

Memorandum

U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

Subject: **ACTION:** Final Recommendation to Grant-Congressman
Timothy E. Wirth Petition to Issue an FMVSS to
"Limit the Rollover Propensity Of Passenger
Automobiles, Utility Vehicles, and Pick-Up Trucks."

Date: JUN 25 1987

From: Barry Felrice
Associate Administrator for Rulemaking

Reply to
Attn of

To: Erika Z. Jones
Chief Counsel

The Draft Evaluation dated April 3, 1987, (copy attached) of the subject petition has been distributed and a concurrence on the recommendation to grant-in-part was received from Enforcement (NEF), and non-concurrences with recommendations to fully grant the petition were received from Research and Development (R&D), Plans and Policy (P&P), and your office (copies attached). The comments are organized by the office from which they originated.

First, the concurring comments of Enforcement. Their first comment suggests the possibility that part of the effect attributed to the issuance of the FTC warning may have been due to another factor, that being the installation of a front stabilizer bar that was fitted to some Jeep CJ's at about the same time. An attempt was made to analyze the existence of such an effect, but no significant correlation was found. This, however, may have been due to a lack of data, as it was not possible to determine what percentage of 1976 thru 1979 Jeep CJ's were so equipped, and data for those model years could not be used in the analysis.

NEF's other comment related to the possible impact of non-vehicle related factors on Jeep rollover accidents. From their prior reviews of the Jeep rollover issue, they found that these vehicles were involved in many "weekend accidents in a rural environment with high occupancy situations and young intoxicated drivers." The analyses conducted by RM for the draft evaluation did not address such usage and driver factors, however, an analysis of the CARDfile performed by R&D did so. Stepped Multivariate Regression analyses were performed which addressed a number of driver and usage factors, as well as the stability factor. They indicated that driver age, driver sex, alcohol involvement, and "rural land use" at the crash site were the only other variables which were statistically significant. They were not all significant in any one regression, but were in different combinations in the various regressions performed on two different CARDfile databases.

In their comments, P&P argues that although the draft evaluation indicates that the rollover stability factor is not "the answer" that "it may play a role as part of some combination of factors" that could be used as the bases for future agency action. Based on this, P&P recommends that the petition be granted. They suggest that the notice of grant should indicate that the rollover stability factor is not the answer, but that the agency is developing a plan to evaluate the problem and the most effective means to address it. P&P indicates that "the discussion on page 11 of the NRM Draft Evaluation could form the basis of such a plan." P&P states that in light of the "Light Truck and Van Safety" report recently sent to Congress, it would be difficult to justify denying the petition.

Similar comments were received from your office, Office of Chief Counsel (NCC). These comments basically follow the same argument as those of P&P, stating that if the petition is narrowly viewed as only a request to establish the rollover stability factor as the criteria for an FMVSS, it could be denied. However, if the overall issue of vehicle rollover is addressed, then the petition should be granted. The agency should then indicate that "the vehicle stability factor suggested in the petition apparently is not the answer to the problem of vehicle rollover," however, the agency acknowledges the safety problem associated with rollover and is seeking appropriate solutions "to protect the public from such hazards." Addressing the recommendation to publish and distribute some form of consumer information, the fact that the fatal accident rates for the Jeep CJ's is still much higher after the FTC warning, even though there is a significant reduction in the rate, is pointed out. Justifying this course of action as a substitute for rulemaking is, therefore, questioned.

Upon further consideration, Rulemaking is persuaded that the petition should be granted in the broad sense, i.e., the agency should consider rulemaking to address the rollover problem in some manner, but not simply by regulating the value of the "stability factor."

R&D had extensive comments questioning much of the analysis, as well as the conclusions of the draft evaluation. Rather than discuss each comment individually, a general review of them will be made.

R&D's and RM's analyses differed in both database utilized and methodological approach. R&D questioned the appropriateness of using an analysis of Fatal Accident Reporting System (FARS) data for the draft evaluation, due to the inherent severity bias of that file. However, the problems related to inconsistencies from state to state in reporting

thresholds and the unknown, but probably significant, level of unreported accidents which may not be evenly distributed across accident and/or vehicle type, that exist in the CARDfile used by R&D were not noted. There is also the potential bias of CARDfile toward the lower end of the severity spectrum. However, both of these files, given their strengths and weaknesses, will have to be used for a thorough analysis of the rollover safety problem to be performed.

