THE IIR PETITION CONCERNING THE INERTIAL UNLATCHING OF SAFETY BELTS

Safety Belt Performance

- Safety belts are extremely effective in reducing the risk of serious injury and fatality. Studies done by safety researchers throughout the world have concluded that, when worn, belts reduce the risk of fatality by approximately 50% --that is, belts cut the chances of being killed in half.

- Safety belt use in this country has increased from 11% in 1982 to current levels of over 60%. This increased belt use has provided significant life savings. Since 1983, safety belts have saved more then 33,000 lives. In 1991 alone, seat belts saved some 4,700 lives.

- Essentially every car in the U.S. is equipped with safety belts. All new cars have been required to be equipped with lap and shoulder belts in the front seat since model year 1968.

NHTSA Defect Investigations Concerning Safety Belts

- NHTSA has a strong program to identify safety defects in motor vehicles and seek safety recalls when the facts warrant. This defect investigation program is part of the agency's effort to improve motor vehicle safety.

- The agency has been aggressive in identifying safety defects in safety belts and securing recalls. Over the past four years, manufacturers have initiated ten safety recalls involving safety belts in 2.7 million vehicles. NHTSA's defect investigations have influenced over 87% of the vehicles involved in these recalls. In each of these recalls, the defect involved a manufacturing deficiency in the safety belt, such that the belt system was not providing adequate occupant crash protection.

Inertial Unlatching

- The purpose of a safety belt buckle is to provide a means of latching and unlatching the two parts of a safety belt system. The buckle has a button that is pushed to unlatch the belt. The button has a spring mechanism beneath it that must be depressed in order for the belt to unlatch. Theoretically, if a spring-type mechanism, such as a safety belt buckle, is exposed to an abrupt acceleration, this acceleration can cause the button to self-depress to the point that the belt becomes unlatched. This occurrence is a well understood engineering phenomenon, and is known as "inertial unlatching."

- Whether the phenomenon has practical significance for automotive safety belts depends on whether the types of abrupt acceleration needed to unlatch a belt can occur in a vehicle crash. In a laboratory setting, a sharp blow to the opposite side of a buckle can cause an acceleration of such magnitude that it will cause the safety belt to unlatch. However, such a sharp blow is not characteristic of the motor vehicle crash environment.

Past NHTSA Testing of Inertial Unlatching

- NHTSA opened a defect investigation into inertial unlatching in 1977 after a single complaint that the seat belt mechanism in a 1975 Chevrolet Monza could inadvertently release if a sharp blow was applied to the backside of the buckle.

- As part of its investigation into this issue, NHTSA conducted testing at its Vehicle Research and Test Center (VRTC). The results of this laboratory testing indicated that a sharp blow to the backside of a safety belt buckle could indeed open the buckle. However, aside from the Monza complaint mentioned above, there were no other complaints or reports of real-world incidents of alleged inertial unlatching. Absent other real-world incidents it was clear that an inherent defect in the design of seat belt buckles did not exist. It was also clear that the laboratory tests were not indicative of real-world conditions.

- It is noteworthy that these results are identical to those obtained by other safety researchers. For example, a 1973 study by the Department of Motor Transport in New South Wales, Australia titled "Dynamic Tests for Seat Belts" found that laboratory tests could result in an inertial unlatching, but the chances of such laboratory conditions existing in actual crashes were unknown. In an October 1992, letter from Australia in response to NHTSA's petition assessment, the Australian government reports no real-world problems of safety belt buckle unlatching. This further confirms the conclusions from NHTSA's testing.

- The agency published results of the VRTC tests in a 1978 report titled "Survey of Seat Belt Latching Mechanisms Used on 1971-1978 Passenger Cars." While the agency found no defect in the Chevrolet Monza, or a need to conduct further investigation, the report recommended that tests be performed simulating pelvic impact force on the back of the buckle in rollover and corner impact crashes. This type of testing has been done. The agency has conducted thousands of laboratory crash tests using dummies restrained by safety belts. Included in these tests are frontal, side, rear, rollover, and corner impact tests. In all of these tests, there is no evidence of inertial unlatching.

