehicles The report mentioned the attendant problem of a smaller and distored view, but in a choice between this problem and the blind-spot problem, it considered the use of convex mirrors the lesser evil.

In September 1969 the Safety Administration awarded a follow-on research contract to further evaluate convex mirrors This contract was completed in August 1970. The contractor's overall conclusion was that the proved advantages of convex mirrors seemed to outweigh the disadvantages The contractor said, however, that the study did not conclusively prove all issues in favor of convex mirrors and encouraged larger scale studies

In January 1971 the Safety Administration issued an NPRM which would have greatly improved the indirect field of view for passenger cars and multipurpose vehicles and extended application of the standard to other types of vehicles The NPRM's preamble cited statistics showing that 22.5 percent of all vehicle crashes, or about 6 million crashes a year, occur in the indirect field of view to the sides and rear of vehicles and pointed out that systems providing broad and clear rear vision could reduce such accidents by over a million a year

For passenger cars, after January 1974, specified percentages for each of five rearview target areas were to be met with not more than three separate display locations. After January 1976, the percentages of the target areas were to be increased and the display locations were to be reduced to one. Furthermore, all passenger car mirrors were to be designed so as not to distort the image, which ruled out the use of convex mirrors. The preamble to the NPRM stated that a periscope-type system may prove to be the most effective way of meeting the proposed 1976 standards.

The provisions of the NPRM applicable to vehicles other than passenger cars were to be effective after January 1973 and permitted the use of convex mirrors for meeting the requirements of certain target areas. MVP officials told us that convex mirrors for passenger cars were not permitted because (1) the most acceptable degree of convexity had not been determined and (2) all drivers are not able to adjust to convex mirrors. Convex mirrors, however, were permitted for trucks, buses, and multipurpose vehicles because these vehicles are driven primarily by professional drivers who have adapted to their use and because there were no practical alternatives available.

In March 1973, due to negative comments from industry and other available information, the Safety Administration withdrew the NPRM and decided that further research was needed for adequate standards development Reasons cited for the withdrawal were (1) a desire to combine indirect vision and direct vision requirements in the proposed amended standard, (2) industry's belief that there were alternatives to a periscope system, and (3) industry's objection to the phased effective dates which would have required the design of two different systems Also, industry claimed that the Safety Administration had incorrectly used certain

accidents statistics. In this regard, the MVP Office asked the R&D Office for an analysis of accident data to support a revised NPRM, but the R&D Office has been unable to provide the data because of higher priority assignments.

Additional research findings needed

To counter industry's adverse comments, in June 1972 the Safety Administration contracted for a study of the benefits of selected periscope systems that would meet the 1974 and 1976 criteria of the proposed NPRM. This study resulted in an interim report which contained no recommendations and was followed by a second expanded study by the same contractor This second contract, scheduled for completion in February 1974 but since extended, is to fully investigate all likely alternative mirror systems and concepts, including those developed since the preceding study, before final rulemaking action is taken This study may provide some of the necessary followup recommended by the 1970 report on which no further action has been taken.

In October 1973 the MVP Office contracted for a quick-reaction project to test convex mirror systems, since industry representatives had stated that convex mirrors might be a practical alternative for meeting the requirements of the NPRM The project was to design, manufacture, and install 42 European-type convex mirror systems and the same number of a combination of plane and convex mirrors on 84 Government vehicles. The MVP Office is now obtaining driver reaction to these systems.

Another research contract, awarded in June 1971 and completed in February 1972, was undertaken to investigate various techniques used on commercial vehicles to eliminate the rear-view blind spot. The contractor concluded that several techniques were available but needed testing. This task had been deleted from the R&D Office's original contract because of budget constraints and will be undertaken only when funds become available. In the meantime, the research results of this contract cannot be used for rulemaking purposes.

SEATING SYSTEMS AND HEAD RESTRAINTS

This area is governed by two safety standards. Standard 207, effective January 1, 1968, established requirements for passenger car seats The standard was amended effective January 1, 1972, to extend the requirements to other vehicles. Standard 202, effective January 1, 1969, specifies requirements for passenger car head restraints

On the basis of two supporting research contracts, the Safety Administration had planned to amend the two standards, effective September 1, 1973, by combining and upgrading seat and head restraint requirements and to issue an NPRM in January 1972. These target dates were not met. The research studies were completed by June 1971, and the NPRM was issued in March 1974 proposing to make the amendment effective September 1, 1976.

The proposed amendment, which is based primarily on the results of the first research contract, would require an increase in seat back strength, specify minimum head restraint heights, and provide for permanently attaching the head restraint to the seat back.

The second research contract was to study head restraint systems that would automatically deploy to prevent crash injury without significantly compromising driver vision during normal vehicle operations. The contractor recommended additional research which the Safety Administration had deferred because of higher priority research.

Proposed improvements of head restraint systems

The first research study was a broadly based effort to develop improved safety standards not only for seats and seat backs but also for occupant restraint systems in general, which are covered by Safety Standard 208, Occupant Crash Protection. The study raised but did not fully answer certain questions on the desirable height of seat backs. The research findings indicated that high seat backs reduced the probability of neck injury but contributed to side and rear visibility problems.

In its proposed amendment, the Safety Administration would prescribe minimum head restraint heights intended to protect essentially all drivers and right front passengers without hindering driver visibility However, recognizing the possible adverse effect on short drivers, the Safety Administration solicited comments on rearview visibility problems inherent in higher head restraints in its March 1974 NPRM.

One of the proposed improvements, that would amend standard 207, is the requirement that head restraints be permanently attached to the seats This requirement is intended to prevent removal or loss of the head restraints, since the Safety Administration found that drivers removed head restraints from their vehicles or did not properly adjust the movable type of head cushion Such action negates the protection from whiplash injury and exposes car occupants to the hazard of impact with the attachment hardware which remains in or on the seat back

Safety Administration officials estimated that properly adjusted head restraints could prevent approximately 931,000 whiplash injuries a year. New rear-impact tests required in the proposed standard are expected to result in a large increase in seat-back strength over that currently required by standard 207 These tests will include the use of dummies

Safety Administration officials attributed the delay in preparing and issuing the NPRM--from June 1971 when the research study was completed until March 1974--to the need for coordinating the amended standard's test procedures with those under a proposed amendment to standard 208. Problems were encountered in obtaining consistent dummy tests results. Also during this period, the Safety Administration analyzed data on torso heights to develop requirements for minimum head restraint heights proposed in the NPRM.

