



Publisher of Consumer Reports

Docket Management System
U.S. Department of Transportation
Room PL-401
400 Seventh Street, SW
Washington, DC 20590-0001
Via: <http://dms.dot.gov>

**Comments of Consumers Union of US Inc.
to
National Highway Traffic Safety Administration
on
49CFR Part 575
Docket No. NHTSA-2001-9663; Notice 2
RIN 2127-A181
Consumer Information Regulations;
Federal Motor Vehicle Safety Standards;
Rollover Resistance**

When the US Congress enacted the Transportation Recall Enhancement, Accountability, and Documentation Act (TREAD) of 2000, it directed the National Highway Traffic Safety Administration (NHTSA) to “develop a dynamic test for rollovers” and to share the results of that testing with consumers.¹

Consumers Union concurs with the approach NHTSA has taken, in particular that it is adopting a combination or suite of tests that includes dynamic rollover tests – one with a reverse steer maneuver – handling tests (proposed), and the Static Stability Factor to estimate inherent stability.

Background

This issue has a long history. Nearly 30 years ago, NHTSA first announced its intention to consider a standard “that would specify minimum performance requirements for the resistance of vehicles to roll over in simulations of extreme driving conditions encountered in attempting to avoid accidents.” NHTSA, however, declined to follow up with a proposal. Coincidentally, in 1973, Consumers Union (CU) developed its first avoidance-maneuver test to evaluate how easy or difficult a vehicle is to control when a driver is forced to make an abrupt steering maneuver such as steering around a sudden obstacle in the road. The CU maneuver was based on tests developed by General

¹ Section 12 of TREAD directs the Secretary to “develop a dynamic test on rollovers by motor vehicles for a consumer information program; and carry out a program conducting such tests. As the secretary develops a [rollover] test, the Secretary shall conduct a rulemaking to determine how best to disseminate test results to the public.”

Motors during the 1960s. CU has continued to use this test, and to date more than 1,200 test vehicles have been evaluated using the test.

Fifteen years later, in 1988,² CU petitioned NHTSA urging the establishment of a minimum stability standard to protect against unreasonable risk of rollover in all vehicles. NHTSA granted the petition, saying that the petition was "consistent with the agency's steps to address the rollover problem." Four years later, as a result of its studies relating to that CU petition for a minimum rollover standard, NHTSA announced its intent to develop a rule to provide consumer information on a vehicle's propensity to roll over. NHTSA ultimately concluded in 1994, however, that a standard applicable to all vehicles would require the redesign of nearly all SUVs, vans and pick-up trucks – at an unacceptably high cost – and closed the docket.

In 1996 CU petitioned NHTSA again, asking the agency to develop a dynamic test program for assessing rollover propensity in sport-utility vehicles and to make such test results available to the car-buying public. The following year NHTSA granted that petition, noting that CU was "a welcome partner that has focused the public's attention on rollover and provided a wealth of consumer information to the car-buying public." NHTSA researched and conducted on-road tests for rollover in the ensuing months. However, in May of 2000, NHTSA released a proposal for using Static Stability Factor (SSF) alone to measure rollover propensity. This was a significant departure from its previous work on developing dynamic tests for rollover, tests that would evaluate the performance of a vehicle through a road course and employing a steering reversal. CU disagreed with this approach.

The current proposal comes as a result of requirements in TREAD, and CU supports NHTSA's approach. CU urges the prompt promulgation and implementation of the

² Since 1988, CU has used the short course form of its double lane change avoidance maneuver (one of several handling tests CU utilizes) principally as a "pass-fail" check test of a vehicle's emergency handling. In our view, a vehicle should keep all four wheels on the road during the test. If a vehicle experiences significant tip ups during the test sequence, it is judged as "Not Acceptable" on safety grounds. CU's test protocols are designed to maximize objectivity and reliability, and minimize variability inherent in dynamic testing using humans as drivers. For example, CU's uses three drivers who are all skilled test engineers; the testing is carefully controlled; the track surface and tire conditions are regulated and accounted for. In the 14 years that CU has been using the short course as a component of its handling tests for light trucks, the results have been consistent and accurate. Indeed, for many years, the major automotive manufacturers have included a Consumers Union-like maneuver as part of their in-house test programs. In the Federal Register notice, NHTSA affirms that the CU double lane change avoidance maneuver short course is an appropriate test for assessing emergency handling and making an expert judgment that a vehicle that experiences tip ups in this maneuver is a "Not Acceptable" safety hazard (see Notice of Proposal Rulemaking pp. 38, 143, 147). NHTSA recognizes that its own mandate for developing dynamic tests that measure a vehicle's rollover resistance for comparative purposes is different from CU's goals of assessing emergency handling. Indeed, CU has never proposed that NHTSA adopt the CU short course as one of the dynamic tests to be used to ascertain rollover resistance.