The IIR Petition

- On September 11, 1992, the Institute for Injury Reduction (IIR) petitioned NHTSA to conduct a defect investigation, leading to a recall, of safety belts which can become unlatched due to inertial unlatching. IIR alleged that crash forces applied to the buckle can actuate the release button, allowing the belt to become unlatched. Additionally, the IIR petition called for NHTSA to initiate rulemaking to preclude such designs in the future. IIR stated that the alleged defect appears to involve belts with the release button on the face of the buckle. When latched, the release buttons on such buckles are to the side of the occupant, hence they are characterized as "side release" buckles.

- Associated with this petition was a national news story appearing on CBS's "Street Stories" show. On this show, side release buckles were portrayed as unsafe, in that they could become unlatched due to inertial unlatching. This show appeared on national TV on September 10, 1992 with a follow-up presentation on the CBS Evening News on September 11, 1992.

NHTSA's Response to the IIR Petition

- To address the allegations in this petition, NHTSA planned an extensive effort to obtain, analyze, and review all available information and data on safety belt inertial unlatching. It was recognized that a thorough and exhaustive review would require extensive agency resources and, since such resources are fixed, other agency activities would necessarily be adversely affected.

- NHTSA's comprehensive review of this petition encompassed a variety of approaches to address the issues associated with the alleged defect:

  - Detailed review of each and every laboratory crash test conducted by the agency to determine if inertial unlatching occurred in any of the thousands of tests.

  - Laboratory tests to define the characteristics that cause inertial unlatching and to determine if these exist in the real-world crash environment.

  - Securing information from 13 manufacturers of motor vehicles and safety belts, as well as patent holders on safety belt buckles, to search for information concerning the alleged defect.

- Analysis of real-world accident data to determine if there is any difference in the occupant protection provided by safety belts with side release buckles compared to belts with end release buckles, those in which the button is on the end of the buckle, towards the front of the vehicle.

- Reviewing all information provided to NHTSA's Auto Safety Hotline, both before and after the "Street Stories" show to determine if any patterns exist among consumer complaints to suggest a possible defect with safety belt buckles.

- Obtaining information from other countries concerning the alleged defect.

NHTSA Findings

- o A comprehensive agency review of over 2,300 crash tests involving approximately 4,000 belted dummies, including frontal, oblique, rear, rollover, and side crashes, did not provide one instance of inertial unlatching. In ten of these tests, belts did come unlatched due to other reasons, e.g., external contact with the release button, manufacturing defect in the buckle. It was also found that seven of the ten buckle unlatchings involved end release buckles.

- o Laboratory testing performed in response to this petition defined the engineering characteristic which can cause inertial unlatching. Most important, this testing demonstrated that these characteristics are not present in real-world crashes.

- o Manufacturer data did not demonstrate that inertial unlatching is a safety problem. In the tens of thousands of crash tests conducted by motor vehicle and belt manufacturers, only General Motors Corporation (GM) reported what it believes may be two possible, but unverifiable, cases of inertial unlatching. Of the 30,000 tests GM has performed, it identified only these two such possible instances. No other reports were provided by either vehicle or belt manufacturers. Responses from safety belt buckle patent holders indicated that patents were sought to improve the general performance and ease of operation of buckles--not because of a safety problem associated with inertial unlatching.

- o Analysis of real-world crash data demonstrated that "there is no pattern of evidence in the crash data to support the allegation related to inadvertent unlatching for side-release systems." Thus, analysis of real-world data did not indicate the presence of a safety problem associated with inertial unlatching in side release buckles.

- o Review of consumer calls to the agency's Auto Safety Hotline did not suggest the presence of a safety problem. The complaint rate (the number of reports divided by the number of vehicles on the road) is essentially the same for vehicles with both side and end

release buckles. Further, the complaint rate is extremely low compared to other safety problems reported to the agency. Additionally, the number of consumer calls to the Auto Safety Hotline subsequent to the "Street Stories" and CBS Evening News programs, the latter of which broadcast the toll-free Auto Safety Hotline telephone number, were no higher than the number of calls normally received. Generally, national TV publicity of a safety issue, in which the Auto Safety Hotline telephone number is presented, results in large increases in Auto Safety Hotline calls. The fact that such an increase did not occur in this instance suggests that the public does not consider this do be a safety concern.