Further study on
deployable head restraints needed

The study of deployable head restraint systems concluded that such systems are technically feasible and, in some respects, superior to conventional head restraints.

The research findings showed that a deployable head restraint can be packaged to allow the short driver to see over it for rearview vision and still be highly effective in providing head restraint for the tall driver The contractor pointed out that, since the head restraint is in place only when needed in an accident, it can be placed further forward than a fixed head restraint and therefore can greatly reduce motion of the occupant's head during a crash.

On the basis of the contractor's findings, MVP officials concluded that deployable head restraints were a promising concept but merited additional study to demonstrate their practicality. Since this research contract was completed in June 1971, the additional research needed has been deferred because of its low priority in the crashworthiness area.

FUEL SYSTEMS

Safety standard 301, effective January 1, 1968, specifies requirements for passenger cars' fuel systems to protect drivers and occupants against fire caused by ignition of spilled fuel in front-end crashes. Extension of this standard to other types of crashes causing fire hazards from fuel spillage has taken close to 7 years.

Accident statistics cited by the Safety Administration show that motor vehicle collisions accompanied by fires cause 2,000 to 3,500 fatalities annually. Recognizing the need to extend the standard to fire hazards caused by rear-end and side collisions and rollover accidents and to apply it to vehicles other than passenger cars, the Safety Administration contracted for several research studies carried out between June 1967 and December 1971. The contractors' findings confirmed the need for an improved and expanded standard.

The Safety Administration issued notices of proposed amendments in 1969 and again in 1970. It deferred rulemaking action until August 1973 when the standard was amended to cover rollover accidents of passenger cars, starting with model year 1976, and of other vehicles starting with model year 1977. Also in August 1973, the Safety Administration issued an NPRM to cover the hazards of rear-end, side, and other collisions effective in

model years 1977 and 1978 These requirements were incorporated with some modifications in an amendment issued in March 1974.

The delay in rulemaking for automotive fuel system crashworthiness was of special concern to the Subcommittee on Commerce and Finance, House Interstate and Foreign Commerce Committee. The Subcommittee held hearings in May 1973 on new evidence of the hazards of fuel systems disclosed by the Insurance Institute for Highway Safety and focused on DOT's failure to amend standard 301 on a priority basis. Following these hearings the Subcommittee Chairman requested prompt rulemaking action by DOT.

Need for safer fuel systems

The first research study, completed in September 1967, showed that the incidence of fires resulting from collisions is less than 0.5 percent but that the fatality rate among vehicle occupants in fire accidents is high, the contractor cited a 23-percent rate. To provide protection against fires in three major types of accidents not covered by standard 301, the contractor recommended that the standard require limits on fuel spillage in rear-end collisions, side collisions, and static rollovers.[1] The contractor suggested that the highest priority be assigned to these requirements and pointed out that they could be done with a minimum cost penalty and well within the present state of the art.

A second research study, completed in November 1969, recommended various means to eliminate certain design features found to increase the fire hazards caused by crashes, such as the exposed position of fuel tanks, flimsy mounting hardware, and the proximity of fuel system components to sharply profiled parts.

In October 1970 a third research contractor confirmed that rear-end collisions ranked first in contributing to fuel system

---

[1] A distinction is made between static and dynamic rollovers depending on whether tests are conducted on stationary or moving vehicles.

leakage, followed by frontal collisions, rollovers, and side collisions. The contractor studied the effectiveness of barrier test procedures for evaluating fuel system integrity in crashes and made recommendations for inclusion in the prescribed safety standard.

A further study was made between June 1969 and March 1970 to develop improved crashworthy electrical systems that would reduce the ignition potential in crashes The contractor suggested performance standards that would insure the integrity of the electrical systems under specified conditions.

The most recent research study, conducted between June 1970 and December 1971, reported that two of three test vehicles subjected to rear-end crashes into a moving barrier at 20 miles per hour (mph) had extensive leakage from their fuel tanks. All the vehicles tested leaked fuel after rollovers and rear-end collisions with a fixed barrier at 30 mph

The contractor found that only minor fuel system modifications were needed to enable many vehicles to pass a crash test at 20 mph and that many modifications could be made to improve fuel system integrity in crashes at 30 mph These modifications, although resulting in some initial design change costs, were considered to be readily adaptable to mass production methods. The contractor recommended that safety performance requirements, in addition to those in standard 301, be established for rear-end collisions and rollovers and be made applicable to vehicles other than passenger cars

Delay in amending safety standard

Initially, standard 301 required that in a front-end crash with a barrier at 30 mph, a passenger car's fuel tank and system lose no more than 1 ounce of fuel per minute In January 1969 the Safety Administration issued an NPRM proposing to add a similar requirement for a passenger car's rear-end collision with a moving barrier at 20 mph This proposed amendment, however, was not implemented, principally because the inclusion of side collisions and rollovers was also deemed desirable.

In August 1970 the Safety Administration issued a revised NPRM that incorporated extended and stricter requirements. The NPRM proposed that there should be no fuel spillage in a rear-end collision with a fixed barrier at 20 mph for vehicles manufactured in calendar year 1972 and at 30 mph for vehicles manufactured later. After January 1, 1973, no fuel spillage would be allowed in rollovers occurring after a 30 mph front- or rear-end collision with a fixed barrier.

The revised NPRM met substantial opposition by industry representatives, who objected to the requirement of no spillage and the use of a fixed barrier. Industry comments cited the adverse cost-benefit ratio of the no-spillage requirement and favored using a moving-barrier, rear-end impact test as a closer simulation of real accidents. We noted that the several research studies did not recommend these stricter requirements but accepted the 1-ounce-per-minute spillage and the use of a movable barrier in rear-end collision tests.

The Safety Administration recognized the validity of the objections raised against the August 1970 notice and, after extended deliberations, took the following rulemaking action in August 1973.

1. It amended standard 301 by requiring that, in a static rollover, test passenger cars starting with the 1976 model year not have fuel spillage in excess of 1 ounce per minute. A similar requirement applies to other vehicles under 6,000 pounds starting with the 1977 model year.