In terms of methodology, the major difference is that R&D's analysis looked at rollover accidents given the occurrence of a single vehicle accident. The likelihood of a single vehicle accident occurring in the first place was not examined. While this approach may be appropriate for comparing similar vehicles which have similar characteristics related to crash avoidance, i.e., their exposure to single vehicle accidents is not dramatically different, it may confound a comparison of different vehicle types. Precluding from an examination of rollover risk the likelihood of the precipitating event, i.e., a single vehicle accident, may not give a complete picture of the situation. Moreover, it has been suggested by other NHTSA accident data analyses that the likelihood of rollover in a single vehicle accident is dependent upon the pre-crash condition. Malliaris, et al., point out in their March 1983 SAE paper (No. 830560), that more than 1/2 of the vehicles involved in rollover accidents reviewed in that study were sliding sideways prior to rolling over. They also found that the likelihood of a vehicle sliding sideways during a single vehicle accident varied from one vehicle type to another. In an analysis of the differences between lighter and heavier passenger cars, the authors concluded "It is in fact this mode of losing control that leads the lighter cars to roll over so overwhelmingly more often than heavier cars."

Therefore, it is likely that the relationship of wheelbase to directional control and stability and of center of gravity height and track width to rollover stability, together with the covariance of wheelbase and rollover stability factor results in a synergistic effect of both factors on the rate of rollovers per single vehicle accident, as well as, the very high and similar correlations found during the accident data analyses.

Therefore, even though the approach taken in R&D's analysis needs to be broadened to give a more complete picture of the safety problem and possible solutions, their analyses and comments do support their recommendation to grant the petition.

There is no question that for some classes and specific types of vehicles the risk of accident, injury and/or fatality is much greater than for other vehicles, and that further analysis should be conducted to better

understand the reasons and to develop appropriate means to reduce that risk. In addition, the question of occupant protection by specific make/model, given a rollover, needs to be examined, and an analysis of multi-vehicle rollover accidents should be performed. For a thorough examination of these issues to be conducted, it is clear that all of the relevant data bases and methodologies will be needed. It should be pointed out that a recently begun R&D program involving the collection of special data for rollover accidents by the Maryland State Police should result in data that will significantly increase the understanding of rollover accidents.

Based on these persuasive comments from NCC, NPP and NFD, Rulemaking, therefore, requests that the Office of Chief Counsel prepare a Federal Register notice to grant the subject petition. That notice should stress that the agency does not support the exclusive use of the "stability factor" as the only appropriate or reasonable way to address the problem. The notice should indicate that the agency will develop a Work Plan to define the efforts that the agency intends to undertake in response to the subject petition. This Work Plan would include any new research or accident data programs related to the rollover of light duty vehicles, and would also include a number of ongoing or presently planned activities related to this issue. A summary of those existing and currently planned activities follows:

Crash Avoidance Programs-

- 1) Rollover, Braking, and Dynamic Stability-Modified Suspension Vehicles: The objective of the research is to determine the relationship between a vehicle's stability, including rollover, braking and directional, and changes in its center of gravity height due to modifications to its suspension. One of the three vehicles to be tested during this program will be a utility vehicle. This program will begin in late 1987 and will take 18 months to complete.
- 2) Stability and Control of Light Trucks and Vans During Braking: This program will investigate the extent to which vehicle instability as related to unbalanced braking, center of gravity height, suspension roll stiffness, and other factors results in loss of control and ultimately in rollover. A variety of light, medium and full sized pickup trucks, vans and MPV's will be analyzed by both computer simulation and full scale testing. This program has already been started and will be completed in late 1989.

Crashworthiness Programs-

- 1) **Rollover Performance of Light Trucks:** A series of dynamic rollover tests will be conducted aimed at evaluating the safety aspects of roof structures and ejection prevention. Accident data will be examined to determine the appropriate test conditions that are responsible for serious injuries in rollovers in light trucks and multipurpose passenger vehicles. Test devices and procedures will be evaluated during the next 12 months. Information on the structural parameters in rollover/ejection crash events will be obtained by conducting a limited number of rollover tests. An evaluation of these results will be conducted over the following two years.

Accident Data Programs-

- 1) **Light Truck Accident Data Analysis:** An ongoing program to analyze in more detail the safety of various sizes and types of light trucks in different crash modes. The categories of compact pickup, standard pickup, compact van, standard van, and multipurpose passenger vehicle are being analyzed in front, rear, side, and rollover crash modes. Data from FARS and NASS, as well as from several state accident data files will be analyzed to gain a more complete picture of light truck safety problems.
- 2) **Maryland Single Vehicle Rollover Study:** This program will involve Maryland State Police's collecting greatly expanded pre-crash documentation and crash data on 2800 single vehicle rollover accidents over the next year and for which they are already collecting a core of accident description information.

In addition to the programs listed above, the two specific recommendations made on page 11 of the Draft Evaluation with regard to rollover occupant protection for vehicles with minimal or no roof structure, and directional control and stability are also being considered for inclusion in future agency activities.

5 Attachments

cc: Associate Administrator for Enforcement
Associate Administrator for Plans and Policy
Associate Administrator for Research and Development