

Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute

2014 NISSAN
QUEST

INSURANCE INSTITUTE
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Minivans with a

major flaw

3 models have dire results
in small overlap crash test

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- ▶ Motorcycle ABS benefits both high-risk and low-risk riders
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Minivans are a popular choice among safety-conscious parents, but 3 of them fail spectacularly in the small overlap front crash test. The Toyota Sienna earns an acceptable rating, bringing the total number with decent protection to 2.



A group of four minivans recently tested by the Institute for protection in small overlap front crashes shows some of the worst possible outcomes for this type of crash, with only one vehicle performing acceptably.

The Nissan Quest, the Chrysler Town & Country and its twin, the Dodge Grand Caravan, all earn poor ratings. The exception to the disappointing pattern is the 2015 Toyota Sienna, which earns an acceptable rating. It joins the Honda Odyssey, which last year earned a good rating in the small overlap crash test, in the ranks of *TOP SAFETY PICK+* award winners.

“Minivans are popular among parents, a group that tends to be safety conscious, but we’ve only seen two so far that offer decent protection in small overlap crashes,” says David Zuby, IIHS executive vice president and chief research officer.

In the small overlap test, which replicates what happens when the front corner of a vehicle collides with another vehicle or an object such as a tree or a utility pole, the crash forces bypass the vehicle’s main energy-absorbing structure. These crashes may be especially difficult for minivans to handle. That’s because minivans are typically built on car platforms but are wider than cars. As a result, more of the vehicle is located outside the main structure. Minivans also are heavier than cars.

In the case of the Sienna, Toyota modified the front structure of the 2015 model to improve small overlap protection. Still, it didn’t hold up that well in the test, with intrusion measuring as much as 5½ inches at the upper door hinge pillar and instrument panel. The dummy’s head contacted the front airbag but immediately slid off the left side. The safety belt also allowed



The structural collapse of the Chrysler Town & Country was so severe that the dummy’s tough skin was torn in two places on the left leg by intruding structure.

the dummy to move too far forward. On the plus side, the side curtain airbag deployed and had sufficient forward coverage to protect the head from intruding structure. Measures taken from the dummy showed



Chrysler Town & Country

that the risk of any injuries would be low in a crash of this severity.

While the Sienna managed an acceptable rating despite subpar structural performance, all bets were off for the Quest. The structure was pushed in nearly 2 feet at the lower hinge pillar, and the parking brake pedal moved 16 inches toward the driver. The dummy's left leg was trapped between the seat and instrument panel, and its right foot was caught between the brake pedal and toe pan. Following the tests, technicians had to cut the entire seat out and then use a crowbar to free the right foot.

The Quest receives a good subrating for restraints and kinematics, but that is deceiving. This component of the rating measures how well the safety belt and airbags work to control the dummy's movement. In the Quest, the dummy was held in place by the intruding structure, and the airbag was shoved into its face.

Minivan ratings in small overlap front test

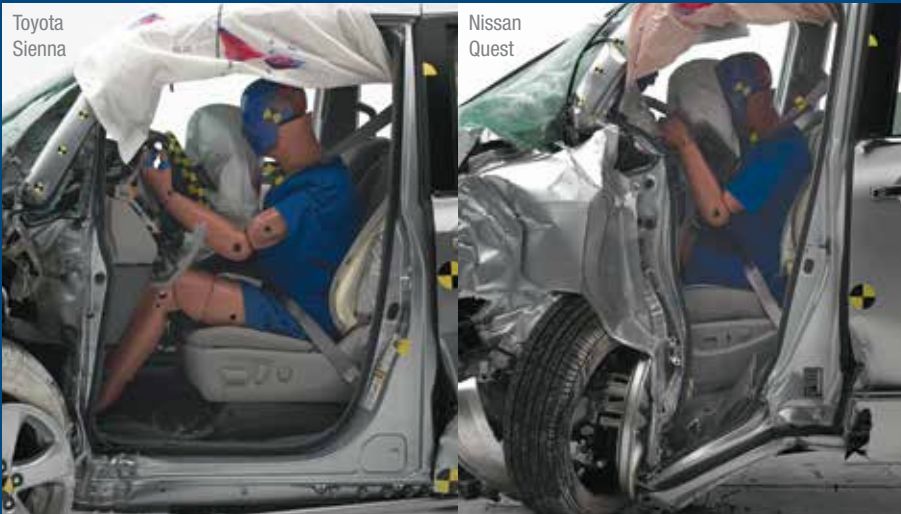
	Overall	Structure	Restraints & kinematics	Dummy injury measures			
				Head & neck	Chest	Hip & thigh	Lower leg & foot
TSP+ Honda Odyssey previously released	G	A	G	G	G	G	G
TSP+ Toyota Sienna	A	M	A	G	G	G	G
Chrysler Town & Country	P	P	M	G	G	P	P
Dodge Grand Caravan	P	P	M	G	G	P	P
Nissan Quest	P	P	G	G	G	P	P