2. It issued an NPRM to apply the 1-ounce-per-minute spillage limitation to (a) static rollovers of vehicles over 6,000 pounds but less than 10,000 pounds, (b) rear-end crashes into a moving barrier at 30 mph, (c) side collisions with a moving barrier at 20 mph, and (d) certain other specified crash tests, including dynamic rollovers These requirements were to apply to various vehicle categories starting with the model year 1977 or 1978.

Safety Administration officials told us that the change in requirements for rear-end collisions from those specified in the August 1970 NPRM precluded them from incorporating the rule in the amended standard and necessitated issuing a revised NPRM subject to comments by interested parties. They attributed the 3-year delay from August 1970 to August 1973 to a number of factors, including (1) the complexity of the rulemaking actions to be taken, (2) the coordination of test conditions prescribed in standard 301 with those in standard 208 (which deals with occupant crash protection), and (3) the choice among alternatives in safety requirements to be decided within the Safety Administration.

In March 1974 the Safety Administration incorporated the provisions of the NPRM in an amendment to standard 301, with certain modifications involving the rate of permitted fuel spillage and without the proposed dynamic rollover test In issuing the amendment, the Safety Administration stated that objections had been registered in the public comments on these provisions of the NPRM but that no major objections had been raised to the other crash tests.

The Safety Administration has not yet based any safety standard on the March 1970 research study which suggested improving the crashworthiness of electrical systems. The program manager told us that additional research on causes of fire ignition was needed before rulemaking action could be taken. However, he said that such research had been deferred because vehicle crashworthiness was considered of higher priority than fire ignition. In fiscal year 1974, the MVP Office drew up a followup research requirement, which was planned to be funded before the end of the year.

MOTORCYCLE RIDER PROTECTION

The Safety Administration has issued several safety standards applicable to motorcycles, but none of them afford protection against motorcycle design hazards that can cause injuries in crash situations The Safety Administration, in recognizing this need, awarded two successive research contracts to study the dynamics of motorcycle crashes in support of a proposed rider protection standard.

The two research studies, completed by the contractor in July 1971 and March 1973, respectively, recommended certain design changes to eliminate or reduce safety hazards. Before using these recommendations for rulemaking purposes, the MVP Office considered it necessary to develop means of measuring by use of dummies the severity of injuries caused by motorcycle crashes. This data is being obtained under a contract awarded in October 1973 to develop an experimental safety motorcycle. Also, a follow-on contract was awarded in March 1973 to further explore one of the recommended features which involves a novel technology.

The Safety Administration cited statistics showing a large increase in motorcycle registrations in recent years, reaching 3 3 million in 1971 In 1972 there were 2,700 motorcycle rider fatalities and an estimated 300,000 injuries. The Safety Administration originally had set a target date of February 1973 for issuing a safety standard This data was changed to February 1974 but was further deferred

Hazardous design features

The first research study, made between June 1969 and July 1971, investigated and identified those elements in a motorcycle crash which are particularly hazardous to the rider The study recommended several changes in the design of motorcycles to eliminate or reduce such hazards, including the following.

--The fuel tank shape should not rise above the level of the loaded seat in order to minimize pelvic impact loads.

--The fuel tank and filler cap system should withstand tests simulating head-on and side impacts at 30 mph in order to minimize potential fire hazards.

--Windshield projections should knock off without leaving injury-producing ends

--Lacerating handlebar projections should be eliminated

--Mirrors should break off without leaving sharp edges

--The outer contours of the motorcycle should be smoothed.

In June 1971 the second research study was begun. Additional crash tests were made to study the effects of new protective concepts, such as redesign of the gas tank shape, breakaway windshields, air bags, and other passive restraints. The contractor concluded that, of all the design modifications tested, air bags were the most effective, preventing almost all contact with the decelerating motorcycle and other obstacles in a crash situation This study was completed in March 1973 and confirmed many of the findings of the first study

Safety Administration officials said the use of the air bags for motorcycles was still in the initial development stage and not ready for rulemaking in the near future Therefore, under an additional research contract signed in March 1973 and scheduled for completion in March 1975, the feasibility of air bags as a protective device on motorcycles will be studied more extensively

The second research study stated that it had demonstrated the potential for applying various motorcycle modifications to reduce injury. However, the MVP Office did not consider the information sufficient to support rulemaking and decided that additional research was required To assist the MVP Office in promptly applying research findings to safety standards, it would have been desirable for the R&D Office to follow its procedures for analyzing the findings and emphasizing those which were sound and could be used to support rulemaking These procedures are discussed in the following section

NEED FOR IMPROVED EVALUATIONS OF RESEARCH FINDINGS

The use of research findings in the rulemaking process could be greatly enhanced by adequately analyzing and evaluating them, as contemplated in a procedure established by the R&D Office in August 1971.

Until August 1971, the R&D Office, after completing a research contract, merely forwarded a copy of the contractor's final report to the MVP Office without evaluation or comment. A Safety Administration task force, charged with determining how rulemaking processes might be improved, recommended in June 1971 that the R&D

Office analyze research contractors' final reports and point out the data and conclusions which it believes are sound and can be used to support rulemaking Accordingly, in August 1971, the R&D Office required that a contract report analysis be prepared for each completed contract. Specifically, the analysis is to (1) describe the contractor's basic findings and their relationship to other research and emphasize those findings and conclusions that can be used to support rulemaking, (2) assess how well the research meets the contract objectives, (3) supplement the report with any additional information gained during the contract, and (4) recommend whether or not further studies should be made

Our review of the analyses made by the R&D Office of 12 final contract reports indicated that, in most cases, the analyses were little more than summaries or synopses of the contractors' findings and contained few constructive recommendations regarding rulemaking. Only 3 of the 12 analyses met all 4 of the above requirements. Five did not describe how the contracts supported rulemaking, one did not assess how well the contract objectives were met, and seven made only brief statements, rather than evaluations, that overall contract objectives had been met. Also, only six analyses recommended whether or not further studies should be made. Of these six, four were essentially restatements of the contractors' reports.

An MVP official responsible for rulemaking told us that the analyses were of little value to him because he had been aware of the contract findings before the reports were finished. He regarded contract report analyses as useful primarily for a quick overview of the contract findings for DOT personnel not otherwise knowledgeable of them.

