
BY THE COMPTROLLER GENERAL
Report To The Chairman,
Subcommittee On Oversight And Investigations
Committee On Energy And Commerce
House of Representatives
OF THE UNITED STATES

Department Of Transportation's Motor Vehicle Defect-Testing Procedures Were Reasonable-- Public Announcements Of Potential Safety Defects Could Be Improved

The Department of Transportation's National Highway Traffic Safety Administration (NHTSA) conducts tests as part of its investigations to determine whether defects exist in motor vehicles that subject the public to unreasonable risks of accident, injury, or death. The Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, requested GAO to review NHTSA's defect-testing program and its investigation of a potential defect involving rear axle separation of General Motors' 1978-80 A-body cars and trucks.

GAO found that NHTSA initiates its investigations of potential safety-related defects primarily as a result of consumer complaints. GAO also found that NHTSA's staff develops and conducts individualized defect tests when, in its professional judgment, such tests are necessary to help in determining whether a safety defect exists in motor vehicles. GAO believes that NHTSA's practices and procedures for identifying potential safety-related defects and conducting defect tests were reasonable.

NHTSA followed its written guidelines in investigating rear axle separations involving General Motors' cars and trucks. However, GAO found that there were problems with NHTSA's announcement of its initial determination that a safety defect involving this problem existed in these vehicles. GAO makes a recommendation to improve NHTSA's future announcements of its initial safety defect determination.



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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-213545

The Honorable John D. Dingell, Chairman
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

As requested by your April 18, 1983, letter, this report summarizes the results of our review of the National Highway Traffic Safety Administration's program to test motor vehicles for safety-related defects. The report also discusses the Safety Administration's investigation of an alleged rear axle separation problem with General Motors Corporation's 1978, 1979, and 1980 A-body cars and trucks, including the Safety Administration's release to the media of film prepared of tests conducted to demonstrate the consequences of that problem.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of the report. At that time, we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

A handwritten signature in cursive script that reads "Charles A. Bowsher".

Comptroller General
of the United States



D I G E S T

The National Traffic and Motor Vehicle Safety Act authorizes the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) to conduct investigations and test motor vehicles with possible safety defects. A safety defect is any defect in the performance, construction, components, or material of a motor vehicle or item of replacement equipment which subjects the public to unreasonable risks of accident, injury, or death.

The Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, requested GAO to (1) review NHTSA's practices and procedures for conducting its defect testing and the actions or events which cause the agency to initiate defect testing of domestic and foreign vehicles and (2) examine in detail a potential defect involving rear axle separation of certain General Motors (GM) vehicles, NHTSA's test of one of those vehicles, and NHTSA's release of a film of those tests to the news media. GAO was also requested to obtain information on the voluntary recall of motor vehicles by domestic and foreign manufacturers, any cutbacks in NHTSA personnel used in the defect-testing program, and the use of private contractors and government installations and personnel for defect testing.

GAO found that NHTSA depends primarily on consumer complaints to identify potential safety-related defects in motor vehicles. Defect investigations and any subsequent testing of vehicles are initiated on the basis of the NHTSA staff's professional judgment that such potential defects subject the public to unreasonable risk of accident, injury, or death.

GAO's analysis showed domestic and foreign manufacturers recalled motor vehicles to remedy safety defects during fiscal years 1974 through 1983 at the same ratio as their respective shares of the market. However, domestic

manufacturers voluntarily recalled a higher percentage of their recalled motor vehicles than foreign manufacturers.

Also, GAO found that NHTSA followed its written guidelines in investigating the potential safety defect of rear axle separations involving certain GM cars and trucks. However, as a part of announcing the results of its investigation, NHTSA released a film to the media of tests demonstrating the consequences of rear axle separation without providing an explanation of how the tests were conducted and before providing information on its investigation, including a copy of the film, to the manufacturer.

THE DEFECT-TESTING PROGRAM

With respect to NHTSA's defect-testing program, GAO found the following:

- Most investigations are initiated on the basis of the NHTSA staff's professional judgment that potential safety defects brought to its attention may subject the public to unreasonable risks of accident, injury, or death. (See p. 5.)
- Defect tests are conducted when, in the NHTSA staff's professional judgment, such tests are necessary as part of its investigations to determine whether a safety defect exists. NHTSA's engineers develop individualized defect-test programs and procedures to identify the causes or demonstrate the consequences of potential defects under investigation. (See p. 7.)
- NHTSA gives particular attention to the safety of its employees when planning and performing defect tests. According to NHTSA's injury reports, its test facility had not experienced a serious injury or fatality in performing more than 100 defect tests since opening in 1976. (See p. 7.)

In GAO's view, these practices and procedures for identifying potential safety-related defects and conducting defect tests were reasonable.

GAO estimated that NHTSA's expenditures for domestic and foreign motor vehicle defect testing were incurred at nearly the same ratio as their manufacturers' shares of the market.

Of the \$1,190,868 spent in fiscal years 1981 through 1983, 81 percent was spent for testing domestic manufacturers' vehicles and 19 percent for testing foreign manufacturers' vehicles. For these 3 years, domestic and foreign manufacturers had a 74- and 26-percent share of the American automotive market, respectively.

Further, GAO's analysis of the \$1,190,868 showed that 68 percent was spent for defect tests conducted by the NHTSA Engineering Test Facility, 27 percent for tests conducted by private contractors, and 5 percent for tests conducted by other federal agencies. A NHTSA official told GAO that NHTSA plans to depend on its Engineering Test Facility to perform an even larger share of its defect testing in the future. (See p. 9.)

For fiscal years 1981 through 1984, the levels of funding and staff available for NHTSA's defect investigation program remained relatively constant. NHTSA requested \$4.5 million to finance the program in fiscal year 1985, which represents a 20-percent increase over NHTSA's authorized funding for fiscal year 1984. (See p. 12.)

VEHICLES RECALLED TO REMEDY SAFETY DEFECTS

During fiscal years 1974 through 1983, domestic and foreign manufacturers recalled 57.7 million vehicles to correct safety-related defects. Domestic manufacturers recalled 47 million, of which 28.1 million (60 percent) were voluntarily recalled. Foreign manufacturers recalled 10.7 million, of which 2.7 million (25 percent) were voluntarily recalled. Domestic and foreign manufacturers' recalls reflected the same percentages as their respective shares of the American automotive market (81 and 19 percent) for the 10-year period. (See p. 13.)

INVESTIGATION OF REAR AXLE SEPARATION PROBLEM

GAO found that NHTSA followed its written guidelines in investigating whether a safety-related defect involving rear axle separation existed in GM's 1978-80 A-body cars and trucks. NHTSA began its investigation of the potential safety defect in April 1981. NHTSA and GM officials told GAO that tests of an

A-body car conducted by NHTSA during its investigation were appropriate to demonstrate the consequences of a rear axle separation.

After completing its investigation, NHTSA made an initial determination in April 1983 that rear axle separation constituted a safety defect in these GM cars and trucks. NHTSA then offered GM an opportunity to present data, views, and arguments regarding the initial determination at a public proceeding. At that May 1983 proceeding, GM challenged NHTSA's initial determination. As of October 1984, NHTSA was still considering whether to make a final determination that a safety-related defect exists in these cars and trucks or to terminate its investigation. (See p. 16.)

PUBLIC RELEASE OF REAR AXLE SEPARATION INVESTIGATION RESULTS

Just prior to making its initial determination announcement late in the afternoon of Friday, April 1, 1983, NHTSA released copies of a film to the media which showed a rear axle shaft and wheel assembly separating from an A-body vehicle that it had tested. NHTSA did not explain to the media that the rear axle separation had been induced by removing a part that retained the car's rear axle.

After the test film was shown that day on television, some owners of GM cars questioned whether their cars might experience axle separation if driven in a manner similar to that shown in the film.

Since GM was not provided information supporting NHTSA's initial determination, including a copy of the film, until Monday, April 4, 1983, GM was not in a position to respond over the weekend to questions from some owners concerning the safety of the A-body cars.

NHTSA does not have written guidelines assigning responsibilities within the agency for announcing its initial determinations of safety-related defects. In GAO's view, NHTSA's adoption of written guidelines for making initial determination announcements would assist NHTSA in avoiding problems such as those that resulted from its release to the media of the film of the A-body defect tests. GAO believes that these guidelines should require NHTSA to accompany any films of defect tests released to the news media, as part of

an initial determination, with an explanation of the modifications, if any, made to the vehicle and the conditions under which the tests were conducted. These guidelines should also apply to tests of replacement equipment.

Also, GAO believes that the guidelines should ensure that films of defect tests and other information supporting an initial determination are not released to the news media or to the public before being provided to the manufacturer. This would provide a manufacturer with information it may need to promptly respond to questions raised about defect tests and the safety of the cars being investigated. (See p. 26.)

RECOMMENDATION TO THE SECRETARY
OF TRANSPORTATION

GAO recommends that the Secretary of Transportation instruct the Administrator, NHTSA, to issue guidelines requiring NHTSA to accompany any film of defect tests released to the media with a clear explanation of any modification to the vehicle or replacement equipment and the conditions under which the tests were conducted. The guidelines should also require that NHTSA not release test film or other information gathered to support its initial determination to the media or the public before providing it to the manufacturer. (See p. 33.)

GAO did not request Department of Transportation comments on this report.



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ABBREVIATIONS

ABC	American Broadcasting Company
CBS	Columbia Broadcasting System
DOT	Department of Transportation
GAO	General Accounting Office
GM	General Motors Corporation
NBC	National Broadcasting Company
NHTSA	National Highway Traffic Safety Administration
ODI	Office of Defects Investigation

CHAPTER 1

INTRODUCTION

The Congress enacted the National Traffic and Motor Vehicle Safety Act (15 U.S.C. 1381) on September 9, 1966, with the stated purpose of reducing traffic accidents, injuries, and fatalities. The act authorizes the Secretary of Transportation to conduct investigations and test motor vehicles with possible safety defects. A safety defect is any defect in the performance, construction, components, or material of a motor vehicle or item of replacement equipment which subjects the public to unreasonable risks of accident, injury, or death.

The Secretary must immediately notify the manufacturer if an investigation determines that any motor vehicle or item of replacement equipment contains a defect that relates to motor vehicle safety. The notifications have included all information upon which the Secretary's initial determinations were based, including any film of tests conducted to identify the cause or to demonstrate the consequences of the defect.

The act requires the manufacturer to recall and correct, without charge to the owners, safety defects found in cars and replacement items not more than 8 years old. Remedy must be provided for tires that are not more than 3 years old.

The Administrator, National Highway Traffic Safety Administration (NHTSA), carries out the Secretary's responsibilities under the act. The Office of Defects Investigation (ODI), under NHTSA's Associate Administrator for Enforcement, conducts the safety defect investigations. NHTSA's investigation process, including its three phases--inquiry, engineering analysis, and formal investigation--is described in appendix I.

OBJECTIVES, SCOPE, AND METHODOLOGY

In an April 18, 1983, letter, the Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, expressed concern about NHTSA's motor vehicle defect-testing program, including its fairness and accuracy. The Chairman requested that we examine NHTSA's (1) practices and procedures for conducting the program and (2) investigation of an alleged safety defect involving rear axle shaft and wheel assembly (brake drum, wheel, and tire) separation that could affect as many as 5.3 million General Motors Corporation's (GM's) 1978-80 A-body cars and trucks. These vehicles are the Chevrolet Malibu, Monte Carlo, and El Camino; Pontiac Lemans and Grand Prix; Oldsmobile Cutlass and Cutlass Supreme; Buick Century and Regal; and GM Caballero. In carrying out our work, the Chairman specifically asked that we

--identify what actions, complaints, or events caused NHTSA to initiate defect testing of domestic- and foreign-made motor vehicles and any problems associated with the program;

- determine how all NHTSA's defect tests are carried out and indicate whether or not these tests follow normal procedures, including procedures to provide for the safety of persons participating in the tests;
- examine the alleged problem of rear axle shaft and wheel assembly separation potentially affecting the A-body vehicles, NHTSA's tests of one such vehicle, and NHTSA's public release of films of those tests; and
- determine whether a research report prepared by the Highway Loss Data Institute¹ provided information on accidents resulting from rear axle separations in GM's 1978-80 A-body vehicles.

In subsequent discussions with the Chairman's office, we were also requested to obtain information on (1) voluntary recalls of motor vehicles by foreign and domestic manufacturers, (2) any cut-backs in NHTSA personnel used in the defect-testing program, and (3) the use of private contractors and government installations and personnel for defect testing.

