UNDERSTANDING ROLLOVER RATINGS

When purchasing a truck or sports utility vehicle, how should you use the star rating along with the percent chance of rollover and dynamic test results?

First look at the Rollover Star Rating when comparing vehicles' chances of rollover. Five-stars is the highest rating and represents those vehicles least likely to rollover. Rollover star ratings can be compared across vehicle classes and weights.

When two vehicles have the same star rating, you should then compare the Chance of Rollover (percentage) between vehicles. The lower the percentage the less likely a vehicle is to rollover. This percentage depends both on the static stability factor (SSF) and whether or not the vehicle tips up during the dynamic test.

What does the rollover "diamond and bar" graphic mean?

This graphic is to be used as a supplemental piece of information to a vehicle's rollover star rating. The diamond represents the vehicle's percent chance of rollover if involved in a single vehicle crash. The bar represents the range of percentages for all vehicles tested in a given vehicle class (passenger cars, vans, pickup trucks, or SUVs) for the last three model years (the current model year plus the two earlier model years).
What is a Static Stability Factor (SSF) and how is it computed?

The Static Stability Factor (SSF) of a vehicle is an at-rest calculation of its rollover resistance based on its most important geometric properties. SSF is a measure of how top-heavy a vehicle is.

A vehicle’s SSF is calculated using the formula \( SSF = \frac{T}{2H} \), where \( T \) is the "track width" of the vehicle and \( H \) is the "height of the center of gravity" of the vehicle. The track width is the distance between the centers of the right and left tires along the axle. The location of the center of gravity is measured in a laboratory to determine the height above the ground of the vehicle’s mass. The lower the SSF number, the more likely the vehicle is to roll over in a single-vehicle crash.
What is a good Static Stability Factor (SSF)?

A higher SSF value equates to a more stable, less top-heavy vehicle. SSF values across all vehicle types can range from around 1.00 to 1.50. Most passenger cars have values in the 1.30 – 1.50 range. Higher-riding SUVs, pick-up trucks, and vans usually have values in the 1.00 – 1.30 range.

Many of the higher-riding vehicles of previous model years are being redesigned to ride lower and with a wider track width, thus improving their rollover resistance and yielding a higher SSF rating.

It is important to note that vehicles traveling at higher speeds are more likely to rollover when loss of control occurs. Studies have also shown the more occupants in the vehicle the greater the probability of a rollover occurring. This is due to the increased weigh and its effect on the center of gravity of the vehicle.
How is the dynamic maneuvering test conducted?

The dynamic maneuvering test uses a heavily loaded vehicle, to represent a five-occupant load, and a full tank of gas. Using a fishhook pattern, the vehicle simulates a high-speed collision avoidance maneuver—steering sharply in one direction, then sharply in the other direction—within about one second. Test instruments on the vehicle measure if the vehicle's inside tires lift off the pavement during the maneuver ("inside" meaning the left wheels if turning left, and the right wheels if turning right). The vehicle is considered to have tipped up in the maneuver if both inside tires lift at least two inches off the pavement simultaneously. The tip-up/no tip-up results are then used with the SSF measurement as inputs in a statistical model that estimates the vehicle's overall risk of rollover in a single-vehicle crash. The overall risk of rollover for the particular vehicle will fall into one of five ranges of rollover risk and thus determine its star rating (1 through 5 stars).