Most of the contractors' final reports included a recommendation that further work be done to confirm research conclusions For example, one contractor's report contained the following comment

> "It is almost a classic conclusion of every research project that 'further work is necessary before the conclusions of the present project can be fully confirmed.' Rather often, of course, one research job does in fact simply point out that another research job is needed "

This tendency of research projects to generate additional work and postpone the time when research results can be used for rulemaking purposes emphasizes the need for timely critical evaluations of contractors' work by the R&D Office Such evaluations should assist the MVP Office in considering the sufficiency and soundness of contractors' research work, its usefulness for rulemaking, and the need for follow-on research

CONCLUSIONS

The Safety Administration needs to strengthen its procedures to insure that the results of motor vehicles safety R&D projects are promptly used to support new or improved safety standards. Our review of selected research findings showed that many years had elapsed between the completion of research projects and the formulation of safety standards.

In some cases, additional research studies were considered necessary, but competing research priorities caused followup studies to be deferred As discussed in chapter 2, adequate planning should insure that only high-priority projects are funded and carried through to completion within funding limitations. After completion of the studies, adequate evaluations should be made to determine whether a sound technical basis exists for rulemaking action or whether further research is warranted.

Improvements in planning and evaluating research studies are needed to assist the Safety Administration in applying the benefits of advanced technology to the issuance of improved motor vehicle safety standards. Such improvements are necessary to insure that life-saving and injury-reducing concepts are available to the public as soon as possible.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

We recommend that the Safety Administration

-- Critically evaluate research findings and determine the extent to which they can be used for rulemaking

--Insure that the MVP Office promptly (1) uses contractors' research findings, if determined to be feasible and desirable, to develop safety standards or (2) obtains any additional research needed on a priority basis to support rulemaking

AGENCY COMMENTS AND OUR EVALUATION

DOT said that the Safety Administration recognizes the need for evaluating research findings and for using them, when feasible and desirable, to develop safety standards. This recognition has led to repeated internal instructions requiring the review, analysis, and evaluation of research findings DOT also told us that the Safety Administration had taken steps to redirect the thrust of its evaluation reports so they will now serve primarily to evaluate contractors' performance. It said that detailed evaluations of the research took place during the multiyear contract cycle and that these evaluations included planning reviews, budget reviews, procurement reviews, and performance reviews which were monitored very closely by research and standards personnel DOT further said that the Safety Administration's plans for an improved program plan, its monitoring and updating, and the new procedures for multiyear research planning are expected to lead to increased use of research findings or to a requirement for additional research in support of rulemaking.

Improved planning for research and other changes proposed by the Safety Administration should result in increased usefulness of research findings. It is not clear at this time how the Safety Administration intends to evaluate research findings Since the completion of our review, no new written instructions have been issued to require the review, analysis, and evaluation of research findings The various internal reviews which the Safety Administration said were monitored very closely by research and standards personnel are not new, they also took place during our review when many research findings were not used in the rulemaking process or supplemented by further research and when reasons for not accepting research findings were not stated.

A Safety Administration official recently told us that detailed instructions were being developed to establish intermediate milestones for research and formal reviews at 6 month intervals. We believe that formal procedures should be established for the timely and critical evaluation of research findings to insure their maximum use in the rulemaking process

CHAPTER 4

EXPERIMENTAL SAFETY VEHICLE PROGRAM

The purpose of the Experimental Safety Vehicle (ESV) program is to test, on an experimental basis, new ideas of automotive safety incorporated in a complete vehicle. Its principal objectives are to

--Demonstrate the feasibility of advanced automotive safety performance by designing, fabricating, and testing experimental vehicles.

--Stimulate public awareness of safety and the economic advantages of advanced automotive safety design

--Encourage industry to increase its efforts in automobile safety design.

--Apply program results to the formulation of new or improved motor vehicle safety standards.

Little progress has been made in meeting the fourth objective Although several prototypes of a family sedan developed under the program have demonstrated higher levels of safety performance than required by the Safety Administration, these achievements have not resulted in new or improved safety standards

The ESV Program Office, a unit of the R&D Office, has not analyzed the test results from the family sedan project sufficiently to identify superior safety features of the prototype vehicles that could be used to develop improved safety standards. Instead, the ESV Program Office has focused on determining whether the prototype vehicles have met performance specifications and on using these specifications to plan fabrication of additional readily producible vehicles. However, after the family sedan project was terminated in June 1973, a contract was awarded the following October for an evaluation study which is expected to furnish the technical data that has been lacking.

CHRONOLOGY OF ESV PROGRAM

The program started in 1968 when three contract studies investigated feasible approaches to applying the total systems engineering concept to the development of an experimental safety vehicle. The conclusions of the studies formed the basis for developing program objectives and prototype performance specifications for the family sedan vehicle project.

Between June 1970 and July 1971, the Safety Administration contracted with two nonautomotive concerns and two auto manufacturers to build prototype family sedan vehicles. The first two contracts were competitive in that the contractor which produced the better vehicle would receive a follow-on contract for designing and developing 12 identical vehicles The auto manufacturers' contracts did not involve competition and were for a token sum of $1 each

An independent contractor tested the four contractors' prototype vehicles to assess their achievement of performance specifications and their compliance with design requirements. Testing of the first two prototype vehicles was completed in May 1972, the third in December 1972, and the last in July 1973

In June 1972 the Safety Administration modified its plan to award a follow-on contract for 12 additional vehicles to the winner in the competition for building the prototype vehicle. Instead, the winning contractor was to make additional studies and tests to develop final specifications for an improved safety vehicle.

In June 1973 DOT announced its decision not to build additional family sedan prototypes because of the trend toward smaller vehicles To conclude the family sedan project, in October 1973 the Safety Administration contracted for an evaluation study which was to make a technical review and analysis of all test data derived from the development work.

Costs of developing and testing the family sedan prototypes totaled about $14 6 million through fiscal year 1973. The October 1973 evaluation contract was estimated to cost $56,000. In January 1974 the Safety Administration awarded several contracts totaling about $2 million for preliminary design studies on

a 3,000-pound, advanced state-of-the-art, compact Research Safety Vehicle. These studies represented the initial stage of a planned four-stage program intended to support the development of safety standards for the 1980s.