To accomplish our objectives, we examined ODI's process for identifying potential safety-related defects in motor vehicles for investigation and testing. We reviewed legislation and regulations which describe NHTSA's and the manufacturers' responsibilities for identifying safety-related defects and for recalling vehicles having such defects. We did not attempt to determine whether other potential problems posed a greater risk to motor vehicle safety than those problems investigated.

We obtained information on the number and costs of defect tests that were conducted on motor vehicles during fiscal years 1981 through 1983. In addition, we compiled statistics on the number of domestic- and foreign-made vehicles that were recalled voluntarily by manufacturers and as the result of NHTSA's investigations during fiscal years 1974 through 1983. We then compared this information on defect tests and voluntarily recalled motor vehicles to the number of domestic and foreign vehicles produced and sold during these periods. In addition, we obtained information on the relative number of investigations and resources expended by NHTSA for its defect investigation activities.

At NHTSA's headquarters, we interviewed the Associate Administrator for Enforcement; the Chief Counsel and an attorney

¹The Highway Loss Data Institute gathers, processes, and publishes information on the injury and other insurance claims experience of various types of cars and other motor vehicles. Financial support for the Institute is provided through the Insurance Institute for Highway Safety which, in turn, is supported by most automobile insurers either directly or through their trade associations.

involved in the GM A-body investigation; the Chiefs of the Engineering Analysis and Defects Evaluation Divisions, ODI; the ODI engineers assigned to the engineering analysis and formal investigation of the GM A-body case; and the Chief, Defects Information Systems Division, ODI. At NHTSA's Vehicle Research and Test Center, Office of Research and Development, East Liberty, Ohio, we interviewed the Chief of the Engineering Test Facility to determine how defect tests are carried out. At the Center, we also interviewed the project engineer and one former and two present technicians who participated in the testing of the alleged GM A-body rear axle and wheel assembly separation problem. We did not review files at GM relating to that problem.

We examined ODI's investigation files to determine its basis for initiating tests of the alleged rear axle and wheel assembly separation problem with the GM A-body motor vehicles. We also reviewed NHTSA's test report on that alleged problem as well as other defect test reports prepared for ODI by the Engineering Test Facility and a private contractor. In reviewing other test reports, we sought only to generally determine whether NHTSA had previously conducted other individualized tests as in the case of the GM A-body rear axle problem.

NHTSA's Engineering Test Facility, Vehicle Research and Test Center, Office of Research and Development, conducted most of ODI's defect tests during fiscal years 1981 through 1983. To determine NHTSA's consideration of the safety of its employees who participate in defect testing, we interviewed the Chief of the Facility and the four employees mentioned above who conducted the A-body vehicle rear axle tests. We also reviewed reports prepared on all injuries at the Vehicle Research and Test Center since its 1976 opening through October 1983.

ODI contracted with two other federal agencies and private contractors for the performance of some of its defect tests for fiscal years 1981-83. However, NHTSA planned to discontinue the use of other federal agencies and to rely less on private contractors to perform defect tests beginning in fiscal year 1984. Furthermore, the Chief and the Supervisory Defect Safety Engineer, Engineering Analysis Division, ODI, told us that to their knowledge, other federal agencies and contractors had not experienced injuries or fatalities during the performance of defect tests for the agency. Accordingly, we did not examine the safeguards taken by other federal agencies and private contractors to ensure the personal safety of their employees who were involved in conducting defect testing for ODI.

We reviewed a Highway Loss Data Institute report on injury loss experience for 1978-80 model year cars and interviewed a senior vice-president, Insurance Institute for Highway Safety, concerning the appropriateness of relying on such data to assess the existence of a potential defect relating to motor vehicle safety.

Concerning NHTSA's public release of films of the defect tests conducted as a part of its investigation into the GM A-body rear axle separation problem, we interviewed the Director, NHTSA's Office of Public and Consumer Affairs; and the Chief and cognizant Information Specialists of that office's Public Affairs Division. In GM's Washington, D.C., office, we interviewed the Director and the Manager, News Relations, Office of Public Relations; and an Automotive Safety Engineer, Environmental Activities Staff. We also discussed the matter with reporters for the Columbia Broadcasting System (CBS) and the National Broadcasting Company (NBC), an assignment editor for the Cable News Network, and an Associate Director for the National News Council.

Our review was conducted from August 1983 through July 1984. We did not request formal agency comments. However, we discussed the report's contents with NHTSA's Administrator, Deputy Administrator, Chief Counsel, and Associate Administrator for Enforcement. Also, we apprised GM's Washington, D.C., office's Manager, Transportation Issues; Director, Office of Public Relations; and an Automotive Safety Engineer, Environmental Activities Staff, of information extracted from GM documents that we obtained from NHTSA's files and statements made by GM officials to us that are presented in this report.

Except as noted above, we made this review in accordance with generally accepted government auditing standards.

CHAPTER 2

NHTSA'S PROCEDURES FOR INITIATING DEFECT INVESTIGATIONS

AND PERFORMING TESTS WERE REASONABLE

In conducting its defect investigation program, NHTSA depends primarily on its analysis of consumers' complaints to identify potential safety-related defects in motor vehicles and equipment. Most investigations are initiated on the basis of its staff's professional judgment of whether the potential defects subject the public to unreasonable risks of accidents, injury, or death. NHTSA conducts tests when it decides they are a necessary part of an investigation to determine whether a safety defect exists. Such tests are individually developed to identify the causes or demonstrate the consequences of the potential safety defect being investigated. We believe that NHTSA's procedures for initiating defect investigations and performing tests were reasonable. Further, our review of NHTSA's injury reports and discussions with NHTSA officials and personnel showed that NHTSA gave particular attention to the safety of its employees when planning and performing defect tests.

We estimated that NHTSA's expenditures for domestic and foreign motor vehicle defect testing during fiscal years 1981 through 1983 were incurred at nearly the same ratio as the respective number of vehicles which these manufacturers produced or sold during the 3-year period. About two-thirds of NHTSA's expenditures for defect testing was incurred for tests conducted by its Engineering Test Facility, with other federal agencies and private contractors accounting for the remainder. Finally, for the fiscal years 1981 through 1984, the levels of funding and staff available for ODI's defect investigation program remained relatively constant.

Concerning program results, domestic and foreign manufacturers recalled vehicles to correct safety-related defects during fiscal years 1974 through 1983 at the same ratio as their respective shares of the American automotive market over the 10-year period. However, domestic manufacturers voluntarily recalled 60 percent of their total and foreign manufacturers voluntarily recalled 25 percent of theirs. The remaining motor vehicles were recalled as a result of NHTSA's defect investigations.

ODI'S BASIS FOR INITIATING INVESTIGATIONS OF POTENTIAL SAFETY-RELATED DEFECTS

ODI receives information relating to possible safety defects in motor vehicles, vehicle equipment, or tires from several sources, including individual consumers, Members of Congress, and a consumer group. This information is the primary source from which NHTSA first learns of potential safety defects. Using this information, ODI decides to initiate an inquiry or engineering analysis based on its staff's professional judgment of whether a potential problem may be caused by a defect that relates to motor vehicle safety.

ODI operates a toll-free Auto Safety Hotline (telephone number 800-424-9393) which gives 24-hour service for consumers to report motor vehicle safety problems. A questionnaire is sent to each consumer who calls the Hotline about his or her potential safety defect so that vital information that NHTSA may need in any investigations can be recorded. In addition, NHTSA receives letters containing complaints from consumers. Pertinent information from each questionnaire and complaint letter is stored in a computerized data base.

At the time of our review, NHTSA was receiving about 900 consumer calls a day (either by Hotline operator or by a recording device). In addition, NHTSA was receiving about 1,000 to 2,500 letters a month. Some of the letters were Hotline questionnaire returns; others were unsolicited complaints from consumers, requests for recall information, Freedom of Information Act requests, or specific defect research requests from lawyers and interested parties. Copies of the complaint letters and questionnaire forms are sent to the respective manufacturers for their records.

The Chief, Engineering Analysis Division, ODI, estimated that about 80 percent of NHTSA's inquiries and engineering analyses are started as a result of the staff's professional judgment that potential defects may subject the public to unreasonable risks of accident, injury, or death. He said that the staff gains knowledge of potential defects from its review of Hotline questionnaire responses and consumer complaint letters. He estimated that the remaining 20 percent of ODI's inquiries and engineering analyses are started as a result of (1) an analysis of quarterly reports that summarize all complaints received on a problem, (2) special requests from Members of Congress, the Center for Auto Safety,¹ and individuals, and (3) vehicle owners' comments received in conjunction with NHTSA's routine followups of manufacturers' recalls that may describe a problem not being remedied by such recall. In addition, the National Traffic and Motor Vehicle Safety Act of 1966, as amended (15 U.S.C. 1410a(a) and 1412 (1982)), provides that any interested person may file a petition requesting the Secretary of Transportation to determine whether a manufacturer should be ordered to notify car owners, purchasers, and dealers of the existence of a safety defect and to remedy such defect.

Specific criteria or threshold numbers of complaints have not been established for reports of component failures, accidents, injuries, or deaths for ODI's use in identifying potential safety-related defects for investigation. According to the Administrator for Enforcement, it is impractical for NHTSA to develop such criteria or thresholds because the seriousness of risks posed to

¹The Center for Auto Safety is a nonprofit organization founded to advocate auto and highway safety. The Center monitors government agencies charged with regulation of the industry, supports safety standards, and participates in the rulemaking procedures of NHTSA and the Federal Highway Administration.

motor vehicle safety by different problems varies. For example, a potential defect such as a leaky carburetor plug which could create a fire in the engine compartment might require fewer consumer complaints than a potential defect involving a vehicle component, such as defective props (gas-loaded cylinders) which cause the liftgates of hatchback vehicles to close unexpectedly.

Engineers' judgment basis for selecting defect-test procedures

Safety defect investigations lead to testing when ODI engineers decide, with the approval of the Director, ODI, that tests are necessary to determine whether a defect exists. The Chief of NHTSA's Engineering Test Facility, Vehicle Research and Test Center, said that tests conducted for ODI are designed to identify the causes and/or demonstrate the consequences of a potential safety-related defect. He said that the test procedures must be determined on the basis of the responsible engineers' (those at ODI, Washington, D.C., headquarters and at the Engineering Test Facility) professional judgments of what would be most appropriate to achieve the tests' objectives.

Tests of the rear axle separation problem with GM's 1978-80 A-body vehicles, which are discussed in chapter 3, are one example of such individually designed tests. As another illustration of such individually designed NHTSA tests, we noted that in May 1982, the Vehicle Research and Test Center tested a 1978 Ford Fiesta to evaluate the consequences of panhard rod² breakage on vehicle control. These tests consisted of a series of turns, lane changes, straight-ahead runs, and bump course runs at various speeds, with the panhard rod disconnected before and during the maneuvers. Test speeds ranged from 5 miles per hour to 55 miles per hour.

The Center's May 1982 report on the panhard rod tests stated that when the panhard rod is disconnected (simulating failure) during a maneuver, the body does shift from side-to-side, but is limited in the extent of its travel by the wheel well's scrubbing against the inside of the tire. Also, the report stated that the sensation of the vehicle body's shifting from side-to-side created a sensation of possible control problems, but the vehicle steered and braked correctly and could be controlled.

SAFETY OF DEFECT-TEST PARTICIPANTS

NHTSA's Engineering Test Facility has a good record with respect to the safety of its personnel who test for defects.

²The panhard rod is the connecting rod between the rear axle and the vehicle body. It prevents lateral motion of the body.

Our review of reports prepared on all injuries at the Vehicle Research and Test Center since its 1976 opening through October 25, 1983, showed that only one injury occurred during the performance of more than 100 defect tests. On July 13, 1977, an employee was injured while leaning out of a chase car window to film a test vehicle. The employee unfastened his lap/shoulder belt and was twisting to keep the vehicle he was filming in view. After the filming was completed, the employee complained of stomach pain. An examining physician diagnosed the injury as an abdominal hernia and referred the employee to his own surgeon. The accident report prepared by the Center on the injury stated, with respect to corrective actions, that:

"In the future, photographic work of this type will be performed from a window van with the camera mounted on a tripod and with the cameraman continuously belted."

The Chief, Engineering Test Facility, told us that employee safety is given a lot of attention during defect testing. He said that safety is a job element on which management, project engineers, and project technicians are rated as part of their annual performance appraisals. A typical project technician's performance appraisal form provides that in order to be rated "highly satisfactory," the technician must maintain ". . . positive control over all aspects of the actual test . . . [and have] a high awareness of safety."

