

STATUS INSURANCE INSTITUTE FOR HIGHWAY SAFETY REPORT

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27 WINNERS FOR 2010

Twenty-seven vehicles earn the Institute's *TOP SAFETY PICK* award for 2010. Nineteen cars and 8 SUVs qualify. For the first time good performance in a roof strength test to measure protection in a rollover is required to win. *TOP SAFETY PICK* recognizes vehicles that do the best job of protecting people in front, side, rear, and now rollover crashes based on good ratings in Institute tests. Winners also must have electronic stability control, which research shows significantly reduces



crash risk. This is the second time the Institute has tightened criteria since announcing the first recipients in 2005.

Subaru is the only manufacturer with a winner in all 4 vehicle classes in which it competes. This automaker earns 5 awards for 2010. Ford and subsidiary Volvo have 6 winners, and Volkswagen/Audi has 5. Chrysler earns 4 awards, continuing a recent trend of improving the crashworthiness of its vehicles. Two new small cars, the Nissan Cube and Kia Soul, join the *TOP SAFETY PICK* list for 2010.

“With the addition of our new roof strength evaluation, our crash test results now cover all 4 of the most common kinds of crashes,” says Institute president Adrian Lund. “Consumers can use this list to zero in on the vehicles that are on the top rung for safety.”

Good rollover ratings: A new requirement for strong roofs winnows the list of *TOP SAFETY PICK* winners from a record 94 in 2009. The addition of this criterion recognizes manufacturers with vehicles that provide good protection in rollovers, which kill more than 9,000 people in passenger vehicles each year. The first rollover ratings were released in March (see *Status Report*, March 24, 2009; on the web at ihs.org). Vehicles rated good have roofs more than twice as strong as the current federal standard requires. The Institute estimates that such roofs reduce the risk of serious and fatal injury in single-vehicle rollovers by about 50 percent compared with roofs meeting the minimum requirement.

“Cars and SUVs that win *TOP SAFETY PICK* are designs that go far beyond minimum federal safety standards,” Lund points out.

Missing the mark: Not a single model from the world’s biggest automaker by sales is represented among this year’s winners. Toyota and its Lexus and Scion subsidiaries had a strong showing in 2009 with 11 winners but were shut out for 2010. Four other manufacturers whose vehicles have earned *TOP SAFETY PICK* in the past didn’t have a qualifying vehicle for 2010: BMW, Mazda, Mitsubishi, and Saab.

The Honda Accord picked up the award the past 2 years, but the 2010 didn’t earn the required good roof strength rating to qualify (the

roof is rated acceptable). The Ford Fusion is another midsize car that dropped off the list for the same reason.

“Honda and Ford would have to make only minor changes to achieve good ratings for roof strength, as the Accord and Fusion just missed the mark,” Lund explains.

The midsize Toyota Camry would have qualified with good ratings, except for its rear crash evaluation. This car’s seats and head restraints are rated marginal for protection against whiplash injury. A change to good would have earned the Camry a *TOP SAFETY PICK* for 2010. Other automakers have improved head restraints to win. For example, inadequate head restraints kept earlier Chrysler models from earning awards, but in 2010 the Sebring, Dodge Avenger and Journey, and Jeep Patriot all earn good ratings and *TOP SAFETY PICK*. Likewise, General Motors upgraded the seats and head restraints in the Chevrolet Malibu to win.

Volvo glitch: The Institute identified a problem with the Volvo XC60 in the side test. A piece of plastic trim on the driver seat pushed against a service release button for the safety belt, which then detached from its anchor during the test.

“This would be a serious issue if it happened in a real crash, but it’s not likely to happen and it’s fixable,” Lund explains. “Still, belts shouldn’t come loose in a crash test. Volvo is fixing the problem so it won’t be an issue with XC60 models produced after November 2009. *TOP SAFETY PICK* applies only to these modified XC60s.”

Consumers who own 2010 XC60s already on the road should see their Volvo dealer for repairs, Lund advises.