In addition to carrying out the ESV program in the United States, DOT is involved in an international program under the sponsorship of the North Atlantic Treaty Organization's Committee on the Challenges of Modern Society. Between November 1970 and March 1972, DOT signed memorandums of understanding with the governments of France, Germany, Sweden, Italy, Great Britain, and Japan for the cooperative exchange of safety performance information based on the development of complete experimental vehicles in each of these countries. The Safety Administration estimated that the free world's automobile industry is investing approximately $200 million in this work. The Safety Administration pointed out that governments and manufacturers are participating because they believe that the program will enable them to keep abreast of technological advances and that the manpower and funds expended on such experimental vehicles will help them to meet future safety standards.

EXISTING SAFETY STANDARDS EXCEEDED BY ESV SPECIFICATIONS

The prototype vehicles delivered by the four contractors to the Safety Administration were designed, fabricated, and tested against a total systems performance specification which stipulated requirements for crashworthiness, accident avoidance, post-crash factors, and pedestrian safety The specifications met or exceeded all existing and proposed safety standards issued through mid-1970, especially in the highest priority area of crashworthiness.

For example, crash injury reduction specifications exceeded those of existing safety standards by requiring occupant survival without serious injury in a variety of crash modes, including front-end and 15-degree-angle crashes at 50 mph into barriers and poles. Accident avoidance criteria required braking, handling, and visibility of the vehicles to be much safer than those of the average sedan.

Post-crash specifications required improved levels for fire prevention and emergency exit Fire prevention requirements stipulated that the fuel system prevent any penetration of the fuel tanks and lines and any spillage of fuel in both front-and rear-end crashes into barriers and poles. The pedestrian safety specification, an area not covered by an existing or proposed safety standard, required that the vehicle exterior be designed to minimize injury to the pedestrian upon impact.

The Safety Administration, in its periodic progress reports, stated that, with minor exceptions, the performance of the prototype vehicles demonstrated that the specifications were generally achievable in the areas of accident avoidance, post-crash factors, and pedestrian safety. In the area of crashworthiness, it reported that good structural performance was demonstrated, although the vehicles did not completely demonstrate the technical feasibility of surviving crashes at 50 mph. In particular, the vehicles' restraint systems using air bags did not always provide the intended degree of protection. Also, the Safety Administration found that the initial specifications for crashworthiness resulted in designs of questionable practicality, either because of excessive weight, costly materials, or materials requiring changed production methods All prototype designs exceeded the 4,000-pound specification. The lightest vehicle weighed just over 5,000 pounds and the heaviest just over 6,000 pounds.

To remedy the problems experienced in the area of crashworthiness, the follow-on contract with the winner of the prototype competition provided for a series of trade-off studies and intensive development tests to support the development of final improved specifications. Concurrent with the ESV work, Safety Administration officials participated in discussions with industry and foreign government representatives to obtain their recommendations on specifications.

IMPROVED SAFETY PERFORMANCE OF PROTOTYPES

The contractor which conducted the test program for the four prototype vehicles reported a number of noteworthy safety features on one or more of the prototype vehicles In our comparison of selected test results with related safety requirements established or proposed by the Safety Administration, we noted that the prototype vehicles in most cases exceeded the following five safety standards.

Crashworthiness
Standard 215--exterior protection

Accident avoidance
Standard 104--windshield wiping and washing systems
Standard 105a--hydraulic brake systems
Standard 111--rearview mirrors

Post-crash protection
Standard 301--fuel system integrity

MVP officials confirmed that none of the prototype test results had been used to formulate new or improved safety standards. They said the results had not been used to improve the above five standards because (1) the higher levels of safety achieved would not be cost effective and (2) it was difficult to evaluate and apply results obtained within the context of a total vehicle system to safety standards applicable to subsystems or separate components

Exterior protection

Safety standard 215 requires that the safe operations of certain vehicle systems of passenger cars not be impaired by front- and rear-end collisions at 5 mph The Safety Administration issued an NPRM in July 1973 which would additionally require that these collisions cause no physical damage to the vehicles' front and rear ends.

Test results showed that two prototype vehicles sustained no damage at speeds up to 9.5 mph for front-end collisions and 5.8 mph for rear-end collisions. The only damge of a third prototype vehicle was during the front-end collision, in which the side guard trim moulding pulled loose from one fender

Rulemaking officials told us that the higher level of safety of the prototype vehicle bumper systems involved both cost and aggressiveness penalties. Aggressiveness relates to the penetrating force of the striking vehicle. With regard to cost, rulemaking officials said that larger frames and tires plus new suspension systems would be required if the safety standard were upgraded

to the performance of the prototypes. Furthermore, in their opinion, the penetrating force of prototype bumper systems would likely result in injuries to occupants of the struck vehicle.

Rulemaking officials believed that prototype bumper systems would not be cost effective but said that a cost analysis had not been made. Also, one official told us that the prototype designs had not been sufficiently analyzed to determine how much weight they added.

Windshield wipers

Safety standard 104 provides that passenger vehicles' windshield-wiping systems clearly wipe a specified percentage of the windshield. The prototype vehicles surpassed the requirements of the standard by using conventional state-of-the-art technology to wipe a larger percentage of the windshield Rulemaking officials told us these developments were not used to formulate an improved safety standard because the change would probably not be cost effective.

A benefit-cost analysis was not made because rulemaking officials believed that any contribution to safety by increasing the windshield areas wiped would be insignificant Rulemaking officials told us that, before they improve the standard, they need to determine the direct fields of view that a driver should see. A research contract awarded by the Safety Administraton in June 1973 is investigating required fields of view to support development of a new standard.

Hydraulic brake systems

Standard 105a requires that a lightly loaded passenger car traveling at 60 mph stop within 194 feet under normal conditions and within 456 feet under partial brake failure conditions. Two prototype vehicles stopped within 157 and 159 feet, respectively, under normal conditions and within 269 and 214 feet, respectively, under partial brake failure conditions.