Other Countries' Experience with Inertial Unlatching

- The agency asked representatives of the Canadian Ministry of Transport, the Australian Federal Office of Road Safety, and the United Kingdom Department of Transport for any information they may have of investigations and reports concerning inertial unlatching of safety belt buckles.

- The response from Canada indicated that many investigations of alleged release of safety belt buckles had been conducted, but "in NO case was it concluded that the buckle released due to inertial forces."

- The response from Australia noted that their review of the safety defect investigations found "no record of any alleged problems in Australia with this type of buckle."

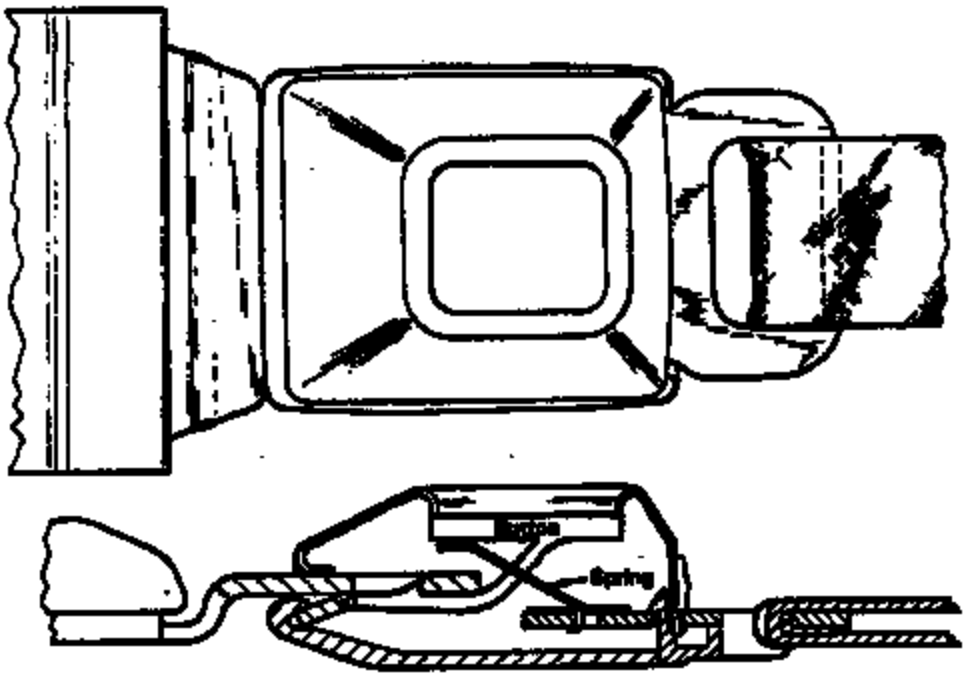
- The response from the United Kingdom stated that its in-depth accident investigations have shown no instances of inertial release of safety belt buckles, and, that its counterpart to our defect investigations and compliance testing efforts have found no defects of this nature in its testing and investigations.