Personnel safety during testing of GM A-body vehicle

The project engineer for the tests conducted of the GM A-body rear axle separation told us that special attention was given to the personal safety of participants in planning and performing of the tests. All participants went through a rehearsal primarily to get some indication of where the vehicle and the axle and wheel assembly might go if and when a separation occurred. He said that the type of cameras available for filming the tests required that two cameras be relatively close to the vehicle's path (between 30 and 50 feet) in order to adequately show the consequences of the anticipated axle separation. (The Vehicle Research and Test Center now has cameras with zoom lenses that permit filming from a farther location.)

The project engineer said that his only duty during the actual performance of the tests was to observe the test vehicle's and axle shaft and wheel assembly's paths. Also, he said that the two cameramen located near the vehicle's path were alert to the possibility that support vehicles--which provided power sources and monitoring equipment--parked near them could be used as shields against the separated axle and wheel assembly, if needed. The project engineer and cameramen told us that they believed their personal safety was adequately considered when the tests were planned and conducted.

The driver of the GM A-body vehicle used in the rear axle tests also said that adequate provisions were made for his personal safety. He said that he wore (1) a lap/shoulder safety belt, (2) a heavy leather jacket as used by welders, and (3) a helmet. The driver also said that he recalls having worn goggles to protect his eyes from flying glass if the vehicle's windows broke during the tests.

DEFECT TESTING OF DOMESTIC AND
FOREIGN MANUFACTURERS' MOTOR VEHICLES

Our review showed that funds were expended for domestic and foreign vehicles' defect testing at about the same ratio as their respective shares of the American automotive market. Most of the defect testing was conducted by NHTSA's Engineering Test Facility.

During the 3 fiscal years 1981 through 1983, ODI expended \$1,190,868 for defect testing of domestic and foreign manufacturers' motor vehicles. We estimated that 81 percent, or \$961,566, was spent for defect testing of domestic manufacturers' motor vehicles. The remaining 19 percent, or an estimated \$229,302, was spent for testing of foreign manufacturers' motor vehicles. For the 3 model years 1981 through 1983, domestic manufacturers produced a total of 23.7 million motor vehicles, and foreign manufacturers sold 8.2 million motor vehicles in this country, which equates to 74 and 26 percent of the motor vehicle market for that period, respectively. The estimated costs of defect tests conducted on domestic and foreign manufacturers' motor vehicles during the 3 fiscal years and the organization which performed the tests is shown in the following table:

Estimated Costs of Defect Test Projects
Conducted on Domestic and Foreign
Manufacturers' Motor Vehicles,
Fiscal Years 1981-83

<u>Testing organizations</u>	<u>Domestic vehicles</u>		<u>Foreign vehicles</u>		<u>Totals</u>	
	<u>Esti- mated cost</u>	<u>Per- cent</u>	<u>Esti- mated costs</u>	<u>Per- cent</u>	<u>Esti- mated costs</u>	<u>Per- cent</u>
Federal agencies:						
NHTSA's Engi- neering Test Facility	\$629,209	77	\$183,819	23	\$ 813,028	100
Consumer Prod- uct Safety Commission	12,500	25	37,500	75	50,000	100
National Aero- nautics and Space Admin- istration	-	-	5,000	100	5,000	100
Subtotal	<u>\$641,709</u>	74	<u>\$226,319</u>	26	<u>\$ 868,028</u>	100
Private contrac- tors	<u>319,857</u>	99	<u>2,983</u>	1	<u>322,840</u>	100 ^a
Total	<u>\$961,566</u>	81	<u>\$229,302</u>	19	<u>\$1,190,868</u>	100

^aOne project related to both domestic and foreign manufacturers, and its cost of \$5,966 was divided equally between them.

Source: GAO analysis of NHTSA test cost data.

The above expenditures were incurred for 34 projects. Twenty of these projects, or 59 percent, involved domestic manufacturers' motor vehicles or components; 13 projects, or 38 percent, involved foreign manufacturers'; and 1 project involved a component used on both domestic and foreign manufacturers' as shown in the following table:

Defect Test Projects Conducted on Domestic and Foreign
Manufacturers' Motor Vehicles,
Fiscal Years 1981-83

<u>Testing organizations</u>	<u>Domestic vehicles</u>		<u>Foreign vehicles</u>		<u>Totals</u>	
	<u>Proj- ects</u>	<u>Per- cent</u>	<u>Proj- ects</u>	<u>Per- cent</u>	<u>Proj- ects</u>	<u>Per- cent</u>
Federal agencies:						
NHTSA's Engineering Test Facility	15	65	8	35	23	100
Consumer Product Safety Commission	1	25	3	75	4	100
National Aeronautics and Space Adminis- tration	-	-	2	100	2	100
Subtotal	<u>16</u>	55	<u>13</u>	45	<u>29</u>	100
Private contractors	<u>4</u>	80	-	-	<u>5^a</u>	100 ^a
Total	<u>20</u>	59	<u>13</u>	38	<u>34^a</u>	100 ^a

^aOne project related to both domestic and foreign manufacturers; therefore, the columns do not add across because it is shown only in the totals.

Source: GAO analysis of NHTSA test project data.

Our analysis of the \$1,190,868 expended by ODI in fiscal years 1981 through 1983 showed that about \$868,028, or 73 percent, was for defect tests conducted by the NHTSA Engineering Test Facility (68 percent) and other federal agencies--the Consumer Product Safety Commission and the National Aeronautics and Space Administration--(5 percent). ODI used these other federal agencies during this period to assess their capability and interest in meeting part of its defect-testing needs. The remainder of about \$322,840, or 27 percent, was expended for tests conducted by private contractors.

NHTSA's Associate Administrator for Enforcement told us that ODI plans to depend on NHTSA's Engineering Test Facility to perform an even larger share of its defect testing in the future. He said that the reason for this change is that other agencies have no interest in performing tests for ODI in the future and that private contractors have also shown less interest in conducting defect tests for ODI. He added that to help ensure that the Engineering Test Facility will be able to meet ODI's additional

demand on it, NHTSA has awarded a contract to Ohio State University for the services of one of its engineers who will relocate at the Facility and work exclusively on ODI's test projects.

RESOURCES AVAILABLE FOR
DEFECT INVESTIGATIONS

From fiscal year 1981 to fiscal year 1983, ODI's budget for conducting its defect investigations decreased slightly (less than 1 percent). ODI's budget for fiscal year 1984 has been increased about 6 percent above that authorized for fiscal year 1983. ODI has requested \$4.5 million to finance its defect investigation activities in fiscal year 1985. This represents a 20-percent increase over ODI's authorized funding for fiscal year 1984. The budgets for fiscal years 1981 through 1984 are shown in the following table:

Activity	ODI Funding, Fiscal Years 1981-84			
	Fiscal years			1984 (authorized)
	1981	1982	1983	
Personnel salaries and expenses	\$1,416,000	\$1,590,000	\$1,754,000	\$1,848,000
Operations:				
Computer support	1,355,292	1,232,246	1,262,266 ^a	980,000
Investigations, including consumer interviews and testing	673,067	752,815	422,328	820,000
Hotline	92,422	84,960	91,156	100,000
	<u>2,120,781</u>	<u>2,070,021</u>	<u>1,775,750</u>	<u>1,900,000</u>
Total	<u>\$3,536,781</u>	<u>\$3,660,021</u>	<u>\$3,529,750</u>	<u>\$3,748,000</u>

^aExcludes major equipment purchases of \$224,234.

Source: NHTSA

ODI's positions and on-board personnel for fiscal years 1981 through 1984 are shown in the following table:

ODI Personnel Positions,
Fiscal Years 1981-84

<u>Fiscal year</u>	<u>Ceiling</u>	<u>On-board at end of year</u>
1981	39	39
1982	37	37
1983	38	37
1984	46	41

Source: NHTSA

On October 22, 1984, the Associate Administrator for Enforcement told us that ODI was authorized 48 positions for fiscal year 1985. According to him, 46 of the positions were filled and ODI was recruiting personnel to fill the remaining two positions.

MOTOR VEHICLES RECALLED DURING
FISCAL YEARS 1974 THROUGH 1983

The number of motor vehicles recalled by domestic and foreign manufacturers during fiscal years 1974 through 1983 reflected the same percentage as their respective shares of the American automobile market for the 10-year period. However, domestic manufacturers voluntarily recalled a higher percentage of their recalled motor vehicles than foreign manufacturers.

Domestic manufacturers produced 100.6 million motor vehicles, and foreign manufacturers sold 23.5 million motor vehicles in model years 1974 through 1983 for a total of 124.1 million vehicles. (The automotive model year generally covers the 12-month period from September of 1 year through August of the following year.) In terms of percentages, domestic manufacturers accounted for about 81 percent and foreign manufacturers 19 percent of the total automotive market in this country for these 10 years.

Domestic and foreign manufacturers recalled about 57.7 million motor vehicles to correct safety-related defects during fiscal years 1974 through 1983. Domestic manufacturers recalled about 47 million vehicles, or 81 percent of the total, and foreign manufacturers recalled about 10.7 million vehicles, or 19 percent--the same ratio as their respective shares of the American motor vehicle market over this period. The number of motor vehicles recalled voluntarily and as a result of NHTSA's investigations is shown in the following table:

Motor Vehicles Recalled by
Domestic and Foreign Manufacturers,
Fiscal Years 1974-83

Manufacturers	Recalled voluntarily		Recalls influenced by NHTSA's investigations		Totals	
	Number	Percent	Number	Percent	Number	Percent
	(millions)		(millions)		(millions)	
Domestic	28.1	60	18.9	40	47.0	100
Foreign	<u>2.7</u>	25	<u>8.0</u>	75	<u>10.7</u>	100
Total	<u>30.8</u>	53	<u>26.9</u>	47	<u>57.7</u>	100

Source: GAO analysis of NHTSA recall data.

As shown in the above table, domestic manufacturers voluntarily recalled about 60 percent of the total vehicles they recalled; whereas, foreign manufacturers voluntarily recalled about 25 percent of the total vehicles they recalled. Conversely, NHTSA influenced 40 percent and 75 percent, respectively, of the motor vehicles recalled by domestic and foreign manufacturers.

The following table shows that domestic and foreign manufacturers conducted 1,724 recall campaigns to remedy the safety-related defects found in the 57.7 million motor vehicles recalled during fiscal years 1974 through 1983. Domestic manufacturers conducted 80 percent of those recall campaigns and foreign manufacturers conducted 20 percent.

Recall Campaigns Conducted by
Domestic and Foreign Manufacturers,
Fiscal Years 1974-83

Manufacturers	Initiated voluntarily		Initiated as a result of NHTSA's investigations		Total	
	Number	Percent	Number	Percent	Number	Percent
Domestic	1,227	89	153	11	1,380	100
Foreign	<u>273</u>	79	<u>71</u>	21	<u>344</u>	100
Total	<u>1,500</u>	87	<u>224</u>	13	<u>1,724</u>	100

Source: GAO analysis of NHTSA recall data.

The table shows most of the recall campaigns were initiated voluntarily by the manufacturers.

CONCLUSIONS

We believe that NHTSA's reliance on professional judgment to initiate investigations of potential safety-related defects is reasonable because some alleged defects inherently pose a greater risk to motor vehicle safety than others. For example, a potential defect involving a fire in the engine compartment might pose a greater risk to motor vehicle safety and require fewer complaints before NHTSA would initiate an investigation than one relating to potentially defective liftgate props of hatchback vehicles.

We also believe that NHTSA's practice of developing individualized test programs and procedures to demonstrate the consequences and/or identify the causes of potential defects under investigation is reasonable because there are generally no standard test programs and procedures that may be followed. For instance, different rear axle problems involving GM and Ford motor vehicles required the development of individualized test procedures to demonstrate their consequences. Further, we believe that NHTSA adequately considers the safety of its personnel in planning and performing defect tests.

Resources available to carry out defect-testing activities remained fairly constant for fiscal years 1981 through 1983. However, the program's funding increased about 6 percent for 1984, and ODI requested a 20-percent increase for fiscal year 1985. In addition, while a few staff positions remain vacant, ODI intends to fill them during fiscal year 1985.

CHAPTER 3

ODI'S INVESTIGATION OF REAR AXLE SEPARATION PROBLEM

ODI's review to determine whether a safety-related defect involving rear axle separation existed in GM's 1978-80 A-body cars and trucks was conducted in two phases--an engineering analysis and formal defect investigation. ODI has written guidelines for conducting these phases of an investigation which it followed in investigating the rear axle separation problem. ODI's guidelines for conducting an engineering analysis and a formal defect investigation are described in appendix I.

An engineering analysis was started in April 1981 after ODI's search of its complaint data showed that ODI had received reports of rear axles separating from these vehicles. NHTSA and GM officials told us that tests conducted of a GM A-body vehicle by ODI during this phase of the investigation were appropriate to demonstrate the consequences of a rear axle separation.