For the record, CU notes that NHTSA's Notice of Proposed Rulemaking contains references to and assessments of closed-loop driver-controlled maneuvers, including CU's short-course test, that CU believes to be inaccurate or incorrect. However, taking time to correct these references in the context of this proposal—whose proposed testing protocols we largely support—is not productive in this forum.

proposed comprehensive rollover test program. We submit the following comments in response to NHTSA's notice of proposed rulemaking.

The Rollover Problem

According to NHTSA's Fatality Analysis Reporting System (FARS), 9,882 people were killed in rollover crashes in 2000; this represents 31% of the people killed in crashes that year. Of those who died, 8,146 were killed in single vehicle rollover crashes. According to NASS (National Automotive Sampling System) estimates, 61,000 occupants annually receive incapacitating or fatal injuries in rollover crashes.

The risk of rollover differs by vehicle type. Estimates from NASS indicate that in single vehicle crashes, 10 percent of cars and 10 percent of vans rolled over, compared to 18 percent of pickup trucks and 27 percent of sport utility vehicles (SUVs) in similar situations. The fact that SUVs, primarily due to their height, and hence higher center of gravity and ungainly handling, have a greater propensity to roll over should be central to the planning for NHTSA's dynamic testing program. Thus, as NASS data clearly illustrate, the risk of rollover is significantly higher for SUV occupants compared to occupants of passenger cars. For this reason we urge NHTSA to test sport utility vehicles first for dynamic rollover resistance under the new testing protocol, followed by pickup trucks and minivans. Should lack of agency resources become a serious problem, Consumers Union recommends that NHTSA not expend the time and resources to test passenger cars for rollover resistance.

CU Supports NHTSA's Overall Approach

In presentations before the National Academy of Sciences (NAS) Committee for the Study of a Motor Vehicle Rollover Rating System in 2001, and meetings with NHTSA staff during the agency's development of this proposal, CU proposed that rollover propensity should be measured using a matrix of tests.³ We believe that NHTSA's adoption of this approach is a significant step forward in helping to protect the public from unnecessary rollover risks.

Specifically, CU recommended that this matrix include:

CU-I. STATIC or QUASI-STATIC MEASUREMENT of inherent rollover propensity, which could be derived using any of the following static measurement devices: SSF (Static Stability Factor), Tilt Table, Centrifuge, and Braked sled test.

After considerable analysis, NHTSA clearly favors SSF as the best means for estimating tripped rollover propensity, and CU supports that choice.

³ These recommendations are found in Consumers Union's comments on Consumer Information Regulations, Rollover Resistance, Docket No. NHTSA-2001-9663, September 19, 2001. See also CU's submission to the NAS Committee, "Summary of Consumers Union's Suggestions for Approaches to Assess Vehicle Rollover Resistance," David Champion, Director, Automotive Testing, April 12, 2001.

CU-II. DYNAMIC MEASUREMENT, using Rollover Resistance Tests (RRT), including a combination of dynamic tests that together provide an objective evaluation of on-road rollover resistance when the vehicle is pushed to its handling limits. We said in our comments in September 2001 that these tests should include a reverse steer maneuver that could induce a lateral acceleration of 1.0 g or more. We noted, moreover, that NHTSA had previously suggested that it is prudent to test each vehicle under the worst-case conditions the vehicle could encounter in real world accidents—conditions that take into account the vehicle’s suspension, tire grip, and steering response. We agree with that approach.

We wrote that assessing resistance to untripped rollover in a reverse steer maneuver could be measured most accurately by the Fishhook Test. We concur with NHTSA’s decision to make this maneuver a central element of the proposed dynamic testing protocol, along with the J-turn limit maneuver test.

We generally agree with the conditions for the protocol NHTSA favors: using the J-turn and Fishhook limit maneuver tests in two load conditions. Both maneuvers will be conducted with an automated steering controller, with the reverse steer of the Fishhook Maneuver timed to coincide with maximum roll angle to create an objective “worst case” for each vehicle to account for differences in resonant roll frequency. However, we present alternative recommendations regarding load conditions on page 5.

CU-III. HANDLING TESTS, to assess a vehicle’s controllability in emergency maneuvers that frequently occur immediately prior to a crash. NHTSA’s handling tests will also help determine whether a vehicle’s design overcompensated for situations where it would have a high propensity to roll over by making it slow to respond and difficult to maneuver and control in an emergency situation.

CU agrees with the inclusion of these tests in NHTSA’s proposal and believes that the handling tests outlined in this proposal would accomplish this task.

