INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

November 21, 2002

The Honorable Jeffrey W. Runge, M.D.
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Notice of Proposed Rulemaking; Consumer Information Regulations; Federal Motor Vehicle Safety Standards; Rollover Resistance
Docket No. NHTSA 2001-9663

Dear Dr. Runge:

The publication by the National Highway Traffic Safety Administration (NHTSA) of vehicle static stability factors (SSFs) and the relationship between SSF and the propensity of a vehicle to roll over was a useful first step in alerting consumers to differences between major categories of vehicles. SSF is based on objective vehicle parameters and provides consumers with an indicator of rollover propensity. However, it is a relatively simple approach that primarily identifies rollover risk differences among classes of vehicles, for example, between cars and sport utility vehicles. SSFs do not fully capture all of the differences in vehicle designs that may influence a driver's ability to maintain control of a vehicle in situations that lead to rollover. Most important is that this metric does not explain why some vehicles with very similar SSFs have very different rollover rates in real-world fatal crashes. As the Institute indicated in prior comments to the agency, the goal of dynamic testing should be to provide better predictive differentiation of real-world rollover rates. If such tests cannot help predict these differences, their justification is questionable.

The Insurance Institute for Highway Safety congratulates NHTSA on the progress that has been made in developing dynamic tests for vehicle rollover propensity, but the methodological problems in evaluating these tests (J-turn and fishhook maneuvers) and providing useful information to consumers still are largely unresolved. Based on the limited information developed by the agency at this stage, it is difficult to tell whether these particular dynamic tests will provide consumers with much useful information.

Versions of J-turn and fishhook maneuvers have been included in each of the first four phases of NHTSA's light vehicle rollover research program. In each phase of dynamic testing, vehicles with lower SSFs have exhibited a greater tendency to tip up. It also has been shown that SSF is correlated with real-world rollover rates. However, the direct relationship between dynamic test results and real-world

rollover rates remains unclear, in part because vehicles tested to this point as part of NHTSA's dynamic research were chosen to have widely varying SSFs. This choice is not a good strategy for exploring whether dynamic tests can help differentiate vehicles with low SSFs that nevertheless appear to have low real-world rollover rates. Hopefully the vehicles now being tested in Phase VI include some, such as the 1997 Jeep Grand Cherokee and Toyota 4Runner, with similar (low) SSFs but very different real-world rollover rates (Farmer, C.M. and Lund, A.K., 2002, Rollover risk of cars and light trucks after accounting for driver and environmental factors, *Accident Analysis and Prevention* 34:163-73). Only when such tests have been conducted and the results correlated with real-world crashes can it be determined whether the results of the dynamic tests add significantly to the discriminating power of SSF. Only then can the agency's question about the validity of these tests be answered.

Given the uncertainty of these results, it is premature to speculate greatly on the form of presenting consumer information about the test results. Two alternative vehicle rating schemes are briefly described in the current Notice of Proposed Rulemaking. One scheme would provide separate ratings based on static and dynamic tests. An alternate would provide a single rating. Certainly a single rating based on both SSF and dynamic test results would be more useful for consumers than separate ratings of tripped and untripped rollover resistance, but we cannot adequately compare the schemes without more information. We would like to see a detailed explanation of the proposed rating schemes and the statistical analyses behind them, including a discussion of the reliability and precision of the predicted risk curves.

The statistical model presented by NHTSA in the current notice does not use any of the information from the four vehicles subjected to the proposed J-turn and fishhook tests. Instead, the model is based on estimates of the "probable dynamic maneuver test results" of 25 vehicle models (model years 1988-98) whose SSFs were used to derive the existing rollover rating scheme. Figure 1 in the notice shows how including these approximate results in the statistical model changed the predicted rollover risk curve, but it does not show how much, or whether, the dynamic tests improved the prediction.

Much testing and statistical work remain before a rating scheme can be devised that includes both SSF and dynamic test results. The analyses must include actual J-turn and fishhook test results (as proposed) for at least some large number of vehicle models in the real-world crash database. Furthermore, the database used to derive the existing rollover rating scheme -- police-reported crashes in six states during 1994-97 -- should be expanded to include more recent data.