Improved protection: Front and side impacts and rollovers killed 24,056 passenger vehicle occupants in 2008. Rear-end crashes usually aren’t fatal but result in a large proportion of crash injuries. Neck sprain or strain is the most commonly reported injury in two-thirds of insurance claims for injuries in all kinds of crashes.

“In safety terms, we’ve come very far, very fast in just the past decade,” Lund says. “When the Institute began conducting frontal tests for consumer information in 1995, few vehicles earned top rat-

CHRYSLER MAKES CHANGES TO WIN

Chrysler has 4 *TOP SAFETY PICK* winners for 2010, noteworthy considering it’s even tougher to win this year. The stumbling block had been inadequate seats and head restraints, but Chrysler improved them in the 2010 Sebring, Avenger, Journey, and Patriot to secure good ratings and *TOP SAFETY PICK*. These models earn good ratings for front, side, rear, and rollover protection. They have electronic stability control standard or optional.





2010 WINNERS

LARGE CARS

Buick LaCrosse
Ford Taurus
Lincoln MKS
Volvo S80

MIDSIZE CARS

Audi A3
Chevrolet Malibu (built after October 2009)
Chrysler Sebring (4-door with optional ESC)
Dodge Avenger (with optional ESC)
Mercedes C class
Subaru Legacy
Subaru Outback
Volkswagen Jetta (sedan)
Volkswagen Passat (sedan)
Volvo C30

SMALL CARS

Honda Civic (4-door with optional ESC, except Si)
Kia Soul
Nissan Cube
Subaru Impreza (except WRX)
Volkswagen Golf (4-door)

MIDSIZE SUVs

Dodge Journey
Subaru Tribeca
Volvo XC60
Volvo XC90

SMALL SUVs

Honda Element
Jeep Patriot (with optional side torso airbags)
Subaru Forester
Volkswagen Tiguan

WHAT IT TAKES TO WIN AWARD

GOOD FRONTAL CRASHWORTHINESS, BASED ON 40 MPH FRONTAL OFFSET CRASH TEST

GOOD SIDE CRASHWORTHINESS, BASED ON CRASH TEST IN WHICH A VEHICLE'S SIDE IS STRUCK BY BARRIER GOING 31 MPH

GOOD REAR CRASHWORTHINESS, BASED ON HEAD RESTRAINT GEOMETRY AND TEST OF SEAT/HEAD RESTRAINT

GOOD ROLLOVER CRASHWORTHINESS, BASED ON TEST OF ROOF STRENGTH IN RELATION TO VEHICLE WEIGHT

ELECTRONIC STABILITY CONTROL, WHICH CAN PREVENT CRASHES BY HELPING DRIVERS MAINTAIN CONTROL WHEN VEHICLES MIGHT SPIN OUT

ings. Now almost all do. Most cars failed the side tests we added in 2003. Test results in that initial round were so bad we nearly broke our budget for repairing the crash test dummy, but now most vehicles ace the side test thanks to side airbags and stronger side structures. Factor in improved head restraints to protect against whiplash and ESC to prevent crashes, and consumers are the clear winners.”

Safety equipment is increasingly standard. Ninety-two percent of 2010 model cars, 99 percent of SUVs, and 66 percent of pickup trucks have standard side airbags with head protection. ESC is standard on 85 percent of cars, 100 percent of SUVs, and 62 percent of pickups.

“Now that roof strength is a priority, we think manufacturers will move quickly to bolster roofs to do well in our roof strength test. This means consumers likely will have more *TOP SAFETY PICK* choices for 2011,” Lund predicts.

Keep in mind vehicle size and weight, he adds, because larger, heavier vehicles generally afford better protection in serious crashes than smaller, lighter ones (see *Status Report*, April 14, 2009; on the web at iihs.org). Even with a *TOP SAFETY PICK*, a small car isn't as crashworthy as a bigger one.

The Institute awarded the first *TOP SAFETY PICK* winners to 2006 models and then raised the bar the next year by requiring good rear test results and ESC as either standard or optional equipment. Early this year the Institute alerted manufacturers to the new criteria for roof crush and asked them to nominate candidates for testing. Go to iihs.org for full vehicle results.