NHTSA Conclusion

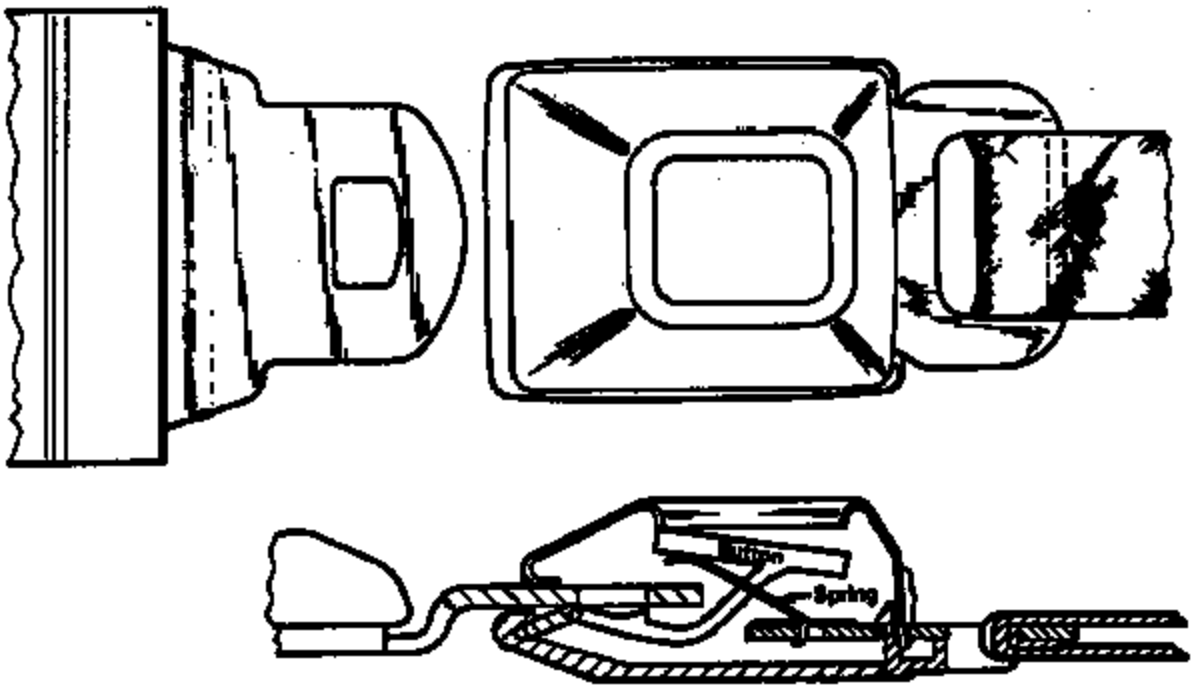
- A comprehensive and exhaustive review of all available information led to the conclusion that there is no safety problem associated with inertial unlatching of safety belts in real-world crashes. This conclusion is based on laboratory crash tests, manufacturer submissions to the agency, analysis of real-world accident data, and assessment of consumer complaints filed with the agency. In each of these independent areas, the conclusion is strong and consistent--inertial unlatching is a phenomenon that is not associated with real-world crashes.

- Accordingly, the petition to conduct a defect investigation and to initiate rulemaking is denied.

BUCKLE LATCHED



BUCKLE UNLATCHED



NHTSA'S EVALUATION OF PETITION

- Conducted an exhaustive review of 4,000 crash tests available to the agency—Not one instance of inertial unlatching
- Conducted laboratory and crash tests to define the characteristics that cause inertial unlatching and determine if these exist in the motor vehicle crash environment—Characteristics that cause inertial unlatching are not present in crashes
- Obtained information from
  - 8 vehicle manufacturers
  - 5 safety belt manufacturers
  - 7 holders of safety belt patents
  - —All information indicates inertial unlatching is not a safety problem
- Analyzed real-world accident data—Same high level of occupant protection provided by safety belts with side release buckles as with belts with end release buckles
- Reviewed calls to NHTSA's Auto Safety Hotline—Despite national publicity alleging problems of inertial unlatching of seat belts, calls to the Hotline, which might indicate a real-world problem, did not increase
- Coordinated with other countries—No record of any buckle release due to inertial unlatching

LEVEL OF EFFORT

- Over 50 Agency Employees Expended in Excess of 5,000 Person Hours
- Offices of Rulemaking, Enforcement, Research and Development, Chief Counsel Involved
- Taxpayer Costs—Over $100,000
- Agency Safety Activities Adversely Affected

—Rulemaking
Delays in statutorily-required rulemaking actions

—Enforcement
Delays in identifying defective vehicles on the road

—Research and Development
Delays in research to support safety rulemaking