On the basis of the engineering analysis, which was completed in March 1982, ODI concluded that a formal defect investigation of the potential defect was warranted because it could cause vehicle control problems and further accidents. After ODI completed the formal defect investigation in March 1983, NHTSA made an initial determination in April 1983 that rear axle separation constituted a safety-related defect in GM's A-body cars and trucks. NHTSA offered GM an opportunity to present data, views, and arguments regarding the initial determination at a public proceeding. At that May 1983 proceeding, GM challenged NHTSA's initial determination. As of October 1984, NHTSA was still considering whether to make a final determination that a safety-related defect exists in these cars and trucks or to terminate its investigation.

Concerning the Highway Loss Data Institute's September 1981 Report on automobile insurance losses, we found that the report cannot be relied upon to determine whether a safety defect involving rear axle separation existed in GM's 1978-80 A-body cars and trucks.

ENGINEERING ANALYSIS INITIATED AS A RESULT OF CONSUMER COMPLAINT

On January 28, 1981, the owner of a 1978 Pontiac Grand Lemans station wagon, pursuant to the National Traffic and Motor Vehicle Safety Act, as amended, petitioned NHTSA to conduct an investigation to determine whether the failure of the rear axle in his car constituted a defect which could result in a safety recall campaign. The Pontiac Lemans is 1 of 10 GM A-body models.

According to the petitioner, on December 13, 1980, when his wife was driving the car at 30 to 35 miles per hour, the right rear wheel and axle separated from the car. His wife's mother and four of his children were also passengers. He said that the car

swerved out of control into a ditch, where it flipped over and came to rest on its roof. He added that the passengers suffered only bruises and the trauma of experiencing the incident.

The Director, ODI, acknowledged receipt of the petition on February 11, 1981, and advised the petitioner that a technical review would be made to determine whether his petition would be granted.

In its February 25, 1981, letter, ODI advised GM of the petition and requested certain information that it needed to investigate the potential risk to motor vehicle safety posed by such a problem. As a part of its request, ODI asked that GM furnish a brief description of the following:

- Circumstances or contributing factors which may lead to the axle separation.
- The malfunction.
- GM's opinion of the safety consequences of the axle separation.
- Any warning which may be perceived by the vehicle driver or occupants.

In a March 30, 1981, response to ODI's February 25, 1981, letter, GM's Director, Product Investigations, stated that GM's investigation determined that the petitioner's accident was not caused by a rear axle separation but, rather by a rear suspension lower control arm front bolt failure. The Director added that GM's investigation disclosed that the rear suspension lower control arm front bolt was missing, allowing the wheel to fold under the rear of the car, snapping the axle housing and axle. The Director stated that on February 20, 1981, GM had initiated a recall campaign to replace these bolts, and the petitioner's incident was one that contributed to that recall. That official further stated that NHTSA should deny the petition because GM had already recalled vehicles to correct the defect which caused the petitioner's accident and that GM believed that answers to ODI's specified questions were not necessary to dispose of the petition.

Nevertheless, ODI initiated an engineering analysis on April 7, 1981, of rear axle failure on GM's 1978-80 A-body vehicles after its search of complaint data showed that it had received 35 rear axle separation reports on these vehicles. On April 21, 1981, ODI repeated its request to GM for information necessary for its investigation of the problem. On May 12, 1981, NHTSA's Associate Administrator for Enforcement advised the petitioner that NHTSA was granting his petition and had initiated the engineering analysis.

Description of the alleged rear axle problem

GM's 1978-80 A-body rear-wheel-drive vehicles transmit power from the front-mounted engine to the rear wheels through a transmission, drive shaft, and rear axle assembly, including a differential. A differential is a gear arrangement (see fig. 1) that permits power from the engine of a motor vehicle to be transmitted to the two driving wheels. An axle shaft enters the differential assembly through one of the gears, called a side gear, and is retained by a "C"-shaped device (C-lock) which is placed in a groove near the end of the axle shaft, (see fig. 2). The C-lock sits loosely in the axle shaft groove but is normally retained in the groove by the pinion shaft, which keeps the axle shaft in an outward position. Under those conditions, the C-lock is prevented from falling out of the axle groove because it cannot move out of the side gear recess.

The axle separation problem is allegedly due to wear of the axle shaft's end buttons (see fig. 2) which eventually allows enough axle shaft end play so that a C-lock can clear the groove on the inner end of the axle shaft and the side gear recess. The C-lock can then drop out of the axle groove. Because the C-lock is the only thing retaining the axle shaft to the differential, if that occurs, the axle shaft can separate from the differential assembly.

Potential consequences of rear axle separation

According to ODI, when the rear axle shaft separates from the differential assembly, it may continue to move out of the differential housing and ultimately from the vehicle. If the axle and wheel assembly separate completely, the affected side of the vehicle collapses onto the road.

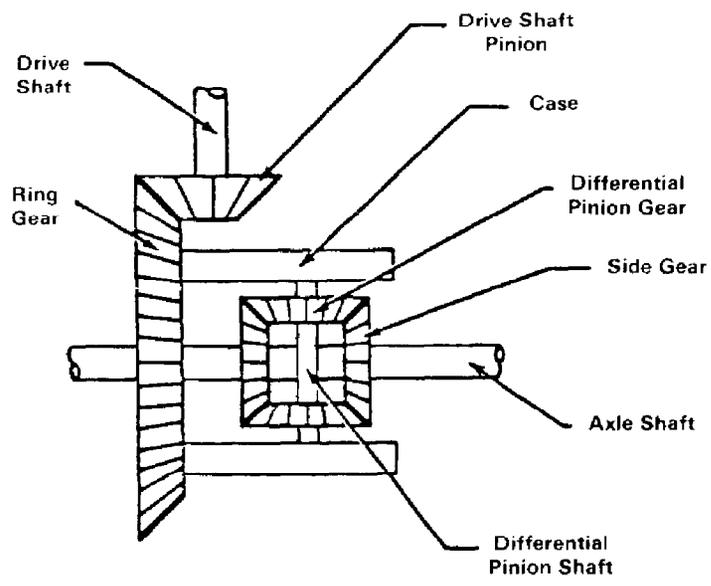
ODI has stated that two separate safety-related consequences stem from rear axle separation--one with respect to the vehicle and another with respect to the separated axle and wheel assembly. The alleged safety consequences involving the vehicle are loss of drive, loss of rear brakes, and possible loss of vehicle control. The separated axle and wheel assembly pose an inherent risk to motor vehicle safety because it becomes an uncontrolled projectile. According to ODI, there is no known warning before an axle shaft disengagement.

Regarding the alleged defect's risk to motor vehicle safety, GM stated in a June 26, 1981, letter to ODI that:

"The disengagement of the complete axle shaft assembly does not generally result in a vehicle control problem. The vehicle will lose drive and the driver can steer the vehicle to the side of the road, usually without incident.

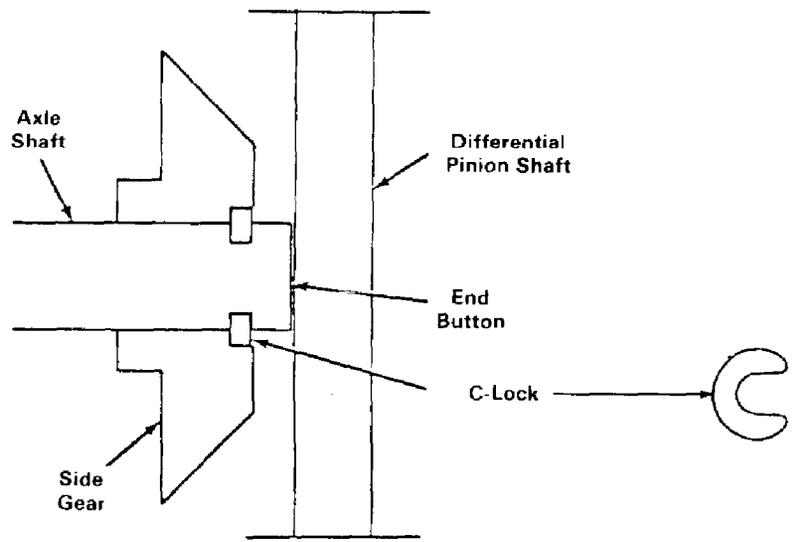
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Figure 1
Differential



Source: G.M.

Figure 2
How The C-Lock Retains The Rear Axle Shaft
(Detail View Of Figure 1)



Source: G.M.

"In the event that an axle shaft 'C' lock should come out of position, the axle shaft and wheel assembly may move outboard while the car is moving until there is disengagement between the axle shaft splines and the side gear, resulting in loss of drive. If the axle shaft and wheel assembly continues to move outboard, then the tire may contact the rear wheel opening in the quarter panel. If the axle shaft and wheel assembly contacts the quarter panel with sufficient force, the quarter panel will deform and the wheel and axle shaft assembly could continue to move outboard and eventually become detached from the vehicle, allowing the vehicle to drop down on the brake backing plate and lower control arm mounting bracket. Unusual noises will accompany all phases of the sequence of axle shaft disengagement."

Testing of a 1979 GM A-body to determine the consequences of rear axle separation

In the fall of 1981, NHTSA's Engineering Test Facility, Vehicle Research and Test Center in East Liberty, Ohio, conducted a series of tests at ODI's request to determine the consequences of a rear axle C-lock failure on GM's 1978-80 A-body vehicles. The C-lock was removed from the right axle of the test vehicle (a 1979 Chevrolet Malibu station wagon) to expedite the testing and to provide more control over the timing of the separation.

A straight-ahead test and an emergency lane change test were run on September 30, 1981, and a gradual right turn test was run on October 7, 1981. According to the Facility's project engineer, these were the only tests conducted of the alleged problem, and these tests were videotaped for the official record.

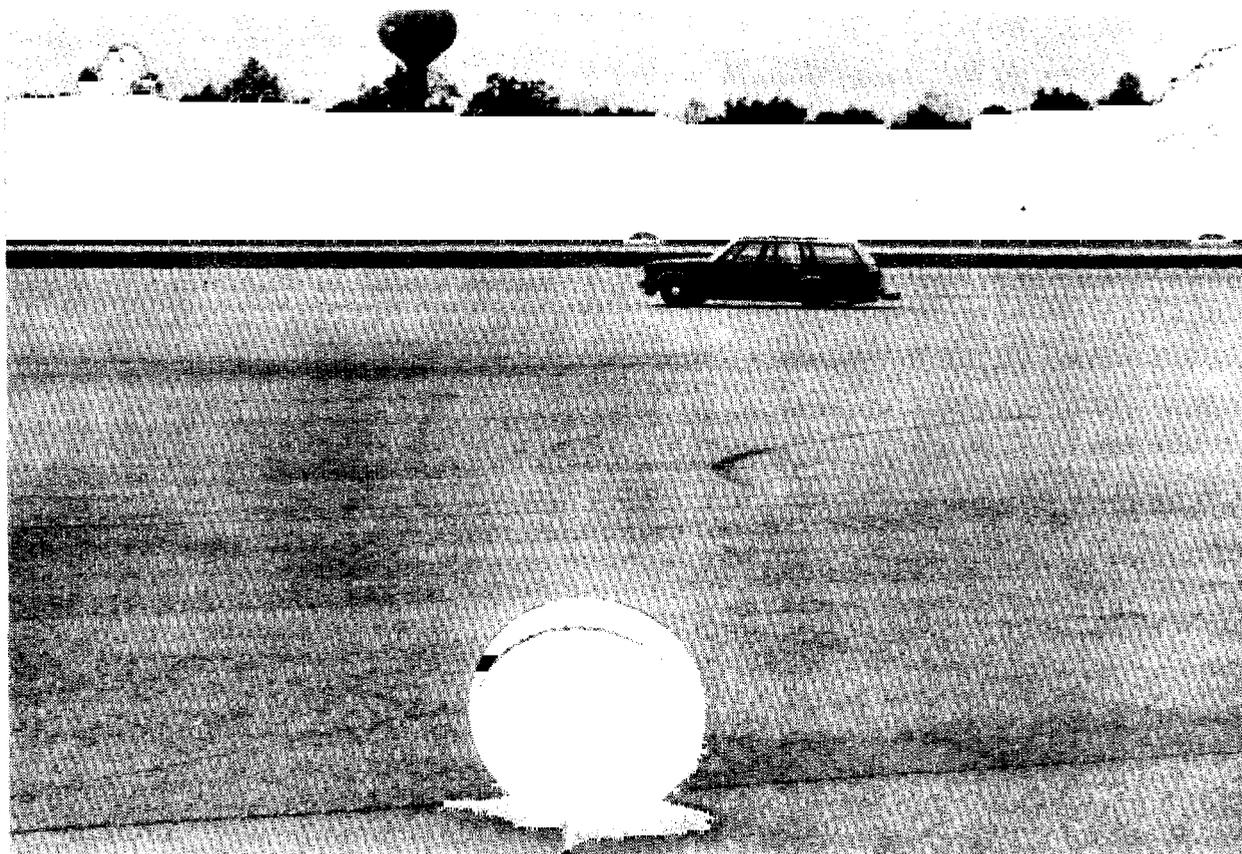
• During the emergency lane change and gradual right turn test runs, the axle shaft and wheel assembly separated completely from the vehicle and traveled several hundred feet. A photograph of the test vehicle and separated axle shaft and wheel assembly is shown on the following page.