Good **G** Acceptable **A** Marginal **M** Poor **P**

“That kept the measured risk of head injury low, but that’s about the extent of what can be expected from the restraint system when the basic structure collapses so completely,” Zuby says.

The forces measured all along the dummy’s left leg, from the thigh to the foot, were very high, in some cases exceeding the limits of the sensors.

“A real person experiencing this would



The door hinge pillar and instrument panel were pushed in 5½ inches during the test of the Toyota Sienna (left), but the minivan still managed an acceptable rating overall. Intrusion in the poor-rated Nissan Quest was much worse, reaching nearly 2 feet and completely trapping the dummy's left leg.



The Toyota Sienna managed an acceptable rating despite subpar structural performance. It joins the Honda Odyssey, which last year earned a good rating in the small overlap test, in the ranks of *TOP SAFETY PICK+* winners.

be lucky to ever walk normally again,” Zuby points out. A broken right femur also would be possible. The Quest’s poor rating applies to 2011-15 models.

The Town & Country’s structure also collapsed around the dummy. Intrusion measured 15 inches at the lower hinge pillar and the instrument panel. The skin on the dummy’s left lower leg was gouged by the intruding parking brake pedal, and its left knee skin was torn by a steel brace under the instrument panel. The head barely contacted the front airbag before sliding off and hitting the instrument panel, as the steering column moved to the right. The door sill and the steering column both moved in toward the driver. The side curtain airbag deployed but lacked sufficient forward coverage.

Measures taken from the dummy indicate that injuries to the left hip, left knee and left lower leg would be likely in a crash of this severity. As with the Quest, some of the forces were off the scale.

These results apply to the 2008-15 Town & Country and the 2008-15 Grand Caravan. (They also apply to another, discontinued twin, the 2009-12 Volkswagen Routan.)

The only minivan sold in the U.S. not rated by the Institute is the Kia Sedona. The manufacturer has told IIHS it plans to make a change to the vehicle in the coming weeks to improve small overlap protection, so it will be tested shortly.

The Institute introduced the small overlap front test in 2012. In the test, which is more challenging than either the head-on crashes conducted by the government or the Institute’s moderate overlap front test, 25 percent of a vehicle’s front end on the driver side strikes a rigid barrier at 40 mph.

Vehicles with a good or acceptable small overlap rating, along with good ratings in the moderate overlap front, side, roof strength and head restraint tests, qualify for the 2014 *TOP SAFETY PICK* award. Vehicles that meet those criteria and also earn a basic or higher rating for front crash prevention qualify for the *TOP SAFETY PICK+* award.

The Sienna earns its “plus” on the basis of an advanced front crash prevention rating. Its optional system includes forward collision warning and an automatic braking function that reduced impact speeds by an average of 9 mph in the Institute’s 12 mph test and by 7 mph in the 25 mph test. ■

Global NCAP tests show how base-model cars sold in India fall short of safety norms

Nissan's Datsun Go couldn't be sold in North America or Europe. Neither could the Maruti Suzuki Swift nor a host of other cars produced for consumers in India. Not only do these models fail to meet stringent U.S. and EU safety rules, they also fall far short of the United Nations' minimum crash-test standards.

New test results from the Global New Car Assessment Programme (NCAP) show how manufacturers can sell substandard models in emerging markets — and it's all perfectly legal. That's because India's government doesn't yet require vehicles to meet U.N. regulations for occupant protection in frontal crashes and side impacts.