National Academy of Sciences (NAS) Study

In October of 2000, Congress directed the National Academy of Sciences to study vehicle rollover ratings. NAS was asked to determine whether SSF was a scientifically valid measure of rollover and to compare the relative value of SSF to dynamic driving tests as a basis for providing useful information to the public on rollover resistance. The NAS reported its findings in February of 2002.

CU largely agreed with and supported the conclusions of the NAS report. We believe the proposals in this rulemaking, including identification of dynamic tests to be used to evaluate rollover resistance, combining the SSF and dynamic testing scores, and offering alternative methods for communicating the rollover information to the public, tracks well the NAS recommendations.

CU's SUGGESTIONS CONCERNING THE DYNAMIC TEST PROTOCOLS AND PROCEDURES IN THE NOTICE OF PROPOSED RULEMAKING

CU's specific concerns and comments are presented below:

- Heavy Load Condition: The heavy load test conditions NHTSA is proposing, with 175 lb manikins in all seating positions (except one which accounts for the test equipment), will affect the three-row seat vehicle more than the standard two-row vehicles. This approach may discriminate unfairly against three-row vehicles in that with all three rows occupied, the vehicle is loaded closer to its Gross Vehicle Weight (GVW). With all the seats occupied in a two-row vehicle, the vehicle is usually not near to a full-load condition.

Instead, CU recommends that the heavy load condition include all seating positions occupied by 175 lb manikins plus enough load (including test equipment) in the cargo area to bring the vehicle up to GVW. The center of gravity of the load mass should be in the center of the cargo area (but not to overload the rear axle). In this way all vehicles would be tested in their recommended maximum load condition. This approach more accurately reflects the increase in the center-of-gravity height in maximum load conditions and more closely approximates what a consumer could experience with fully loaded use of the vehicle.

- Roof Load: The roof load is not addressed in this proposal, and yet roof load can considerably affect a vehicle's stability. CU recommends that NHTSA add to the matrix of tests a test with a vehicle's roof loaded to the recommended capacity or including maximum roof load in the GVW, i.e., maximum people, roof load and cargo load to bring it up to GVW. At a minimum, NHTSA and manufacturers should provide warnings to consumers about the effect of roof load on a vehicle's stability, particularly for SUVs and minivans.

RESPONSES TO NHTSA'S REQUEST FOR COMMENTS

- Electronic Stability Control (ESC) CU believes if ESC is standard equipment and is passively activated (i.e., the system defaults to ON when the vehicle is started and the driver does not need to do anything), that full credit should be given to the system. NHTSA identifies the entry speed as that speed in effect before ESC slows the vehicle down. If the vehicle has an on/off switch but the system always resets to the "on" position when the vehicle is started, then the system should stay engaged during testing.

Based on the results of our past handling tests, we have come to appreciate the value of these systems, and believe they will help to prevent drivers from getting into situations where vehicles may tip up or roll over. NHTSA's proposed handling tests would likely give vehicles with good controllability and ESC systems that include yaw control a better score. CU believes that this should be the case, as most drivers in routine driving rarely exceed 0.3g in any direction (acceleration, braking or cornering) and when confronted with an emergency, are unprepared for a vehicle

that is sliding out of control. The intervention of ESC helps the driver keep a vehicle under control, preventing a crash, and allowing the restraint systems to be fully optimized in the event of a crash.

- Response to Concerns About Dynamic Maneuvers Resemblance to Real World Maneuvers

In response to NHTSA's concern as to whether the rollover tests need to resemble real world maneuvers, we think this is less important than the rollover test program being capable of fully evaluating on a comparative basis the performance of the range of vehicles consumers will find in showrooms. Indeed, while the current New Car Assessment Program (NCAP) frontal crash test does not replicate the majority of real world crash conditions, NHTSA nevertheless uses and supports the test as a stringent measure that provides a valid indicator of a vehicle's ability to protect its occupants. We agree with that approach. Similarly, the Fishhook approximates real world forces on a vehicle at its limit closely enough to be acceptable as an evaluation of rollover propensity, while still being able to provide a quantitative and comparative assessment of a vehicle's rollover propensity.

- Response to NHTSA's Concerns about Pavement Friction

CU believes that although pavement friction levels do vary with test facility and climatic conditions, test condition parameters can be specified and regulated for the testing. There would need to be bounds on how far the surface conditions vary from the ideal. The LAR (lateral acceleration at roll) would seem to be a useful metric to regulate for changes in pavement friction.

- Combining Static Versus and Dynamic Measurements For Assisting Consumers In Determining A Vehicle's Rollover Resistance.