The Vehicle Research and Test Center's final report entitled, C-Lock Axle Test, 1978-1979 G.M. Vehicles, was received by ODI on May 24, 1982. The test report stated that after the axle and wheel assembly separated during the gradual right turn maneuver, the vehicle was stopped in a straight line. With respect to the emergency lane change maneuver, the report stated that after the rear axle and wheel assembly separated, the vehicle slewed right and left several times but was brought under control.

The Chief, NHTSA's Engineering Test Facility, Vehicle Research and Test Center, told us that the tests of the rear axle separation problems were not unusual or inappropriate for their intended purpose--to demonstrate the consequences of a rear axle separation. Also, the Director of GM's Washington, D.C., Office

of Public Relations, told us that GM's engineers agreed that the tests were appropriate to demonstrate the consequences of a C-lock failure. Details on the performance of these tests are presented in appendix II.

ODI completed its engineering analysis phase of the defect investigation on March 1, 1982--about 11 months after its start. The ODI report that summarized the results of the engineering analysis recommended that a formal defect investigation be initiated because of the risk to motor vehicle safety caused by separation of the rear axle from these vehicles. ODI concluded in its engineering report that a formal defect investigation was warranted because of vehicle control problems and the risk of further accidents caused by rear axle assembly separations.



Source: NHTSA

1979 A-body Test Vehicle Showing Separated Axle Shaft And Wheel Assembly

FORMAL INVESTIGATION OF PROBLEM RESULTED
IN INITIAL DETERMINATION OF A SAFETY-
RELATED DEFECT

On March 10, 1982, ODI's Defects Review Panel met to discuss the merits of opening a formal defect investigation of the 1978-80 GM A-body rear axle separation problem. The panel was made up of NHTSA representatives from ODI, Chief Counsel, and Office of Public and Consumer Affairs. This panel normally meets and reviews various documentation already gathered and analyzed by ODI engineers during an engineering analysis and decides whether to open a formal investigation, close out the review, or request that further information be obtained before making a decision. The panel decided that the evidence presented at the meeting warranted the opening of a formal investigation of the rear axle separation problem.

ODI opened a formal defect investigation on March 16, 1982, on the basis of reports of about 225 rear axle failures, including 57 which involved separation of the rear axle shaft and wheel assembly from the vehicle. According to ODI, in an unspecified number of these cases the rear axle shafts and wheel assemblies had been reported as traveling down the roadway and striking other vehicles. ODI opened its investigation to determine whether the alleged problem constituted a safety-related defect within the meaning of the National Traffic and Motor Vehicle Safety Act of 1966.

In response to ODI's May 21, 1982, letter requesting additional information relating to the alleged rear axle separation problem, GM provided information in August 1982 which, among other things, showed that the various GM divisions produced 5,324,851 1978-1980 A-body vehicles.

ODI's March 30, 1983, report on the results of its formal investigation showed that axle shafts manufactured by one of three GM plants for use on the subject vehicles had a significantly higher potential to be defective than axle shafts manufactured at the remaining two plants. ODI's analyses showed that 85 percent of the axles that failed, for which the source could be determined, were supplied by that plant as shown in the following table.

Sources of Axles Reported as
Having Failed Through October 22, 1982^a

Reason for failure	Axle plants							
	Chevrolet-Buffalo		Oldsmobile-Lansing		GM of Canada		Total	
	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
End button ^b	121	92	9	7	2	1	132	100
C-lock ^c	26	79	4	12	3	9	33	100
Undefined ^d	<u>18</u>	62	<u>7</u>	24	<u>4</u>	14	<u>29</u>	100
Total	<u>165</u>	85	<u>20</u>	10	<u>9</u>	5	<u>194</u>	100

^aA total of 506 axle failures had been reported to NHTSA by this date. The plant supplying the axles that were involved in 312 of these failures could not be determined.

^bInvestigation and analysis of failure reports indicated that the axle shaft end button was thin and/or broken off.

^cInvestigation and analysis of failure reports indicated that the C-lock had fallen out of the groove or was otherwise implicated as a causal factor of failure. Although these incidents could well be end button problems, insufficient confirming information existed.

^dInformation on these axle failures was not sufficient to determine whether the failures were due to end button and/or C-lock problems.

Source: ODI

On April 1, 1983, NHTSA announced in a press release that it had made an initial determination that a safety-related defect existed in GM's 1978-80 A-body vehicles because of a potential rear axle problem. The press release stated that the initial determination resulted from NHTSA's formal investigation which established that some of these vehicles may have been manufactured with rear axle shafts with thin end buttons. According to the press release, this condition could allow the C-lock to fall out of its groove because of excessive axle end play, resulting in the separation of the axle shaft and wheel assembly from the vehicle. Such a situation could lead to loss of vehicle control, accidents, property damage, injuries, or deaths.

NHTSA afforded GM an opportunity to present data, views, and arguments regarding the initial determination at a public proceeding. The public proceeding was held on May 4, 1983. At that proceeding, GM challenged NHTSA's initial determination. A statement submitted by GM included the following:

"Approximately 5.3 million 1978-80 'A' cars were sold. . . . [T]here have been approximately 500 reported incidents involving rear axle 'C' lock disengagements. There have been 11 reports of injury accidents. NHTSA's own report indicates that there were only 2 cases requiring hospitalization. General Motors projects, based on NHTSA data, that there may be another 16 injury accidents. That means that only 3 out of every 1 million of these vehicles will be involved in an axle separation incident resulting in any injuries at all, and those injuries will largely include the kind of minor ones experienced so far. There have been no reported deaths.

"The issue before the Administrator and the issue we are here to address today, is whether this evidence demonstrates that the public is being exposed - in the words of the Safety Act - to an unreasonable risk of accidents or injuries. We submit the answer is no."

After considering information gathered during its investigation and presented at the public proceeding, NHTSA may make a final determination that a safety-related defect exists with respect to the rear axles of these vehicles or terminate its investigation. Under a final determination, NHTSA must order a manufacturer to (1) furnish notification of the defect to owners, purchasers, and dealers and (2) remedy such defect. A manufacturer may contest a final determination in the federal courts, and its obligation to remedy the defect is conditioned on the outcome of the court proceeding.

A January 20, 1984, memorandum from the Director, ODI, transmitted for consideration a final report to NHTSA's Assistant Chief Counsel for Litigation. As of October 17, 1984, NHTSA's Chief Counsel was considering what action to take on the case.

INSURANCE CLAIM DATA NOT USEFUL FOR IDENTIFYING SAFETY DEFECTS

The relative frequency of insurance injury claims cannot be relied upon to determine whether a safety-related defect exists in motor vehicles.

We examined the Highway Loss Data Institute's September 1981 Research Report HLDI 80-1 entitled Automobile Insurance Losses, Personal Injury Protection Coverages, Claim Frequency Results by Size of Claim, 1978-80 Models to determine whether it could provide injury loss experience for GM's 1978-80 A-body motor vehicles that was due to accidents resulting from rear axle separations.

The report presents injury claims frequency results for the different sizes of motor vehicles--small subcompacts, subcompacts, compacts (includes GM A-body vehicles), intermediate, and full size. Under personal insurance protection coverage, an insurer pays, within specified limits, the medical, hospital, and other

expenses of the insured, others in his vehicle, and pedestrians struck by him regardless of fault.

However, the report does not provide information on all occupant injuries because in addition to personal injury protection coverage, other sources of medical expense reimbursements, such as bodily injury liability and/or health insurance coverages, are available. More importantly, the report does not break out injury loss experience for any manufacturer's motor vehicles that was due to accidents resulting from different causes, such as rear axle separation.

A senior vice-president, Insurance Institute for Highway Safety, told us that the Highway Loss Data Institute's reports on personal injury claims are intended to show which of the various makes and models of motor vehicles are having better or worse injury claim experience without regard to the reasons for the accidents.

The senior vice-president said that while the Institute has much information on automobile insurance losses, it generally is not adequate for determining the existence or absence of a potential safety-related defect. In his view, it is doubtful that any safety-related defect could be detected from insurance claims data. He added that the institute does not have information on the causes of accidents for which claims have been filed; therefore, it would not be possible to show the relative claim frequency for the different makes and models of vehicles attributable to rear axle separation.

CONCLUSIONS

NHTSA followed its written guidelines in conducting the engineering analysis and formal defect investigation of the potential safety defect of rear axle separation involving GM's 1978-80 A-body cars and trucks. NHTSA and GM officials told us that NHTSA's tests of the rear axle separation problem in the GM A-body vehicles were appropriate to demonstrate the consequences of a C-lock failure. We draw no conclusions as to whether rear axle separation constitutes a safety defect in these vehicles. That matter was still being considered by NHTSA in October 1984.

CHAPTER 4

FILM OF DEFECT TEST RELEASED

TO THE PUBLIC WITHOUT AN EXPLANATION THAT

THE MOTOR VEHICLE HAD BEEN MODIFIED

On Friday, April 1, 1983, NHTSA announced that it had made an initial determination that a safety-related defect involving rear axle separation existed in as many as 5.3 million 1978-80 model years GM A-body cars and trucks. As a part of the public announcement, NHTSA released to a local television station and to the national television networks a film of tests it conducted on a GM A-body vehicle which showed a rear axle shaft and wheel assembly separation from the vehicle. Neither NHTSA's April 1 press release announcing the initial determination nor the film--the only information released that day relating to the investigation--explained that NHTSA had modified the test vehicle to induce the separation. NHTSA does not have written guidelines for announcing its initial determinations of safety-related defects.

NHTSA's general practice has been to call a manufacturer to advise it that an initial determination had been made. Also, NHTSA had customarily released, if available, test film to the media relating to a potential defect as a part of such announcements. On April 1, 1983, NHTSA notified GM representatives that it planned to make its initial determination involving rear axle separation that day. Because April 1 was Good Friday and a holiday for most GM employees and because the initial determination documents were not ready for delivery to GM until late that day, GM picked up the letter from NHTSA notifying it of the initial determination and the supporting information, including a copy of the film, on the following Monday, April 4, 1983. As a result, GM was not in a position to respond over the weekend to questions concerning the safety of its A-body vehicles which arose following the film's airing on local and national television on April 1.

PUBLIC ANNOUNCEMENT OF THE INITIAL DETERMINATION

The Director of NHTSA's Office of Public and Consumer Affairs said that the then NHTSA Administrator told him in a meeting held on the morning of April 1, 1983, that NHTSA was going to make its initial determination of a safety-related defect involving the rear axle problem that day and that he should prepare the press release to announce it. The Director said that he asked the former Administrator if the announcement could be postponed until the following Monday because he believed that (1) more time was needed to get the Department of Transportation's (DOT's) Office of Public Affairs' clearance of the press release and (2) the agency could get better press coverage on Monday. The Director told us that it was the Administrator's position that the initial determination's announcement had to be made that day.

NHTSA's notification to GM

NHTSA's Office of Public and Consumer Affairs contacted GM representatives by telephone at their homes in the mid-afternoon of April 1, 1983, to advise them that NHTSA planned to officially announce the initial determination that afternoon at 4 p.m. As previously stated, April 1, 1983, was Good Friday and a holiday for most GM employees. The Director of that office said that he telephoned the Manager, News Relations, of GM's Washington, D.C., Office of Public Relations to advise him of NHTSA's planned announcement. An Information Specialist in that NHTSA office said that he telephoned an Automotive Safety Engineer on GM's Washington, D.C., Environmental Activities Staff to advise him that the initial determination and supporting information would be available for pickup later that afternoon.