Highlighting safety deficiencies in cars sold in India and other fast-growing automotive markets is part of Global NCAP's mission to create safety marketplaces in these countries. The London-based organization offers technical guidance and financial support to expanding new car assessment programs as part of the U.N.'s Decade of Action for Road Safety, a program to halve the death and injury toll on roads worldwide by 2020 (see *Status Report*, June 27, 2013, at iihs.org). IIHS is among Global NCAP's associate members.

NCAPs launched in Latin America in 2010 and Southeast Asia in 2012 are having a positive impact on vehicle safety in these regions. In India, plans are under way for an NCAP to provide Indian consumers with vehicle safety ratings. Until that program is up and running, crash tests are being conducted by Global NCAP, which has urged New Delhi to require all new cars to have airbags and a strong occupant compartment.

The Datsun Go and Suzuki Swift are the latest popular model small cars to be evaluated in the Safer Cars for India project. Both hatchbacks lack airbags and received Global NCAP's lowest rating of zero stars (out of a possible five) for occupant protection in an offset frontal crash at 40 mph — a test that nearly all models in North America, Europe, Japan and Australia ace. Injury measures taken from driver dummies in both tests indicate high risk of life-threatening injuries.

The Datsun Go “has a body structure so weak that it is pointless to fit an airbag,” Global NCAP Secretary-General David Ward said in announcing the results in early November. “It is disappointing to see a global company like Nissan launch a new car design in 2014 that so clearly falls below U.N. safety standards.”

Global NCAP Chairman Max Mosley called on Nissan to withdraw the Datsun Go

the U.S. earn the 2014 IIHS *TOP SAFETY PICK+* award when equipped with optional front crash prevention systems, and another is a *TOP SAFETY PICK*.” (For a list, go to iihs.org/ratings.)

Earlier this year, Volkswagen agreed to equip its entry-level Polo model with standard driver and front passenger airbags for the Indian market, a move Lund applauds.



Two budget cars sold in India, the Datsun Go and Maruti Suzuki Swift, performed so poorly in Global NCAP frontal tests that they failed to earn any stars for protecting adults in a crash.

from India and other markets and redesign it. The Go's structure collapsed in the crash test, and the driver dummy's head contacted the steering wheel and dashboard.

“Nissan engineers know how to build safe cars,” says Adrian Lund, IIHS president. “Three of their 2014 models sold in

In an initial Global NCAP test, a version of the Polo without airbags received a zero-star rating. The Polo, unlike the Go or the Swift, has a decent body structure, so in a test of the airbag-equipped Polo, the rating improved to four stars for adult occupant protection. ■

Courtesy of the Global New Car Assessment Programme

Courtesy of the Global New Car Assessment Programme



Motorcycle ABS benefits both high-risk and low-risk riders

Antilock braking systems (ABS) can benefit both risk-taking motorcycle riders and those who are more cautious on the road, a new HLDI analysis suggests. What's more, high-risk riders are no less likely to opt for a bike equipped with the technology than those who appear less risky based on their auto claims record.

Previous studies by HLDI and IIHS have reported that the technology substantially lowers rates of collision claims and fatal crashes (see *Status Report*, May 30, 2013, and March 31, 2010, at ihs.org). Those studies looked at motorcycles with optional ABS, comparing the crash rates of those equipped with ABS with the same models without the feature.

One limitation of that approach is that it's difficult to account for all the differences between riders who choose to purchase an

ABS-equipped bike and those who don't. Although key variables like age and gender as well as motorcycle models are controlled for, a question left unanswered is whether people who value safety might be more inclined to spend money on ABS and also more likely to ride safely, thereby skewing the results.

To answer this question, HLDI analysts looked at a subset of riders of motorcycles with optional ABS who could be matched to an automotive claims history. These riders were grouped by claim frequency: zero (people with no auto claims during the entire period for which insurance records are available), low (those with up to one claim per five insured years), medium (between one and two claims per five insured years) and high (two or more claims per five insured years).

Before looking at the effect of ABS on these groups of riders, the analysts examined how motorcycle collision claim frequency varied by auto claims experience. They found that riders with a high rate of auto claims had a motorcycle claim rate that was 64 percent higher than riders with no auto claims. Riders with a medium auto claim frequency had an 18 percent higher rate of motorcycle claims, while those with a low auto claim frequency had a 4 percent higher motorcycle frequency.

"There's no way of knowing how risky a person is when they're riding a motorcycle, but auto claims history appears to be a pretty good proxy," says HLDI Vice President Matt Moore.