LUXURY OWNERS EMBRACE SYSTEMS TO SKIRT CRASHES

More than a year ago, Institute researchers estimated the safety potential of crash avoidance features but couldn't say then if drivers would welcome the extra help. Now a new Institute survey reveals drivers are using their vehicles' crash avoidance features and would get them again. Drivers generally report safer habits instead of riskier ones. These features' success hinges in part on how drivers respond to and use them.

The Institute surveyed Volvo and Infiniti owners because early in the race these automakers adopted crash avoidance technology. Volvo was one of the first to put many of the features on US cars, and Infiniti was first in the United States to market a system that steps in for drivers to prevent lane drift.

The 2007-08 model Volvos in the study had forward collision warning with automatic braking, lane departure warning, side view assist, and active headlights. The 2005-09 Infinitis had lane departure warning or lane departure warning coupled with prevention. The Institute previously identified forward collision and lane departure warning as the systems with the best potential to avoid or mitigate crashes, including fatal ones (see *Status Report*, April 17, 2008; on the web at iihs.org).

Overall survey responses were positive. Most Volvo and Infiniti owners keep the systems on, a key finding because they must be active to deliver benefits. The exception is Infiniti's lane departure prevention, which has to be turned on each time a vehicle starts. At least 75 percent of people who use each system think the feature helps them be safer drivers and would want it again.

All but active headlights alert drivers to potential crashes with either audible or visual alerts or both. "Annoying" is how some owners described the alerts, either because they consider them false or unnecessary or just jarring. Malfunctions in bad weather or on poorly marked roads were noted.

"The technology is so new that there are bound to be bugs, and drivers will need to get used to the features," says Anne McCartt, Institute senior vice president for research and an author of the study. "What's important is the majority of Volvo and Infiniti owners are happy with their systems, and even those who find certain aspects frustrating don't hit the off button."

Available systems: Volvo's forward collision warning alerts drivers when they get too close to vehicles ahead and automatically applies brakes if a collision is judged unavoidable. Radar measures the distance between vehicles, and a camera distinguishes between vehicles and objects like sign posts. The system works at 20 mph or faster.

Volvo's side view assist, dubbed blind spot information, has rear-facing cameras in the side mirrors to monitor traffic on both sides. Lamps in the windshield pillar by the mirrors light up if a vehicle enters a side blind zone.

Active headlights rotate in the direction of steering as the front wheels turn to improve nighttime visibility on curves. Volvo's lights are bi-xenon, making them brighter than the traditional halogen.

When a driver drifts out of a lane without using a turn signal, Volvo's lane departure warning system sounds an alert. A camera mounted near the center rearview mirror detects lane markings. This system operates at speeds of 40 mph or faster.

Infiniti's lane departure warning activates at speeds above 45 mph, using a camera and speed sensor to recognize lane markings and determine how close the vehicle is to crossing them. Beeps and flashing lights let drivers know they're about to drift into another lane or off the road.

On some newer Infiniti models, drivers can activate a prevention feature that applies the brakes to wheels opposite the lane marker to gently nudge a vehicle back into its travel lane if the driver doesn't respond to an audible warning. When designing lane departure prevention, Infiniti decided that the system's default setting would be off since lane departure prevention intervenes to take action for the driver. In the Insti-



tute's survey, 1 in 5 Infiniti owners with lane departure prevention didn't know they had it. Another 1 in 5 Infiniti owners said they never use the feature.

Safer habits: Respondents were more likely to report potentially safer behavior, not riskier practices. For instance, about 70 percent said they drift from their lanes less often because of lane departure warning or prevention. Up to 64 percent said they use turn signals more. This indicates the crash avoidance features might be conditioning drivers to signal intentional lane changes to avoid triggering warnings. Nearly half of drivers with forward collision warning said they keep safer following distances.