NHTSA's Associate Administrator for Enforcement told us that NHTSA's general practice was for him or the Chief Counsel to call a manufacturer's designated representative to advise the manufacturer that an initial determination had been made. The Associate Administrator said that depending on the manufacturer's preference, NHTSA's notification of the initial determination and the supporting documents could be picked up or mailed to the manufacturer. In the case of GM, the Associate Administrator or Chief Counsel normally calls GM's Director, Product Investigations, Engineering Staff, Technical Center in Warren, Michigan, to advise him of such determinations. A member of GM's Washington, D.C., Environmental Activities Staff then picks up the notification and supporting documentation.

NHTSA's Chief Counsel told us that GM's designated representative in Michigan could not be contacted on April 1, 1983, because it was a holiday for GM. He said that NHTSA's Office of Public and Consumer Affairs made the notification calls for the rear axle separation problem because that office had the home telephone numbers of GM employees who work in GM's Washington, D.C., Office of Public Relations.

The GM Automotive Safety Engineer said that after having received the call at his home, he came to NHTSA's Washington headquarters to pick up the letter officially advising GM of NHTSA's initial determination; copies of materials supporting that determination, including the report which summarized NHTSA's formal investigation of the alleged defect; and the press release. The GM engineer said that he contacted the Director and an Information Specialist in NHTSA's Office of Public and Consumer Affairs and NHTSA's Chief Counsel in an effort to obtain this information. He said that these NHTSA representatives told him that the information which he sought--and which is normally provided to the manufacturer when an initial determination is announced--would not be available to GM until the following Monday, April 4, 1983. Also, the Manager, News Relations of GM's Washington Office of Public

Relations, said that NHTSA's Director of Public and Consumer Affairs told him that this information would not be available to GM until Monday. The GM Automotive Safety Engineer said that after being been told this between 4:30 p.m. and 5 p.m. on April 1, 1983, he returned home. NHTSA's Chief Counsel told us that when GM's Automotive Safety Engineer left NHTSA sometime after 4 p.m., it was his understanding that the GM engineer would return later that afternoon for information supporting the initial determination.

The Chief Counsel told us that when the GM engineer had not returned to NHTSA by 5 p.m. to pick up the copy of the initial determination package, he telephoned to advise him that the information was ready. According to the Chief Counsel, the GM engineer decided not to return for the package that afternoon. The GM engineer told us that to the best of his memory, the Chief Counsel's call could have been received as late as 6 p.m. or as early as 5 p.m. on that date. The GM engineer added that he may have told NHTSA's Chief Counsel that because of the lateness in the day, it would be more convenient for both parties if he waited until Monday, April 4, 1983, to pick up the information. The engineer added, however, that if April 1, 1983, had been a normal work day, he would have picked up the initial determination package even if it were 6 p.m. when he was advised that it was ready. The GM engineer told us that he picked up the information supporting the initial determination on Monday, April 4, 1983, at 7:45 a.m.

The Chief, Defects Information Systems Division, ODI, told us that a copy of the initial determination and supporting information was available in NHTSA's Technical Reference Center for public review on April 4, 1983.

GM's Washington, D.C., Director of Public Relations said that GM never officially complained about the way in which it was provided the initial determination and supporting information. He added, however, that the test film's airing caused some GM A-body vehicle owners to become unduly concerned about the probability of an axle separating on their vehicles. Also, the GM Director told us that the film did not make it clear to viewers that the rear axle separation had been induced by NHTSA's removal of the C-lock from the differential of the test vehicle. He added that because GM initially was not in a position to respond to questions from reporters about the risk that the alleged defect posed to motor vehicle safety, the news stories' theme was that ". . . there was a defect, but GM did not want to talk about it."

NHTSA's efforts to publicize the initial determination

NHTSA's Office of Public and Consumer Affairs' practice is to also telephone members of the news media to advise them of an

imminent announcement of an initial determination. The Chief, Public Affairs Division of that office, told us that NHTSA's policy is to telephone news media staff when NHTSA believes that it might have a "story" for them, particularly if NHTSA anticipates issuing the press release close to the news media's deadline for obtaining information for that day. An NHTSA Information Specialist told us that when these calls are made, NHTSA personnel generally will tell the news media representatives whether film is available of tests that have been conducted to demonstrate the consequences of an alleged defect. Messengers from the news media then pick up the film from NHTSA's headquarters.

Although NHTSA did not maintain records to show precisely when calls were made to the news media concerning the initial determination of the rear axle problem, the Director and an Information Specialist in NHTSA's Office of Public and Consumer Affairs said that the calls were made in the mid-afternoon of April 1, 1983. The Information Specialist said that even if a press release has not cleared the Department, the news media must be provided enough information during these calls to permit their decision as to whether or not the announcement warrants their usage. NHTSA followed this procedure in announcing the GM A-body rear axle separation defect.

The office Director also could not tell us the time when copies of the test film were released to the news media. However, he said that the film was released at different times, depending on when messengers arrived from the different local television stations or networks. He added that the first pickup could have been as early as 3 p.m. According to the Information Specialist, NHTSA must release such test film to the news media, when available, by 2 p.m. or 3 p.m. because it takes several hours to review it for broadcasting on the evening news.

According to the Director, the following organizations were provided copies of the axle test film at their request on April 1, 1983--the American Broadcasting Company (ABC), CBS, NBC, the Cable News Network, and NBC's Washington, D.C., affiliate, WRC.

We contacted representatives from three of these organizations to obtain their views on the adequacy of NHTSA's explanation of how these defect tests were conducted. They stated that it would have been beneficial if NHTSA had provided a clearer description of how these tests were conducted. One reporter told us that it was not apparent to him from viewing the test film that the test vehicle had been modified (C-lock removed from the differential) to induce the rear axle separation. He added that even though it was obvious that the car was at a test facility, the film nevertheless gave the impression that if owners of this type car ran theirs through similar maneuvers, the rear axle could also separate. Another reporter told us that NHTSA should provide a full and complete description of tests for which it releases film to avoid--to the maximum extent possible--any misunderstanding by the news media and the public of the tests' objectives, results, and significance.

NHTSA's press release on the rear axle problem was available to the news media and others in the late afternoon of April 1, 1983. Our review showed that it was received by DOT's Office of Public Information for final clearance at 4 p.m. The Director, NHTSA's Office of Public and Consumer Affairs, told us that his office handed out copies of the final press release on NHTSA's initial determination of the safety-related defect involving rear axle separation to the "printed media" reporters at about 5:15 p.m. on April 1, 1983. The press release contained no information on or reference to the tests which NHTSA conducted to demonstrate the consequences of the alleged rear axle separation defect.

The NHTSA Associate Administrator, Enforcement, told us that ODI's policy is to provide NHTSA's Office of Public and Consumer Affairs, as a part of an initial determination announcement, excerpts from test film, when available, that best demonstrate the effect or consequences of an alleged safety-related defect under investigation. He also said that ODI generally discusses any tests that have been conducted in its report summarizing the results of the formal investigation of a potential defect. That report is normally made available to the manufacturer, the media, and the general public when NHTSA announces an initial determination. However, the Associate Administrator told us that NHTSA does not have written guidelines assigning responsibilities for announcing initial determinations.

Although the investigation report on the rear axle separation problem explained that the C-lock had been removed from the differential of the vehicle for the tests, that report was not obtained by the manufacturer or made available for review by the public, including the media, until the Monday following NHTSA's April 1, 1983, announcement of its initial determination.

The Chief, Public Affairs Division, NHTSA's Office of Public and Consumer Affairs, told us that NHTSA did not retain an exact copy of the test film as released to the news media on April 1, 1983. However, NHTSA requested that one of the television networks return the film as originally furnished to it. Our review of the returned film shows it included footage on test maneuvers involving (1) the gradual right turn and (2) emergency lane change. These were the two maneuvers during which the rear axle and wheel assembly separated from the test vehicle.

We also obtained copies of the test film as shown on the news programs that reported the initial determination on April 1, 1983, and NHTSA's official file copy of the film made as the tests were conducted. The film excerpts furnished to the media and NHTSA's official file copy of the test film contained placards which preceded each test that identified them as C-lock differential tests of a 1979 Chevrolet Malibu. However, our review showed that these various versions of the film contained neither a verbal nor visual explanation that the C-lock had been removed from the vehicle to induce the rear axle separation and demonstrate its consequences.

On April 12, 1983, the Director, NHTSA's Office of Public and Consumer Affairs, held a press conference to present its response to criticisms by the news media and others of the test film which had been released to demonstrate the consequences of the alleged rear axle separation defect. At that conference, the Director stated that the filmed test results released by NHTSA and broadcast by some of the news media fairly and accurately portrayed the consequences of the defect under investigation.

The Chief, Public Affairs Division, NHTSA's Office of Public and Consumer Affairs, told us that the test films were made to assist in NHTSA's investigation by showing the consequences of a C-lock's disengaging from its groove at the end of the axle. NHTSA's Administrator stated that the tests were not intended to give an indication of the probability of an axle's separating in any given vehicle nor of the overall magnitude of the problem.

NATIONAL NEWS COUNCIL'S STATEMENT ON
NHTSA'S RELEASE OF THE TEST FILM

On April 19, 1983, the National News Council issued a press release and background paper on NHTSA's distribution of the test film showing the rear axle separation. The Council states that it is an independent, nongovernmental organization established to serve the public interest by, among other things, providing a public forum through which any individual or organization can present a complaint when it is felt an injustice has been done because of inaccurate or unfair news reporting. The Council is funded by various foundations, the media, corporations, and individuals. Contributions are accepted with the understanding that the contributors can have no effect on the Council's findings.

An Associate Director of the Council told us that the Council's president saw the test film on the evening news and wondered how the axle and wheel assembly could accidentally separate while NHTSA was filming the vehicle. According to the Associate Director, the president noticed that there was no explanation of it. Later viewings of copies of the film shown on the station which he had been watching as well as those shown on the other networks showed that none provided an explanation. The Associate Director said that as a result, the president requested that he investigate the matter.

In its background paper, the Council stated with respect to the film provided to the news networks:

". . . To all appearances the film was of an actual, accidental failure of the axle part about which NHTSA was concerned. That's the way it was presented to millions of television viewers that evening. As a result many GM owners became alarmed and some called their dealers to ask if it were safe to continue driving their cars.

"However, the film was not of an actual, accidental axle failure. NHTSA had removed a C-shaped retaining ring from the test car's axle so that the axle would separate for the benefit of the camera. The agency wanted to demonstrate what could happen when the C-ring dropped out, because its concern about the axle was that its end button was too thin to hold the C-ring in place.

"However, neither the two-page publicity release announcing the 'initial determination of defect' nor the film itself contained any indication that the test car had been tampered with to make the axle separate."

The National News Council stated that the news media, GM, and NHTSA were responsible to varying degrees for the confusion that resulted from the telecast of the test films. First, the Council stated that enough facts were clearly available to have alerted the reporters and editors not to have accepted the film at face value. The Council added that from the evidence available, it was obvious that the incidence of the malfunction was so infinitesimally small that news people examining the film should have inquired as to how NHTSA cameras just happened, against enormous odds, to catch an example of the malfunction.

The Council said that the fact that this question "stared journalists in the face" is affirmed by a Washington Post reporter who began asking questions immediately after seeing the film on television. The Council also said that an ABC correspondent who reported on the film on April 1 called GM, but GM could not warn her that the film was "rigged" because NHTSA had not given GM the background material on the test. The Council said that GM must share the responsibility for the public's being alarmed by the film's broadcast. After learning on April 4 that the test vehicle had been modified, GM did not issue a press release, hold a news conference, or otherwise publicize the fact.

However, the Council stated that the primary responsibility for the misrepresentation which was so widely broadcast rested with NHTSA.

CONCLUSIONS

We believe that there were problems with NHTSA's announcement of its initial determination that a safety-related defect involving rear axle separation existed in GM's 1978-80 A-body motor vehicles.

Just prior to making its initial determination announcement on rear axle separation late in the afternoon of Friday, April 1, 1983, NHTSA released copies of a film to the media which showed a rear axle shaft and wheel assembly separating from an A-body vehicle that it had tested. NHTSA did not explain to the media that the rear axle separation had been induced by removing a part

that retained the car's rear axle. After the test film was shown that day on television, some owners of GM cars questioned whether their cars might experience axle separation if driven in a manner similar to that shown in the film. Since GM was not provided information supporting NHTSA's initial determination, including a copy of the film, until Monday, April 4, 1983, GM was not in a position to respond over the weekend to questions from some owners concerning the safety of the A-body cars.

According to GM, the test film's airing caused some GM A-body vehicle owners to become unduly concerned about the probability of an axle's separating from their vehicles. Further, GM was concerned that the film did not make it clear to viewers that the rear axle separation had been induced by NHTSA's removal of the C-lock from the differential of the test vehicle. Neither NHTSA's April 1 press release announcing the initial determination nor the film released to the media explained that NHTSA had modified the test vehicle to induce the separation.