Rulemaking officials told us that applying the prototype vehicles' braking performance to an upgraded safety standard might

not be cost beneficial and that surpassing the requirements of the standard did not necessarily evidence the need for an improved standard

The importance of an effective braking standard is emphasized in the preamble to standard 105a which states

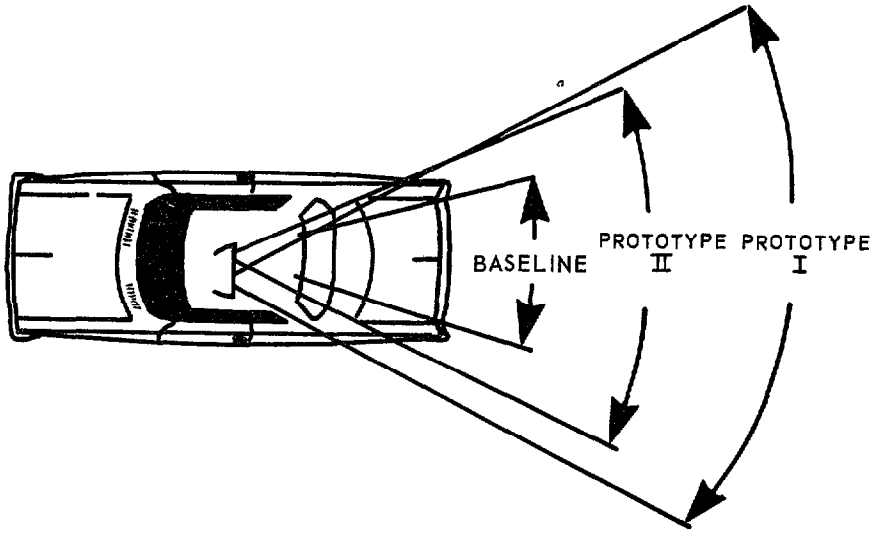
> "Braking continues to be the most important single element of accident avoidance from the standpoint of vehicle performance. The full utilization of the industry's technological capability in this area, within the limits of reasonable costs, is therefore of highest importance to the safety effort."

The Safety Administration estimated that standard 105a would prevent about 10 percent of the 6 47 million accidents attributed to braking performance limits of passenger cars with adequately maintained brakes Accordingly, an increase in the effectiveness of the standard might prevent more accidents The ESV Program Office informed us that the prototype vehicles achieved their improved stopping distance by using current state-of-the-art technology and that, in their opinion, using prototype braking systems would not greatly increase vehicle weight or cost.

Rearview mirrors

Standard 111 established minimum rearview requirements at a 20-degree horizontal angle and a vertical-angle view of the level road surface beginning at a point not greater than 200 feet behind the vehicle. Each of the four prototype vehicles surpassed the standard's requirements One vehicle (prototype I) attained a 55-degree horizontal angle and visibility of the road surface beginning 42 feet behind the vehicle. Another vehicle (prototype II) achieved a 48-degree horizontal angle and a view beginning 45 feet behind the vehicle The two nonautomotive concerns used periscope systems to achieve the increased field of view, while the auto manufacturers used a system of inside and outside mirrors

The following diagram illustrates the superior horizontal angle performance of prototypes I and II over a baseline vehicle which represents typical production vehicles



Rulemaking officials told us that prototype achievements were not used to develop an improved safety standard because of difficulties in making a valid benefit-cost analysis They stated that insufficient accident data was available for such an analysis and cited the lack of data showing drivers' reactions to the increased field of view. The Safety Administration is continuing its efforts to obtain adequate accident data and to determine the effectiveness of periscope systems and convex mirrors. (See p. 19.)

Fuel systems

We previously discussed (see p. 22) safety standard 301 and its August 1973 and March 1974 amendments which specify minimum fuel leakage in front- and rear-end collisions at speeds of 30 mph .

Each of the prototype vehicles achieved zero leakage after front-end collisions at almost 50 mph. Two rear-end impact tests were conducted at 60 mph. In one test, the struck vehicle demonstrated no fuel spillage In the second test, only slight spillage occurred. The performance results were achieved primarily by relocating the fuel tank between the trunk and the rear seat.

Rulemaking officials told us that the prototypes' achievements had not been applied to an improved safety standard because the minimum fuel spillage specified in the standard was essentially the same as no spillage since fuel leaks generally were either catastrophic or negligible. MVP officials commented that the absence of fuel spillage probably resulted from the strength of the vehicle structure rather than the crashworthiness of the fuel systems.

ADDITIONAL ESV STUDIES IN PROGRESS

The Safety Administration expects that the two ongoing ESV studies--the final evaluation of the family sedan project started in October 1973 and the development of an advanced state-of-the-art Research Safety Vehicle started in January 1974--will provide an important source of data for consideration in formulating improved safety standards.

The contractor conducting the family sedan evaluation is to submit a final report containing (1) the results of the analysis and evaluation of test data, (2) an analysis of design solutions, (3) an evaluation of the significance of the results, and (4) conclusions and recommendations The scheduled completion date for the contract is November 1974

The project for developing an advanced state-of-the-art Research Safety Vehicle is intended to provide major input for developing safety standards for the 1980s. The project uses the total systems design approach to provide optimum trade-off between competing design requirements. The Research Safety Vehicle, as presently conceived, is a compact-size passenger car weighing approximately 3,000 pounds. It is to consider the projected changes in automobile use in the next decade, as well as energy, resource, and pollution problems.

The project, to be accomplished in four phases, is currently in its first phase, project definition and specification development. The second phase will consist of advanced engineering required to produce a total vehicle systems design. If the design solutions appear practicable and if total vehicle fabrication for final systems integration is considered desirable, the third phase will comprise the final design optimization and fabrication. In the fourth phase, an independent contractor is to test the vehicle design. The Safety Administration estimates the entire project will take nearly 5 years at a cost of about $14 million.

In hearings held in February 1974 by the Senate Committee on Commerce, Safety Administration officials said that, although the Research Safety Vehicle project was phased, they would not wait for completion of all phases before using worthwhile information to formulate safety standards

AGENCY COMMENTS AND OUR EVALUATION

DOT said the ESV program was a long-term advanced research effort which had little direct application to safety standards for near-term production vehicles. It also said that, although quantifying the contribution of the program was difficult, the contribution was real DOT pointed out that the program had stimulated extensive worldwide automotive research and had provided techniques which would enable DOT to make the most of the information received throughout the research safety vehicle study. DOT said the results of this program would be used in establishing future safety standards.