We support NHTSA's intention to provide all available results to consumers from the matrix of tests outlined in this proposal. As NHTSA's proposal notes,

Regardless of the rating method, the NCAP program will make available the test results for SSF and for each of the dynamic maneuver tests, so that consumers can see the basis of our rating and exercise their own judgments about their particular concerns.⁴

CU believes that consumers looking for information on vehicle rollover resistance must have access to information about *each* of the tests scores and measures NHTSA has conducted. At the same time, we know from our own experience at *Consumer Reports* that many consumers also want summary information in the simplest and most understandable form. In this regard, consumers find value in and appreciate a single safety score to guide them in making purchasing decisions.

⁴ P. 56, Notice of Proposed Rulemaking.

NHTSA may find CU's experience instructive. *Consumer Reports* publishes a Safety Assessment (SA) for each vehicle we test and rate, giving each an overall score for safety. However, we also display the scores for the two general categories that make up the SA, Crash Protection and Crash Avoidance.

Further, CU has found that most consumers understand a bar graph presentation of data and find it to be user friendly and effective in conveying information to consumers quickly. Viewing vehicles within classes and relative to other vehicles is also an important advantage.

- Response To NHTSA's Proposal To Use Logit Model To Analyze Crash Data

While the exponential model appears to provide a good fit to the data within the range of SSF values encountered, a number of criticisms have recently been made. Much of this criticism has to do with the particular method used to estimate the parameters of the model. In theory, alternative methods exist that could be used to estimate these parameters. However, from a practical perspective, Consumers Union supports NHTSA's proposal to use a logit model in place of the exponential model. For one thing, the logit model restricts the estimated probability of rollover to a value between 0 and 1, and hence satisfies a minimal condition for probability. More importantly, however, standard statistical software packages are readily available for estimating a logit model from raw data.

The NAS Committee for the Study of a Motor Vehicle Rollover Ratings System evaluated the effects of several choices of risk scenario for the logit model. Their report clearly shows the significance of risk scenario on the relationship between rollover risk and SSF. In a low-risk scenario, for example, the rollover risk varies from a low of 0.01 to a high of 0.14 over the range of SSF values. In a moderate-risk scenario such as the 75th percentile, however, the rollover risk varies from a low of 0.075 to a high of 0.55, a much wider range.

Since the ultimate goal of the ratings system should be to provide consumers with sufficient information to make informed purchasing decisions for the safest vehicles, CU believes that the logit model used in the development of the ratings should be based on a moderately high-risk scenario, e.g., the 75th percentile. In addition to predicting rollover risks similar to the exponential and nonparametric models, the moderate-risk scenario enables consumers to more readily discriminate among various vehicles on the basis of rollover risk.

- Handling Tests

We understand that NHTSA has not made final determinations about handling tests, but CU agrees that such tests should be placed to help prevent the degrading of a vehicle's handling performance as a consequence of trying to obtain a better rollover resistance score. Handling characteristics are very important to the outcome of pre-crash maneuvers. The more responsive and easy to control a vehicle is, the more control the driver has to help avoid a situation where a rollover can occur.

The tests outlined in the proposal appear to give the required information on a vehicle's handling capabilities to prevent the vehicle manufacturer's optimizing the rollover test score for their vehicle at the expense of its handling. However Consumers Union has not run these tests so we cannot comment further. The method of combining each test into the handling score also appears to have a sound foundation. Without knowing full details, however, it is not possible to comment more specifically.

The A, B, C rating also appears to be an appropriate method for informing consumers. We understand that NHTSA does not want to use a star system, due to its current connection with potential risk.

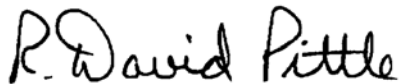
While we concur on the value and inclusion of handling tests in the overall evaluation of vehicle safety, we feel strongly that NHTSA must not delay rollover testing while waiting to finalize the protocol for handling tests. We also understand NHTSA's desire, as described in this proposed rulemaking, for "large samples of single vehicle crash data" to "compute a robust risk model." We urge the agency to avoid allowing the gathering of that crash information to slow the progress of the rollover testing and providing that information to consumers.

Indeed, we understand NHTSA has already done a good deal of dynamic testing in developing this proposal; we urge the agency to proceed with that testing and to make the results of those tests and static measurements, both separately and as a combined single score, available to consumers—both through NHTSA directly and on the agency's website—as soon as possible.

November 21, 2002

Respectfully submitted,

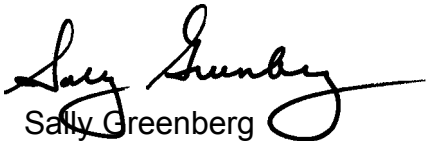
CONSUMERS UNION
1666 Connecticut Avenue, NW
Washington, DC 20009
202-462-6262



R. David Pittle
Senior Vice President, Technical Policy



David Champion
Director, Auto Test Division



Sally Greenberg
Senior Product Safety Counsel



Michael Saccucci
Director of Statistical Services