In our view, the problems evident in this case are significant enough to warrant our recommending actions to improve NHTSA's future initial determination announcements of safety-related defects. NHTSA does not have written guidelines assigning responsibilities within the agency for announcing its initial determinations of safety-related defects. We believe that NHTSA's adoption of written guidelines for making such announcements would assist NHTSA in avoiding problems such as those that resulted from its release to the media of the film of the A-body defect tests.

These guidelines should require NHTSA to accompany any films of defect tests released to the news media, as part of an initial determination, with an explanation of the modifications, if any, made to the vehicle and the conditions under which the tests were conducted. These guidelines should also apply to tests of replacement equipment. Also, the guidelines should ensure that films of defect tests and other information supporting an initial determination are not released to the news media or to the public before being provided to the manufacturer. This would provide a manufacturer with information it may need to promptly respond to questions raised about defect tests and the safety of the cars being investigated.

RECOMMENDATION

We recommend that the Secretary of Transportation instruct the Administrator, NHTSA, to issue guidelines requiring NHTSA to accompany any film of defect tests released to the media with a clear explanation of any modification to the vehicle or replacement equipment and the conditions under which the tests were conducted. The guidelines should also require that NHTSA not release test film or other information gathered to support its initial determination to the media or the public before providing it to the manufacturer.

NHTSA'S SAFETY DEFECT INVESTIGATION PROCESS

The National Traffic and Motor Vehicle Safety Act of 1966, as amended, gives the National Highway Traffic Safety Administration (NHTSA) the authority to perform tests, inspections, and investigations to identify safety-related defects in motor vehicles and motor vehicle equipment. Using that authority, NHTSA has established an Office of Defects Investigation (ODI) with three divisions--Defects Information Systems, Engineering Analysis, and Defects Evaluation--and has given each specific responsibilities for performing safety defect investigations. A description of each Division's responsibility follows.

DEFECTS INFORMATION SYSTEMS DIVISION

This Division gathers and organizes all information NHTSA receives relating to possible safety defects in motor vehicles, vehicle equipment, or tires. The information is received in many forms and is the primary source from which NHTSA first learns of possible safety defects.

The Division operates a toll-free Auto Safety Hotline (800-424-9393) which gives 24-hour service for consumers to report motor vehicle safety problems or request information on recalls. NHTSA sends a questionnaire to each consumer who calls the Hotline about his or her potential safety defect so that vital information needed in NHTSA's investigations can be recorded. The consumer is requested to fill out the questionnaire and return it to NHTSA for processing.

At the time of our review, NHTSA was receiving about 900 consumer calls a day (either by Hotline operator or by a recording device). In addition, NHTSA was receiving about 1,000 to 2,500 letters a month. Some of the letters were Hotline questionnaire returns; others were unsolicited complaints from consumers, requests for recall information, Freedom of Information Act requests, or specific defect search requests from lawyers and interested parties. Copies of the complaint letters and questionnaire forms are sent to the respective manufacturers for their records.

The Division staff initially reviews and sorts all consumer complaint letters and questionnaire forms for trends and then enters those complaints not related to a formal investigation, but determined to be safety-related, into the Division's computerized data base.

One Safety Defect Analyst reviews all vehicle owner questionnaires as they are received by NHTSA. Several times (two or three) a week, a package of these questionnaires (copies) are sent to the Engineering Analysis Division.

Another Safety Defect Analyst reviews all incoming consumer complaint letters and sorts them on the basis of whether they are safety- or nonsafety-related. Letters that are nonsafety-related

are furnished to others, such as the Federal Trade Commission, for disposition. Letters relating to recalls are sent to the Recall Evaluation Group, Engineering Analysis Division, and those relating to defect investigation cases are sent to the Chief, Defects Evaluation Division. All remaining letters are sent daily, weekly, or as otherwise appropriate to the Chief, Engineering Analysis Division. (See the following section for a discussion of the Engineering Analysis Division's role in reviewing questionnaires and complaint letters.)

As a result of their review of all Hotline questionnaires and consumer complaint letters, Defects Information Systems Division's Safety Defect Analysts may relate a particular complaint to others that they have previously seen on a potential problem. If these analysts remember other complaints, they may research the computerized data base to determine the number of such complaints.

NHTSA's computerized data base contains other information--such as manufacturers' service bulletins that describe specific repair procedures to be followed by dealers, motor vehicle warranty data, and past defect recall reports--which can also be used to support safety defect investigations. All computerized data are stored for 9 years (complying with an 8-year statute of limitation requirement).

If the safety analysts believe the potential problem is serious enough to warrant some action by ODI, they draft a memorandum to the Chief, Engineering Analysis Division, from the Chief, Defects Information Systems Division, on the matter. These memorandums may describe the nature of the potential problem and the number of complaints that have been received. These memorandums also advise whether there have been previous recalls for the problem and whether the manufacturer has issued a service bulletin to deal with it. Such memorandums are reviewed by the Director, ODI, before their submission to the Engineering Analysis Division. If the Director agrees that the matter warrants it, the memorandum is sent. In some cases, the Director may decide that the Defects Information Systems Division should wait for additional complaints before sending a memorandum to the Engineering Analysis Division on a potential problem.

The Chief, Engineering Analysis Division, advises the Chief, Defects Information Systems Division, of his disposition of potential problems brought to his attention through these memorandums by notes on copies of the memorandums that are returned to the initiating division.

As a supplement to the Defects Information Systems and Engineering Analysis Divisions' "manual" review of consumer complaint letters and Hotline questionnaires, the Defects Information Systems Division obtains a printout from its computerized data base that summarizes complaints, each quarter. This printout, which is referred to as the Trend Analysis Report, is designed to

identify any potential safety problem which ODI may have overlooked in its manual review processes. Most inquiries and engineering analyses are opened on the basis of the manual reviews of consumer and Hotline questionnaires and complaint letters.

The Defects Information Systems Division furnishes the quarterly Trend Analysis printout to the Engineering Analysis Division for review. On the basis of the review, the designated safety defects engineer, Engineering Analysis Division, prepares a memorandum to the Director, ODI, summarizing the results of his review.

The Chief, Defects Information Systems Division, told us that the safety defects analysts who review all questionnaires and consumer complaint letters received by NHTSA are given the opportunity to read the Engineering Analysis Division's memorandum analyzing the quarterly Trend Analysis Reports. According to the Chief, Defects Information Systems Division, the Engineering Analysis Division's memorandum may put his division on notice to be alert for further complaints on some potential problems. Should the Defects Information Systems Division's safety defects analysts subsequently receive additional complaints on these potential problems, they use their judgment as to when they should write a memorandum to the Engineering Analysis Division suggesting that it consider initiating an inquiry or engineering analysis of such problems.

ENGINEERING ANALYSIS DIVISION

The Engineering Analysis Division reviews the numerous vehicle owner questionnaires and consumer complaint letters forwarded by the Defects Information Systems Division to help identify potentially dangerous safety problems for investigation. A Supervisory Safety Defects Engineer reviews and sorts the questionnaires on the basis of subject (such as brakes, steering, and power train). He then gives the questionnaires to individual safety engineers in the division--on the basis of their expertise--for review. On the basis of their judgment of whether the number of complaints received and the nature of the problem poses a risk to motor vehicle safety, the Supervisory Engineer and the cognizant engineer decide whether an inquiry or an engineering analysis should be started on a potential safety defect.

Two safety defect analysts (who share the workload) review the complaint letters and prepare responses to the complaints for the signature of the Chief, Engineering Analysis Division. From their exposure to the consumer complaint letters, the Chief and the safety defect analysts obtain additional knowledge that may help them to get "a feel for any trend" that may be developing on a particular potential safety defect problem that could warrant review.

The Division accomplishes the review of potentially dangerous safety defects by two types of evaluations--inquiries and engineering analyses. As part of an inquiry or engineering analysis, the Division staff examines Hotline questionnaires, accident

reports, manufacturers' and dealers' service bulletins, prior recalls, and other pertinent sources for data that could identify or pinpoint the problem.

Inquiries may be opened before or instead of engineering analyses. An inquiry is much less detailed and consists of a limited request for information from the manufacturer. Within a relatively short period, the staff can decide whether it wants to proceed with an engineering analysis, close the inquiry without additional work, or continue the inquiry to obtain more information on the potential problem. During an inquiry, if a manufacturer determines that a safety defect exists and initiates a recall, there may be no further need to analyze the problem if the scope of the problem and the vehicle population recalled are compatible with the information developed during the inquiry.

When an inquiry does not produce a voluntary recall by the manufacturer, and ODI believes that the matter merits additional attention, the problem is escalated to an engineering analysis. NHTSA's written guidelines provide that the following actions may be taken as appropriate in conducting an engineering analysis:

1. Contacting owners who have reported the problem to ODI to better identify the scope and nature of the matter under study.
2. Sending additional letters to the manufacturer requesting clarification of previous manufacturer responses; updated information regarding consumer complaints, lawsuits, sales, and warranty figures; the submittal of drawings showing design, production, assembly, or material changes; manufacturer test results; and the manufacturer's reassessment of the problem.
3. Searching existing office files for additional consumer complaints, manufacturer bulletins, previous engineering analysis and petition files, recall records, and investigative files for any similar type problems and conducting a comprehensive analysis to determine if or to what extent the problem involves peer vehicles or components.
4. Requesting accident data from NHTSA's National Center for Statistics and Analysis and a literature search from its Technical Reference Center.
5. Initiating a test program to simulate failure and identify the cause and determine the related safety consequences of the problem.

After the information-gathering phase is completed, the data must be analyzed to determine the extent and severity of the problem being studied.

Because an inquiry or engineering analysis is an internal NHTSA activity that precedes a formal investigation, the staff is

not required to make the closing analysis memorandum and other information available to the public. However, an engineering analysis file containing correspondence with the manufacturer is maintained for public view. Occasionally, NHTSA will issue a press release if a potential defect poses an immediate threat to safety at this point.

A manufacturer may also agree to conduct a recall during an engineering analysis, which could negate any further need for NHTSA analysis. If a manufacturer takes no such action, the staff, after reviewing all information pertinent to the engineering analysis, may decide that a formal investigation is warranted. An NHTSA Defects Review Panel--made up of representatives from ODI and NHTSA's Office of Chief Counsel--will then evaluate the information and determine either to

- open a formal investigation,
- perform additional engineering analysis work before making a final decision, or
- close the engineering analysis.

A representative of the NHTSA Administrator's staff is supposed to attend all panel meetings.

DEFECTS EVALUATION DIVISION

This Division conducts formal investigations after NHTSA's review panel decides to proceed beyond the engineering analysis phase. ODI notifies the manufacturer that it has opened an investigation. This notification allows the manufacturer the opportunity to open its own investigation if it has not already done so.

NHTSA's written guidelines provide that during the formal investigation, the following actions may be taken as appropriate:

1. Making a public announcement of the opening of an investigation to advise the media, consumer interest groups, and others of the alleged defect and to solicit additional responses from the public (the public can provide extensive, significant information once advised of problem details).
2. Sending a letter to the manufacturer asking additional or clarifying questions concerning previously submitted responses or data or posing new questions in areas not previously covered during the engineering analysis.
3. Sending additional letters to the manufacturer asking clarifying questions concerning previous manufacturer responses and requesting updated information regarding consumer complaints, lawsuits, sales, and warranty figures; the submittal of drawings showing design, production, assembly, or material changes; and manufacturer

test results to the extent not covered during the engineering analysis.

4. Conducting owner surveys covering representative vehicle populations consisting of both subject vehicles and peer group vehicles to provide a measure of the scope and seriousness of the problem.
5. Conducting indepth interviews with owners of affected vehicles for additional insight as to modes and consequences of failure and contacting survivors, relatives, or other knowledgeable parties for fatality accidents to gain additional information.
6. Continuing existing test programs or initiating additional test programs to further define problem causal factors and possible effects on safety.
7. Searching office files for new manufacturer bulletins issued since the termination of the engineering analysis.
8. Seeking updated information since the engineering analysis regarding accident data from NHTSA's National Center for Statistics and Analysis and relevant literature from its Technical Reference Center.

The purpose of the formal investigation is to develop documentary evidence which will bridge the gap between an alleged motor vehicle defect and the official determination that a safety-related defect does or does not exist.

At the end of each formal investigation, the staff prepares an investigatory report which includes

- the basis for the investigation,
- a description of the problem,
- an analysis of information from the manufacturer,
- a summary of test results,
- a summary and analysis of consumer letters,
- details of other investigatory actions, and
- conclusions.