The ongoing evaluation of the family sedan project is expected to provide data for developing safety standards. A critical evaluation of the contractor's final report, as recommended in chapter 3, is needed to assist the MVP Office in promptly using ESV safety achievements to formulate new or improved safety standards.

CHAPTER 5

SCOPE OF REVIEW

We made our review primarily to determine whether the Safety Administration had adequate management procedures to insure that priority motor vehicle safety research was being conducted and that benefits from the research program were being used on a timely basis in the development of safety standards. We obtained information on Safety Administration policies and procedures relating to the planning of motor vehicle safety research and the use of research findings from the Safety Administration's headquarters in Washington, D. C

We reviewed the findings of 21 completed research projects undertaken to support planned actions in five rulemaking actions and discussed the procedures and practices followed in implementing the research findings with Safety Administration officials. We also reviewed selected ESV program research findings and held discussions with Safety Administration officials

We met with officials of the following organizations to obtain their views on the planning and implementation of the Safety Administration's research program

Center for Auto Safety
Insurance Institute for Highway Safety
Automobile Importers of America
Automotive News

RESEARCH CONTRACTS REVIEWED BY GAO AS OF MARCH 1974

Research Contracts for Rear Lighting and Signaling

Completed contracts	Date awarded	Date completed	Cost
Rear-lighting system changeover	June 1967	Dec. 1968	$ 354,295
Vehicle rear-lighting systems	June 1967	Aug. 1968	124,996
Vehicle rear-lighting systems	June 1967	Sept. 1968	64,553
Motor vehicle rear lighting and signaling	June 1967	July 1968	244,616
Vehicle rear-lighting systems	June 1967	Apr. 1968	190,700
Analytic assessment of motor vehicle rear signal systems	June 1967	Mar. 1970	135,000
Automotive rear lighting and signaling systems	June 1968	Jan. 1970	102,970
Selections of vehicle rear-lighting systems	June 1968	May 1970	100,000
Total			$1,317,130

APPENDIX I

Contract in progress	Date awarded	Date completed	Cost
Improved rear signaling and lighting	June 1973	-	$ 81,505

Research Contracts for Rearview Mirrors

Completed contracts

Motor vehicle rear vision	June 1968	Sept. 1969	$ 78,215
A comparison of plane and convex rearview mirrors for passenger automobiles	Sept. 1969	Aug 1970	53,897
Field-of-view requirements directly behind vehicle	June 1971	Feb 1972	46,754
Evaluation of selected passenger car periscope and truck mirror rearview systems	June 1972	June 1973	117,722
Total			$ 296,588

Contract in progress

Passenger car periscope and truck mirror rearview systems	July 1973	-	$ 72,879

Research Contracts for Fuel System Integrity

Completed contracts	Date awarded	Date completed	Cost
Investigation of motor vehicle performance standards for fuel tank protection	June 1967	Sept. 1967	$ 47,560
Fuel tank protection	June 1968	Nov. 1969	78,480
Impact intrusion characteristics of fuel systems	June 1969	Oct. 1970	24,306
Prevention of electrical ignition of automotive crash fire	June 1969	Mar 1970	32,630
Assessment of automotive fuel system fire hazards	June 1970	Dec. 1971	112,882
Total			$ 295,858

Research Contracts for Seating Systems

Completed contracts			
Integrated seat restraint systems and child restraint systems	June 1968	June 1971	$ 784,914
Deployable head restraints	June 1970	June 1971	192,974
Total			$ 977,888

APPENDIX I

Research Contracts for Motorcycle Rider Protection

Completed contracts	Date awarded	Date completed	Cost
Dynamics of motorcycle impact	June 1969	July 1971	$ 137,810
Dynamics of motorcycle impact	June 1971	Mar 1973	117,690
Total			$ 255,500
Contracts in progress			
Dynamics of motorcycle impact	Mar. 1973	-	$ 323,040
Near-term safety improvements for motorcycles	Oct. 1973	-	99,180
Total			$ 422,220

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON D C 20590

ASSISTANT SECRETARY
FOR ADMINISTRATION

July 22 1974

Mr. Henry Eschwege
Director
Resources and Economic Development
Division
U S. General Accounting Office
Washington, D C. 20548

Dear Mr. Eschwege:

This is in response to your letter dated May 2, 1974, requesting that we review and comment on the General Accounting Office (GAO) draft report on improvements needed in planning and using motor vehicle safety research

The need for a coordinated program plan for establishing motor vehicle safety standards, for its periodic updating, and for monitoring its execution is fully recognized by the National Highway Traffic Safety Administration (NHTSA) So is the need for the evaluation of research findings and for their use, when feasible and desirable, toward the development of such standards This recognition has led to the efforts, discussed in the GAO report, to develop a coordinated program plan for motor vehicle safety standards with a computer capability for its periodic updating. It has also led to repeated internal instructions requiring the review, analysis, and evaluation of research findings. Most recently, it has led to the issuance, on May 28, 1974, of revised procedures for NHTSA's output-oriented, multiyear planning for research and technical support by specified categories.

NHTSA plans to continue to strive for improved coordination of its program and research functions in support of its mission to reduce accidents and the resulting fatalities, injuries and property damage.

I have enclosed two copies of the Department's reply.

Sincerely,

William S Heffelfinger

Enclosure

DEPARTMENT OF TRANSPORTATION REPLY

TO

GAO DRAFT REPORT TO THE COMMITTEE ON COMMERCE

UNITED STATES SENATE

ON

IMPROVEMENTS NEEDED IN PLANNING AND USING

MOTOR VEHICLE SAFETY RESEARCH, B-164497(3)

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

During the period February 1973 to May 1974, representatives of the General Accounting Office, at the request of the Chairman of the Committee on Commerce, United States Senate, conducted a review of the National Highway Traffic Safety Administration's planning for and use of motor vehicle safety research. The General Accounting Office recommends that the Secretary of Transportation require the National Highway Traffic Safety Administration to

"--Develop a coordinated program for establishing motor vehicle safety standards which delineates the research requirements associated with each planned safety standard and periodically update the plan.