Although these issues make detailed discussions of NHTSA's evaluation approach premature, the Institute does note several issues that will likely need to be addressed in the final rating scheme. First, we would be concerned if NHTSA summarized the results of dynamic tests by coding only the occurrence of two-wheel lift because there are clear differences in the speeds at which the lift occurs, and these differences have important implications for vehicle handling. In Phase IV testing, for example, both the Chevrolet Blazer and Mercedes ML320 tipped up during the fishhook maneuver. However, the Blazer tipped at a maneuver entrance speed of 40.1 mph, while the ML320, even with stability control disabled, did not tip until 46.4 mph. With stability control the ML320 did not tip up until 49.9 mph, very close to the proposed maximum maneuver speed of 50 mph. These differences in maneuver speeds must be accounted for in the vehicle ratings. Thus, an appropriate summary measure could be the maximum speed at which a vehicle safely completes a maneuver, i.e., without tipping or loss of control.

The Institute also is concerned that much of NHTSA's eventual consumer information program resources will be spent testing vehicles with little real-world rollover risk. It seems that vehicles with a high enough SSF, say 1.20 or higher, will consistently reach the proposed maximum speeds of the dynamic maneuvers without tipping. Furthermore, the addition of dynamic test information to the statistical model yielded higher estimated risk for some vehicles with low SSFs but did not change the estimated risk at higher SSFs (because there were no tip ups). This implies that dynamic tests of vehicles with SSFs in excess of 1.20 may be unnecessary because they provide no useful information. So as not to waste both effort and expense, NHTSA should consider restricting dynamic tests to vehicles with sufficiently low SSF values. This gets back to the issue that dynamic tests must distinguish rollover risk among the vehicles whose geometric characteristics indicate they are less stable, if the tests are to be useful at all.

An implication of this observation is that NHTSA should consider changing the five-star system to concentrate the levels in the low SSF range. Currently, passenger cars have ratings of four or five stars and sport utility vehicles typically receive two or three stars. But most of the rollover risk change is among the vehicles receiving two or three stars. That is, the estimated rollover curve is steeper for lower values of SSF, where rollover propensity is greater. To better utilize the richness of the data and provide more meaningful information to consumers that would allow them to distinguish among vehicles in a class, NHTSA should change its rating system to highlight differences among vehicles with lower SSFs.

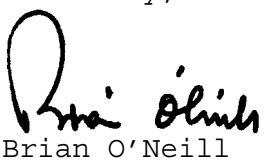
The Institute concurs with NHTSA's plan to conduct dynamic tests in both unloaded and loaded conditions. Adding weight to a vehicle -- whether passengers, cargo, or both -- can have the effect of lowering

static stability and increasing rollover propensity, particularly for vehicles whose centers of gravity already are high. NHTSA's dynamic testing confirms that, particularly for vehicles with lower SSFs, additional loads increase the tendency to tip up, with some vehicles performing much worse in this condition. Adding a variable to the model indicating that the vehicle tipped up does not capture these differences in performance under loaded conditions. As noted earlier, NHTSA should use the maximum speed at which a vehicle safely completes a maneuver, i.e., without tipping or loss of control.

We support NHTSA's plan to study the addition of dynamic J-turn and fishhook maneuver tests to the information provided by the SSF to describe a vehicle's rollover propensity. The Institute remains convinced that dynamic testing is necessary and will be useful in helping consumers understand rollover risk. However, it is premature to ask for final comments on the proposed vehicle rating schemes in this Notice of Proposed Rulemaking. Few vehicles have been tested using the latest protocols, and the statistical models that have been developed to estimate the star rating are based on probable, not actual, dynamic maneuver test results of older model vehicles. Thus, these models demonstrate that the proposed testing *might* provide useful information, not that it *will* provide useful information.

The greatest concern is that NHTSA has not demonstrated that the addition of dynamic test results will improve the ability of the statistical model to discriminate among vehicles with similar SSFs that have different real-world rollover rates. Without this critical link, the addition of dynamic tests will have achieved nothing. Good progress has been made, but this clearly is still a work in progress. For this reason, NHTSA should provide an additional opportunity for comment after Phase VI is completed but before the models and rating schemes are finalized.

Sincerely,



Brian O'Neill
President

cc: Docket Clerk, Docket No. NHTSA 2001-9663