The report, along with a recommendation that an initial determination of defect be made or that the case be closed, is sent to NHTSA's Office of Chief Counsel. All recommendations require the concurrence of the Office of Chief Counsel. When the Chief Counsel concurs with an initial determination of defect, NHTSA's Deputy Administrator must also approve the determination before the

case can proceed. After this approval, NHTSA notifies the manufacturer that it has made an initial determination of safety-related defect and has a public notice printed in the Federal Register.

The manufacturer then has an opportunity to present its views at a public hearing, or it can decide to recall the affected vehicles or equipment. If the manufacturer decides to present its views at a public hearing and the NHTSA Administrator believes that a final determination of safety-related defects is warranted after the public hearing, the Administrator will order the manufacturer to initiate a recall to correct the safety-related defect. If the manufacturer refuses to initiate a recall, NHTSA will proceed with court action against the manufacturer. The final decision of whether the manufacturer should be required to recall the affected vehicles or equipment is made by the court.

DETAILS OF NHTSA'S TESTING OF GENERAL MOTORS CORPORATION'S
1979 A-BODY CAR CONCERNING REAR AXLE SEPARATION

On August 6, 1981, the Director, ODI, provided a preliminary statement of work to the Director, NHTSA's Vehicle Research and Test Center, in East Liberty, Ohio, for a series of tests to determine the "consequences of a rear axle 'C' lock failure" on certain GM A-body vehicles. Personnel in the Center's Engineering Test Facility actually conducted the tests. In that statement, ODI stated that:

"We wish to generate axle separation in this test. To achieve this, we recommend that a 'C' lock be omitted in assembling the differential. This will provide for axle separation in a short period of time and hopefully keep damage to the differential gears to a minimum."

NHTSA's project engineer for these tests at the Engineering Test Facility told us that ODI and the Facility considered "machining" an end button down to the thinness that the "C" lock would probably eventually fall out of its axle groove during the tests. He said that this was rejected in favor of removing the "C" lock in order to expedite the testing and provide more control over the timing of the separation. The Facility project engineer; the engineering analysis engineer; and the Chief, Defects Evaluation Division, ODI, also said that a principal purpose of the tests was to determine whether the axle and wheel assembly would completely separate from the vehicle.

MODIFICATIONS TO TEST VEHICLE

The Engineering Test Facility used a 1979 Chevrolet Malibu station wagon for the tests. The "C" lock was removed from the right axle. The project engineer said that there was no particular reason the "C" lock was removed from the right axle; it could have been removed from the left side for the tests.

A rear axle separation results in the loss of rear braking capability. In order to maintain maximum possible braking capability in an unknown situation, the left rear and front brakes were left fully operational although the right rear brake was disabled for the straight-ahead and emergency lane change tests. Before the gradual right turn maneuver, another axle was installed on the right rear of the vehicle. The right rear brake was returned to operational condition.

The right rear drum was modified to simulate a worn brake drum on the right rear. This was accomplished by enlarging the diameter of the brake drum 0.060 inch by machining the drum on a brake lathe. A small lip (0.030-inch deep) was left on the inside edge of the drum to simulate the effect of a worn drum. According to the project engineer, the brake linings had been worn to a point just short of the maximum before they should be replaced.

The engineer said that because the brakes were self-adjusting, it was thought that the brakes would adjust so that the pads would restrict the drum from moving outward (by the 0.030-inch lip) even though the "C" lock had been removed.

DESCRIPTION AND RESULTS OF TESTS

Personnel of NHTSA's Engineering Test Facility ran three tests to examine the conditions, if any, under which the axle would move outward in the event a "C" lock dropped out of its axle groove and the extent of such movements. The tests were performed on a 1,200-foot by 1,800-foot asphalt pad. The test surface has a 1-percent downward slope from north to south and no cross slope. A straight-ahead test and an emergency lane change test were run on September 30, 1981, and a gradual right turn test was run on October 7, 1981. The Center's project engineer told us that these three test runs were the only ones conducted of the alleged problem, and these tests were videotaped for the official record. The axle shaft separated completely from the vehicle and traveled several hundred feet during the emergency lane change and gradual right turn test runs.

Each test maneuver was videotaped from at least two different positions by manually operated cameras mounted on tripods and by one automatic onboard camera. The manually operated cameras were located an estimated 30 to 50 feet off to the passenger side of the vehicle's path. Two offboard cameras were used in the straight-ahead and emergency lane change tests and three offboard cameras were used for the gradual right turn test. The third camera was mounted on a flatbed trailer and was positioned behind the other two cameras. It was used to film the path of the separated axle and wheel assembly.

The Vehicle Research and Test Center's final report entitled C-Lock Axle Test, 1978-1979 G.M. Vehicles was received by ODI on May 24, 1982. The following is based on our review of that report, videotapes of the test runs, and discussions with various participants.

Straight-ahead test run

The vehicle was accelerated up to the test speed of 50 miles per hour through a large radius left turn to prevent axle separation. The vehicle was then driven through a straight lane 12 feet wide and about 150 to 160 feet long tangential to the left turn radius. The test vehicle traveled about 200 feet beyond the end of the delineated lane for a total distance of between 350 and 360 feet. The axle did not separate from the vehicle during this test run nor was drive power lost to the rear wheels. The project engineer told us that some outward force is required to cause an axle separation even though the "C" lock has been removed from a differential. He said that it would be impossible to drive a vehicle for any extended time without some outward force being applied to the axle assembly. For example, with the right "C" lock removed, turning the vehicle to the right could apply enough

outward force to cause an axle separation (see following discussion of other tests).

Emergency lane change test run

After accelerating using the same method as in the straight-ahead test run, the vehicle was driven through an emergency lane change to the right at 50 miles per hour. Standard traffic cones were set up to permit an emergency lane change in a distance of 100 feet. The May 1982 final test report stated that:

"The emergency lane change to the right caused the axle to completely separate from the vehicle. From the spiraling marks on the axle, it required seven revolutions to separate completely. At 50 mph, this equates to less than 0.1 seconds.

"After separation, the right rear shock absorber mount, which is attached to the axle tube, scraped on the road surface. The rear of the vehicle slewed right and left several times but was brought under control. The brakes were used only near the end of the slide and seemed to operate normally. The vehicle was stopped in 525 feet. The wheel and axle assembly, free of the vehicle, started bouncing and moved off to the right. It then curved back toward the line of the test vehicle, crossed in front of it and came to rest approximately 100 feet to the left of the vehicle. It traveled a total of approximately 1,050 feet."

From our review of the videotapes of the tests and discussions with the project engineer, it appears to us that the first camera was about 30 to 50 feet off to the right and at the end of the 12-foot lane, which was about 70 to 80 feet long. The axle and wheel assembly--which had separated from the vehicle even before it entered the 12-foot lane--traveled slightly off to the right of the vehicle's path and passed in front of the first camera and behind the second camera that was about 180 feet farther down the vehicle's path. As stated in the test report, the axle and wheel assembly turned back left and circled in front of the vehicle's stopping point.

Gradual right turn test run

After accelerating in the same manner used in the two previous tests, the vehicle was driven through a gradual right curve at 50 miles per hour inside a 12-foot lane delineated by standard traffic cones. The length of the curve was 180 feet with a radius of approximately 500 feet. The maneuver was performed with the simulated worn brake drum on the right rear wheel. The Vehicle Research and Test Center project engineer told us that ODI wanted the gradual right turn test run to determine whether a less severe maneuver than the emergency lane change would exert enough outward

force on the axle and wheel assembly to overcome the 0.030-inch lip that had been machined into the test vehicle's right brake drum.

According to the project engineer, the lip had no apparent effect on retaining the axle and wheel assembly.

The Vehicle Research and Test Center's May 1982 final test report stated that:

"The gradual turn to the right also caused the axle to separate from the vehicle. The vehicle was stopped in a straight line with no controllability problems. Stopping distance was 400 feet, using the vehicle brakes earlier than before. The brakes did not seem to perform as well as in the lane change run. In this run the right rear tire was cut and deflated upon separation after striking the onboard camera mount. The axle and wheel assembly traveled for 428 feet, paralleling the path of the test vehicle and moving leftward, coming to rest 153 feet to the left of the test vehicle stopping point."

The test driver told us that during the emergency lane change test run, the vehicle slewed from its path about one-half its length (about 8 feet). He described the experience as being like "slewing on ice." He said that after the vehicle made several side movements, he was able to straighten the vehicle direction and let it slide to a stop.

In the project engineer's view, the safety risk of an axle and wheel assembly separation would be greatest on a two-lane street or highway where the separated items might strike pedestrians or hit an oncoming vehicle (particularly if the left axle separated). The project engineer said that the driver was aware of an imminent separation and the need to steer for control when it happened, whereas the average driver would not be expecting it. Furthermore, he said that the test driver was instructed to try keeping the vehicle in the marked-off lanes.

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U.S. House of Representatives
Subcommittee on Oversight and Investigations
of the
Committee on Energy and Commerce
Washington, D.C. 20515

April 18, 1983

Honorable Charles A. Bowsler
Comptroller General
General Accounting Office
441 G Street, N. W.
Washington, D. C. 20548

Dear Mr. Bowsler:

As you know, the National Highway Traffic Safety Administration (NHTSA) conducts a vehicle testing program, including a defect testing program. I am concerned about this program and request that your agency examine the practices and procedures of the program with particular attention to the following:

1. Please examine how all NHTSA test runs are carried out and indicate whether or not these tests followed the normal procedures, including procedures to provide for the safety of all persons participating in the tests.
2. Please examine what actions, complaints or events caused NHTSA to initiate defect testing of domestic and foreign-made vehicles and identify any problem associated with this program. I am particularly concerned that the program is fair and accurate.
3. The April 12, 1983 edition of the Washington Post reports that on April 1 NHTSA announced that it had found a potentially "catastrophic" defect in as many as 5.3 million cars and pickups produced by the General Motors Corporation (GM) from 1978 through 1980. The Post article states:

NHTSA charged that an improperly manufactured retaining part could fail, causing the rear axle shaft and rear wheels to work loose and possibly separate from a car, which could lead to loss of control, accidents, injuries, death or property damage.

The dramatic NHTSA film, which was broadcast April 1 by some of the television networks, showed the rearwheel assembly separating from a 1980-model GM wagon, supposedly as the result of the alleged defect.

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NHTSA said that a part called an end button could work loose in some cases, permitting a C-lock retaining ring to drop off, resulting in excessive movement of the rear axle shaft.

The article then refers to a GM letter and states that "NHTSA deliberately removed a C-lock from the test station wagon to simulate the results of rear-axle parts failure". It adds that "NHTSA did not identify the test as a simulation".

Last week at least one national television station showed the film again and carried essentially the same story as the Post article.

(a) Please examine in detail the problem that NHTSA was testing and all events that led NHTSA to initiate such testing?

(b) When and where and in what manner did NHTSA conduct tests to show that a "C-lock" could drop off and result in movement of the rear axle shaft?

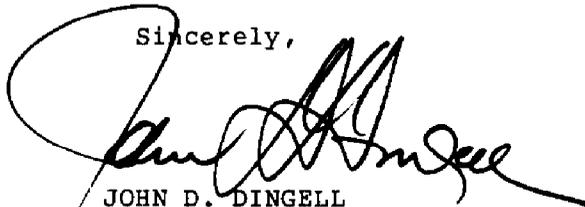
(c) How often were these tests made? Describe in some detail what happens when a vehicle's axle and wheel comes off. What is the danger to the vehicle occupants and to others? What safety precautions were taken to protect people from being hit by a wheel or other objects and to protect the driver of the vehicle? What did each test show? Please examine the September 1981 and other HLDI reports of the Highway Loss Data Institute concerning the cars in this test and advise us of the injury loss experience due to these types of accidents.

(d) Which test runs were filmed? Was the filming by remote camera or hand-held camera? Which test run film did NHTSA use and why was that film chosen? How and when did NHTSA release the film and explain the test results? Did NHTSA fail to explain that it had removed one or more parts or any other pertinent fact? Please explain why the part was removed and whether or not that is a normal practice. What are NHTSA's procedures for making it clear that the tests are simulated?

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Please keep this Subcommittee's staff fully and currently informed about the progress of the investigation. I am particularly interested in an early report of your findings and recommendations. As usual, your agency should not provide to any agency a draft of your report for the purposes of obtaining the agency's views or comments. The Subcommittee will do that after the GAO report is provided to the Subcommittee.

Sincerely,

A handwritten signature in black ink, appearing to read "John D. Dingell", written over a large, stylized initial "D".

JOHN D. DINGELL
Chairman
Subcommittee on
Oversight and Investigations

(347514)





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