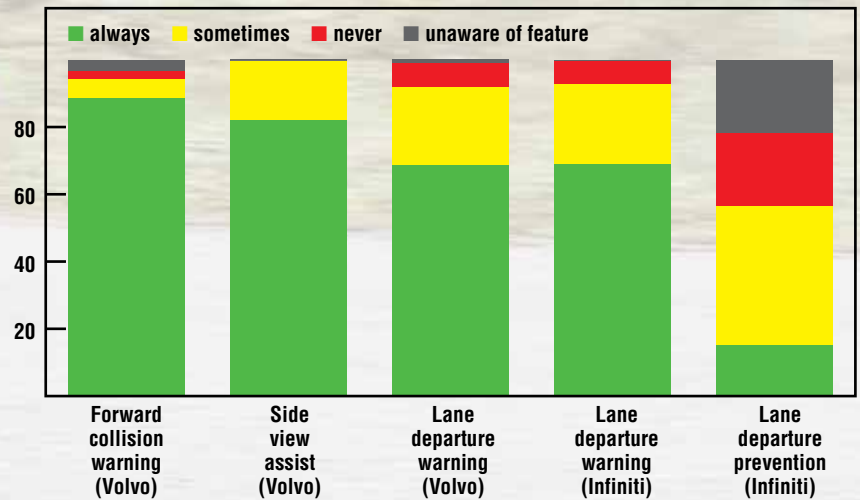
Only 5 percent of surveyed owners of Volvos with forward collision warning said



OWNER EXPERIENCE WITH 4 FEATURES (PERCENT)

| | Forward collision warning (Volvo) | Side view assist (Volvo) | Active headlights (Volvo) | Lane departure warning (Volvo) | Lane departure warning (Infiniti) | Lane departure prevention (Infiniti) |
|--|-----------------------------------|--------------------------|---------------------------|--------------------------------|-----------------------------------|--------------------------------------|
| Received warnings perceived as false or unnecessary | 43 | 74 | n/a | 43 | 46 | 10 |
| Didn't receive warnings when they believed they should | 2 | 17 | n/a | 30 | 18 | 21 |
| Find system annoying | 12 | 2 | n/a | 25 | 41 | 23 |
| Believe they are safer drivers with system | 81 | 84 | 77 | 80 | 75 | 79 |
| Would want system again | 94 | 95 | 77 | 81 | 76 | 83 |

PERCENT OF OWNERS WHO DRIVE WITH SYSTEM TURNED ON



they look away from the road more often, and just 2 percent reported following vehicles ahead more closely. Of those with Volvo side view assist, 13 percent said they solely rely on it when changing lanes rather than turning their head to look for the all-clear.

“A concern is that drivers might depend on crash avoidance technology too much. Another is that they’ll take a risk they wouldn’t otherwise,” McCartt points out. “Most people told us this isn’t the case. They’re using the systems to be safer, not reckless.”

Complaints but acceptance: Some professional drivers reviewing early systems reported deactivating them because they were irritating, particularly lane departure warning. So it’s no surprise this drew the most complaints. When the Institute asked

if owners considered lane departure warning annoying, 25 percent of Volvo drivers and 41 percent of Infiniti drivers agreed it is. Still, 69 percent of both groups reported always keeping the system on, suggesting that even if irksome, it’s useful.

A large percentage of owners reported false or unneeded alerts. This was highest for side view assist (74 percent) and lowest for lane departure prevention (10 percent). It’s possible that a system may work just fine, but drivers don’t think they’re about to crash or already recognize a hazard. For example, 6 percent of Volvo owners reported they got a forward collision warning when a vehicle ahead slowed to turn, but these owners thought the warning unnecessary because they were aware of the situation.

McCartt says “emerging features that warn drivers of potential crashes and even take over the driving in some instances won’t move from the luxury to mainstream market if they don’t win over early adopters. The potential safety benefits are huge, so the survey responses are encouraging. Drivers keep the systems on and use them, despite annoyances. It’s an indication that everyday drivers will accept the technology, too. A caveat is that systems drivers must activate seem less likely to be used.”

For a copy of “Volvo and Infiniti drivers’ experiences with select crash avoidance technologies” by K.A. Braitman et al., write: Insurance Institute for Highway Safety, 1005 N. Glebe Rd., Arlington, Va. 22201, or email publications@ihs.org.