"--Monitor the carrying out of the plan and resolve any differences that may arise between the offices responsible for research and rulemaking

"--Require the Research Institute to adequately evaluate research findings and assist Motor Vehicle Program offices in determining the extent to which they can be used for rulemaking

"--Insure that Motor Vehicle Program offices promptly use contractors' research findings, when determined to be feasible and desirable, toward the development of safety standards, or obtain such additional research as may be warranted on a priority basis to support rulemaking "

SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION

The National Highway Traffic Safety Administration generally agrees with the thrust of the recommendations of the General Accounting Office to the Secretary of Transportation

The need for a coordinated program plan for establishing motor vehicle safety standards, for its periodic updating, and for monitoring its execution is fully recognized by NHTSA. So is the need for the evaluation of research findings and for their use, when feasible and desirable, toward the development of such standards This recognition has led to the efforts, discussed in the subject draft report, to develop a coordinated program plan for motor vehicle safety standards with a computer capability for its periodic updating It has also led to repeated internal instructions requiring the review, analysis, and evaluation of research findings Most recently, it has led to the issuance, on May 28, 1974, of revised procedures for NHTSA's output-oriented, multiyear planning for research and technical support by specified categories.

These efforts are directly complemented by the reorganization of NHTSA on May 15, 1974 As set forth in the justification for this reorganization, its major goals included improved coordination among organizational units, greater teamwork in developing research requirements, an increased cohesiveness within the total organization, and much greater emphasis on planning and evaluation. NHTSA will continue to strive for improved coordination of its program and research functions in support of its primary mission to reduce accidents and the resulting fatalities, injuries, and property damage.

POSITION STATEMENT

With respect to the specific observations and the recommendation in the draft report concerning the development of a coordinated program plan for establishing motor vehicle safety standards,

> "--develop a coordinated program plan for establishing motor vehicle safety standards which delineates the research requirements associated with each planned safety standard and periodically update the plan "

NHTSA has the following comments

The NHTSA, as is acknowledged in the draft report, is fully aware of the need for a coordinated program plan and has taken steps within the past year to develop such a plan. An essential feature of this plan includes a computer capability to monitor and update the plan as new developments and information dictate The new procedures for "Output-Oriented, Multiyear Planning by Categories of Research and Technical Support," issued on May 28, 1974, complement this plan by clearly defining research and technical support categories, assigning responsibilities for the development of multiyear plans and associated research requirements, and establishing control procedures for the coordination and clearance of necessary work statements as well as the resolution of any nonconcurrences

Regarding the observations and the recommendation on the need for monitoring the execution of the program plan and resolving any differences between research and rulemaking elements,

> "--monitor the carrying out of the plan and resolve any differences that may arise between the offices responsible for research and rulemaking programs "

NHTSA has the following comments

The draft report discussed NHTSA efforts to develop a computer capability for the continual monitoring of the program plan and its updating in response to new developments and information. The new procedures for "Output-oriented, Multiyear Planning by Categories of Research and Technical Support," in turn, will facilitate the resolution of any differences between NHTSA program elements through the assignment of specific responsibilities to program managers, the establishment of fixed schedules for the coordination and clearance of work statements for research requirements, and the referral (for resolution) to the Administrator of any issues that cannot be cleared within the prescribed coordination schedule.

As regards the recommendation concerning the evaluation of research findings,

> "--require the Research Institute to adequately evaluate research findings and assist Motor Vehicle Program offices in determining the extent to which they can be used for rulemaking."

NHTSA has the following comments

The backlog of evaluation reports submitted during FY 1974 has been reduced to six, and steps are currently being taken to redirect the thrust of the evaluation reports. The GAO report implies that the reports should present a detailed evaluation of the research effort and how it relates to rulemaking The detailed evaluation of the research effort takes place during the multiyear contract cycle which includes planning reviews, budget reviews, procurement reviews, and performance reviews which are monitored very closely by research and standards personnel. The main emphasis will be to have the evaluation report serve the primary purpose of evaluating the contractor's performance. These data will be used for the evaluation of future solicitations, negotiations, awards, and other Contract Technical Management functions.

Concerning the recommendation on the use of contractors' research findings,

> "--to insure that Motor Vehicle Program offices promptly use contractors' research findings, when determined feasible and desirable, toward the development of safety standards, or obtain such additional research as may be warranted on a priority basis to support rulemaking."

NHTSA has the following comments

Continuing efforts to develop realistic, timely analyses and evaluations of contractors' research findings, coupled with the plans for an improved program plan, its monitoring and updating, and the new procedures

for multiyear research and technical support planning, will lead to increased use of these research findings Depending on priority and program emphasis as well as available resources, this may lead to a requirement for additional or supplemental research in support of rulemaking

A comment appears in order, finally, on the discussion of the Experimental Safety Vehicle Program in Chapter 4 of the draft report The program was undertaken as a long-range effort to demonstrate the feasibility of advanced automotive safety performance To the extent practicable, program results were also to be considered in the formulation of new or improved motor vehicle safety standards This has been done wherever indicated However, it must be stressed that this program was one of long-term, advanced research with little direct application to Federal Motor Vehicle Safety Standards for near-term production vehicles, but there were definite beneficial technological spinoffs that occurred While it is difficult to quantify the contribution of this program, it is nevertheless real and should not be ignored The Experimental Safety Vehicle Program has stimulated extensive worldwide automotive research for a minimum expenditure of U S dollars As a result of our experience in the ESV Family Sedan program, we have phased the new U S initiative, the Research Safety Vehicle Program, in a manner that optimizes the acquisition of pertinent information throughout the program Furthermore, I fully intend to utilize the results of the Research Safety Vehicle Program in my deliberations for the creation of future Federal Motor Vehicle Safety Standards The recent NHTSA reorganization which put all vehicle systems research in a single unit reinforces my commitment in this area

As discussed in the foregoing, and recognized by GAO in the draft report, NHTSA is fully aware of the importance of a coordinated program plan for motor vehicle safety standards, and of the need for its systematic updating and for monitoring its execution The Administration also concurs in the importance of the evaluation of research findings and their use, when feasible and desirable, in the development of new or improved motor vehicle safety standards Positive steps have been taken to bring about further improvements in this important area of NHTSA's mission to reduce accidents and the resulting fatalities, injuries, and property damage Their full implementation will contribute toward reaching this goal

James B. Gregory
Administrator
National Highway Traffic Safety
Administration