The previous HLDI analysis from 2013 found that ABS reduces the frequency of collision claims by 20 percent. For the new

Web makes it easy to find models with ABS

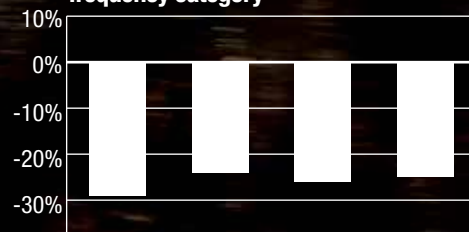
In the market for a motorcycle with an anti-lock braking system (ABS)? A new online tool at iihs.org/motorcycleABS allows users to quickly look up ABS availability by motorcycle make, model and year.

Whether you're buying your first motorcycle or your 10th, consider purchasing one with ABS. These systems can be as light as a pound and a half and intervene only in an emergency. ABS prevents wheels from locking up, and that's crucial on a motorcycle. On a car, a lockup might result in a skid. On a motorcycle, it often means a serious fall. With ABS, riders can brake fully without fear of locking up.

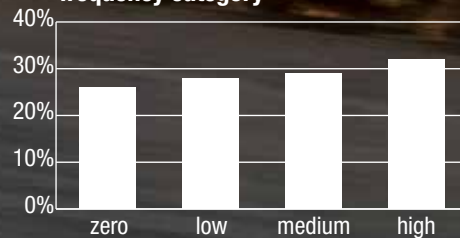
Motorcycle ABS helps save lives. The rate of fatal crashes is 31 percent lower for motorcycles equipped with optional antilocks than for the same models without them. More information is available at iihs.org. ■

HLDI analysts found that ABS reduced motorcycle claim frequency for all four groups of riders judged to have varying degrees of risk based on their auto claims record. The reductions ranged from 24 to 29 percent.

Effect of ABS on motorcycle claim frequency by auto claim frequency category



Percent of riders who choose optional ABS by auto claim frequency category



2015 Harley-Davidson FLTRXS Road Glide

2014 Harley-Davidson Motor Company

study, the analysts checked that the subset of riders matched to auto claims histories had the same estimated benefit from ABS. They found that it did.

HLDI then ran the ABS analysis again, this time controlling for auto claim rates. The effect remained and even increased slightly to 21 percent.

The analysts also looked at the effect of ABS on each of the auto claim frequency groups separately. In order to have enough exposure, they included not only motorcycles with optional ABS, but also those that had the feature standard or didn't have it available at all. Motorcycle class and engine displacement were used to control for other differences among motorcycles.

ABS reduced motorcycle claim frequency for all four auto claim groups. The decrease ranged from 24 to 29 percent.

"Riders whom we would consider high-risk based on their driving benefit from ABS about the same as low-risk ones," Moore says.

High-risk riders also are no less inclined than low-risk riders to opt for ABS as optional equipment, the study shows. In fact, just the opposite is true. Thirty-two percent of the high-auto-claim-frequency riders of models with optional ABS had motorcycles equipped with the technology, while just 26 percent of those with no auto claims did.

"Based both on who is opting for ABS and how much they benefit from it, self-selection doesn't appear to have influenced our earlier findings," Moore concludes.

Antilock brakes prevent wheels from locking up, and that's crucial on a two-wheeled vehicle. With a car, wheel lockup might cause a skid, but on a motorcycle, it

often means a loss of balance and a potentially deadly fall. ABS works by automatically reducing brake pressure if it detects that a wheel is about to stop rotating and then increasing it again after traction is restored. This allows the rider to brake fully in an emergency without fear of a lockup.

With study after study showing large benefits for ABS, IIHS and HLDI petitioned the National Highway Traffic Safety Administration last year to make the technology mandatory on all motorcycles (see *Status Report*, May 30, 2013). European regulators have already taken that step: In the European Union, motorcycles with an engine displacement of more than 125 cc will be required to have ABS beginning in 2016.

For a copy of the HLDI bulletin "Evaluation of motorcycle antilock braking systems," email publications@iihs.org. ■

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The **Insurance Institute for Highway Safety** is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

The **Highway Loss Data Institute** shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

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GEICO Corporation	Tennessee Farmers Mutual Insurance Company
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