NOVEMBER REMAINS HAZARDOUS MONTH FOR STRIKING DEER

Insurance claims for crashes involving animals are nearly 3 times as high in November as in other months, and damage claim costs are climbing. These are the main findings of a Highway Loss Data Institute (HLDI) analysis.

West Virginia, Pennsylvania, and Kentucky have higher insurance claim frequencies than other states for animal strikes in November. West Virginia's frequency of 51 per 1,000 insured vehicle years is 3.6 times the national average of 14.1 for the month (a year is a vehicle insured for 1 year, 2 vehicles for 6 months each, etc.). Insurance claims usually don't specify the animals involved in crashes, but Institute research shows deer are the main ones, especially in

of mates, says Paul Johansen of the West Virginia Division of Natural Resources.

The average damage claim cost in November 2008 was \$2,913, HLDI reports. This is 8 percent higher than November 2007's average of \$2,689 and 11 percent higher than in November 2006, when the average damage claim cost \$2,618. For the entire study period (January 2006 through April 2009), the average November claim cost of a vehicle-animal collision was \$2,743.

"Drivers should be cautious about deer in November, particularly where they're prevalent," says Kim Hazelbaker, HLDI senior vice president. "Luckily, most crashes with deer don't kill car occupants."

Federal data show crash deaths are increasing. In 1994, 131 people died in crashes involving animals. By 2001, the number was 177, and in 2008 it was 210. Many of these deaths wouldn't have occurred if motorists

SUBARU IMPROVES LEGACY BUMPERS TO ACCEPTABLE

Bumpers that don't bump, resulting in costly damage in what should be minor crashes, are the norm for cars evaluated in the Institute's low-speed crash tests. One exception is the redesigned 2010 Subaru Legacy, with bumpers that are big improvements over those on its 2007-09 predecessor. The new Legacy earns an acceptable rating in recent tests to assess and compare how well bumpers resist damage in everyday fender-benders. In contrast, the previous Legacy is rated poor. Fifteen of 17 midsize cars evaluated by the Institute are rated marginal or poor for bumper protection.

"The Legacy's performance shows what automakers can do when they pay attention to damage prevention in the low-speed crashes that happen every day," says Institute senior vice president Joe Nolan.

The Legacy is only the fifth car the Institute has tested to earn an acceptable rating for its bumpers. The others are the Ford Focus, Mazda 6, Scion xB, and Smart Fortwo. No car yet has earned a good rating.

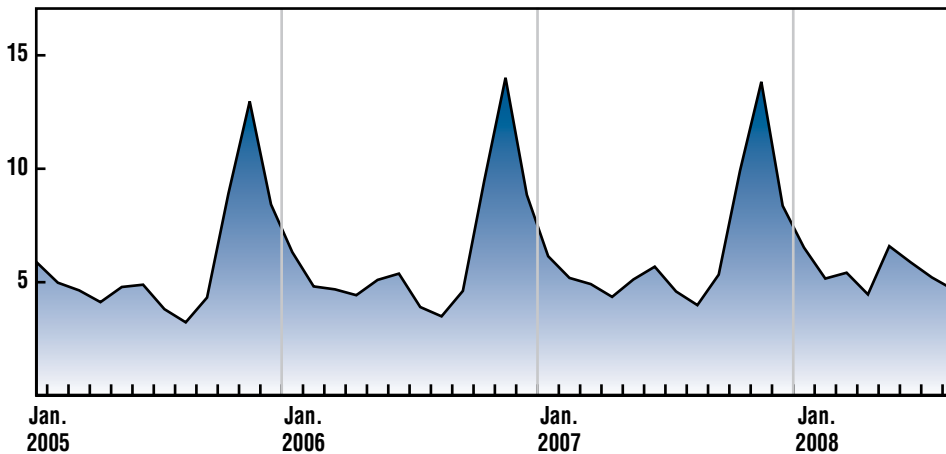
The Institute rates bumpers from good to poor based on performance in 4 tests into a steel barrier — front and rear full-width impacts conducted at 6 mph and front and rear corner impacts at 3 mph. These tests are designed to drive bumper improvements that lead to better damage resistance in real-world crashes.

The biggest improvement for the Legacy was in the front full-width test. The 2007 model sustained more than \$4,000 damage, based on 2009 parts and labor costs, when the bumper underrode the barrier.

"The grille and hood ended up being the bumper," Nolan says. The hood buckled, the grille crushed, and the radiator support just behind the grille also was damaged. In contrast, the 2010 model sustained less than \$900 in the same test.

"Subaru made some simple changes to the Legacy's front bumper," Nolan explains,

ANIMAL HIT CLAIMS BY MONTH PER 1,000 INSURED VEHICLE YEARS



serious crashes (see *Status Report*, Jan. 3, 2005; on the web at ihs.org).

For every 1,000 insured vehicle years, 14.1 animal-related claims were filed under comprehensive coverage in November 2008, compared with an average of 5 claims per 1,000 during January-September. Results are in line with HLDI's prior findings (see *Status Report*, Nov. 25, 2008; on the web at ihs.org).

Drivers are more likely to encounter deer during fall when bucks roam in search

used safety belts and motorcyclists wore helmets. The 5 states with the most deaths in collisions with animals in 2004-08 are Texas with 88, Wisconsin with 62, Ohio with 51, and Pennsylvania and Michigan with 46 each.

State Farm estimates there were 2.4 million vehicle-deer collisions on US roads from July 2007 to July 2009, 18 percent more than 5 years earlier. West Virginia, Michigan, and Pennsylvania top the insurer's list of states where deer crashes are most likely to occur.



SUBARU BUMPER PERFORMANCE IN LOW-SPEED CRASH TESTS

| | RATING | Front full | Front corner | Rear full | Rear corner | WEIGHTED AVERAGE |
|----------------|------------|------------|--------------|-----------|-------------|------------------|
| 2010 Legacy | ACCEPTABLE | \$847 | \$850 | \$903 | \$778 | \$855 |
| 2007-09 Legacy | POOR | \$4,049 | \$1,275 | \$1,169 | \$1,233 | \$2,157 |

The difference between the 2010 Legacy (above) and its predecessor (left) is easy to see in the results of the full-width test. The 2007-09 model sustained more than \$4,000 damage when the bumper underrode the barrier. In contrast, the front bumper on the 2010 model engaged the barrier to resist damage, so repairs cost only about 20 percent as much. The 2010 Legacy is the first car the Institute has tested with damage estimates less than \$1,000 in each of the 4 tests.

“and they paid off in significantly lower repair costs.” Compared with the new model, the 2007 Legacy sustained nearly 5 times as much damage in the 6 mph impact.

The main difference is that the 2010 Legacy’s front reinforcement bar is a little taller, more than 6 inches wider, and more than 1.5 inches higher off the ground. This kept the Legacy’s bumper engaged with the barrier during the test, preventing it from sliding under the barrier. Plus the bumper bar extends to the corners to help protect headlights and fenders.

“The Legacy leapfrogs the competition for bumper protection,” Nolan says. “These common sense bumper changes will help keep repair costs down in low-speed crashes.” The Legacy is the first car the Institute has tested to limit damage to the bumper system in all 4 tests, and it’s the first car with all 4 damage estimates under \$1,000.

Bumpers are evaluated in full-width and corner crashes at low speeds, and vehicles are rated based on the weighted average repair cost of the 4 tests. Both the full-width front and rear test results are given double

the weight of the corner tests because in the real world full-width impacts occur roughly twice as often as corner impacts. Weighted average repairs must be less than \$500 for a good rating, less than \$1,000 for acceptable, and less than \$1,500 for marginal. Repairs of \$1,500 or more earn bumpers a poor rating.

Regardless of repair costs, no vehicle can earn a good or acceptable rating if it’s unsafe to drive afterward or can’t be driven at all because of headlight or taillight damage, severely buckled hoods, or a compromised engine cooling system.

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