

STATUS INSURANCE INSTITUTE FOR HIGHWAY SAFETY REPORT

Vol. 32, No. 5

May 10, 1997



Luxury imports. Lousy bumpers.

Spend \$58,000 on a Lexus or \$51,000 on a Mercedes and you might assume you're buying quality workmanship. But when it comes to cars with bumpers that won't crumple if you back into a pole, price doesn't guarantee performance.

Not only do four of the six 1997 model luxury cars the Institute tested at 5 mph have flimsy bumpers, the repair parts

cost big bucks. Try \$428 for an Infiniti headlight assembly that averages less than \$200 on most cars. Or \$424 for a plastic bumper cover on a Mercedes or \$127 for chrome molding on a Lexus bumper.

The Institute has been testing bumpers on passenger cars for more than 25 years, but it's the first time luxury sedans have been subjected to the 5 mph tests. Six

1997 model sedans underwent four tests — front- and rear-into-flat barrier, front-into-angle-barrier, and rear-into-pole.

As a group, luxury cars fared worse in the low-speed tests than less expensive midsize cars the Institute has tested. Repairs totaled \$6,195 for the Lexus LS 400 and \$6,042 for the Mercedes E420. Two other cars the Institute tested had more



than \$3,500 damage — the Infiniti Q45 and the BMW 540i.

“Costs were high not only because of parts prices but because the bumpers mostly were poor designs,” notes Institute President Brian O’Neill.

Luxury cars as a group did particularly badly in the rear pole and front angle barrier tests. Because angle and pole tests localize energy at specific points, they are more demanding of bumper systems than flat barrier tests, which spread impact energy over the whole bumper face.

Not all luxury cars performed so badly. Two American cars — the Lincoln Continental and Cadillac Seville — did well. The Lincoln had no damage at all in the front-into-flat barrier test and just \$16 damage in the rear-into-flat test. The Cadillac sustained more damage in the front and rear flat barrier tests, but nearly all of it was confined to hidden bumper parts.

Federal rules require the bumpers on cars to keep damage away from the bodies in 2.5 mph front- and rear-into-flat barrier impacts. Damage is allowed to the bumpers themselves. Cars used to have to pass these tests at 5 mph with virtually no damage at all. The Institute tests bumpers because poor bumper performance in minor impacts can result in major repair bills for consumers.

Damage can be hidden: In some low-speed impacts, damage to the bumper can’t always be seen easily. The bumper cover may appear fine, but the structure underneath the cover may be damaged, compromising performance in subsequent collisions. For example, the bumper on the Lexus appeared unscathed after the front-into-flat barrier test, but when appraisers removed the cover from this bumper system, they found the aluminum reinforcement bar was bent.

A bumper system consists of a cover, which typically is plastic; a metal or plastic reinforcement bar that’s usually bolted to the frame but sometimes welded on; and energy-absorbing foam or hydraulic energy absorbers. Most cars have either foam or hydraulic energy absorbers, but a few have both.

Structural strength alone doesn’t make a bumper good or bad. Also important is the distance between the car body and the bumper. There must be enough space between the bumper and the body for good energy management.

Stylish not strong: “It’s apparent from our tests that some luxury car manufacturers favor style over performance,” O’Neill says. “You’d think when you spend up to \$58,000 for a car that its bumpers would withstand minor impacts, but this isn’t the case. Bumpers on some of these cars, including the Mercedes and BMW, fit too



snugly against the vehicle body, leaving very little room between the body and the bumper reinforcement bar to manage impact energy. So the car body instead of the bumper must absorb much of the energy. However, the Lincoln and Cadillac have bumpers that extend far enough away from the car body to minimize damage. These cars performed best in our tests.”

Disappointing results: O’Neill shakes his head when describing test results for the imported Mercedes and Lexus. “These results illustrate what can happen when styling becomes more important than function,” O’Neill says. “The Lexus performance in the rear-into-pole test was a particular disaster.”

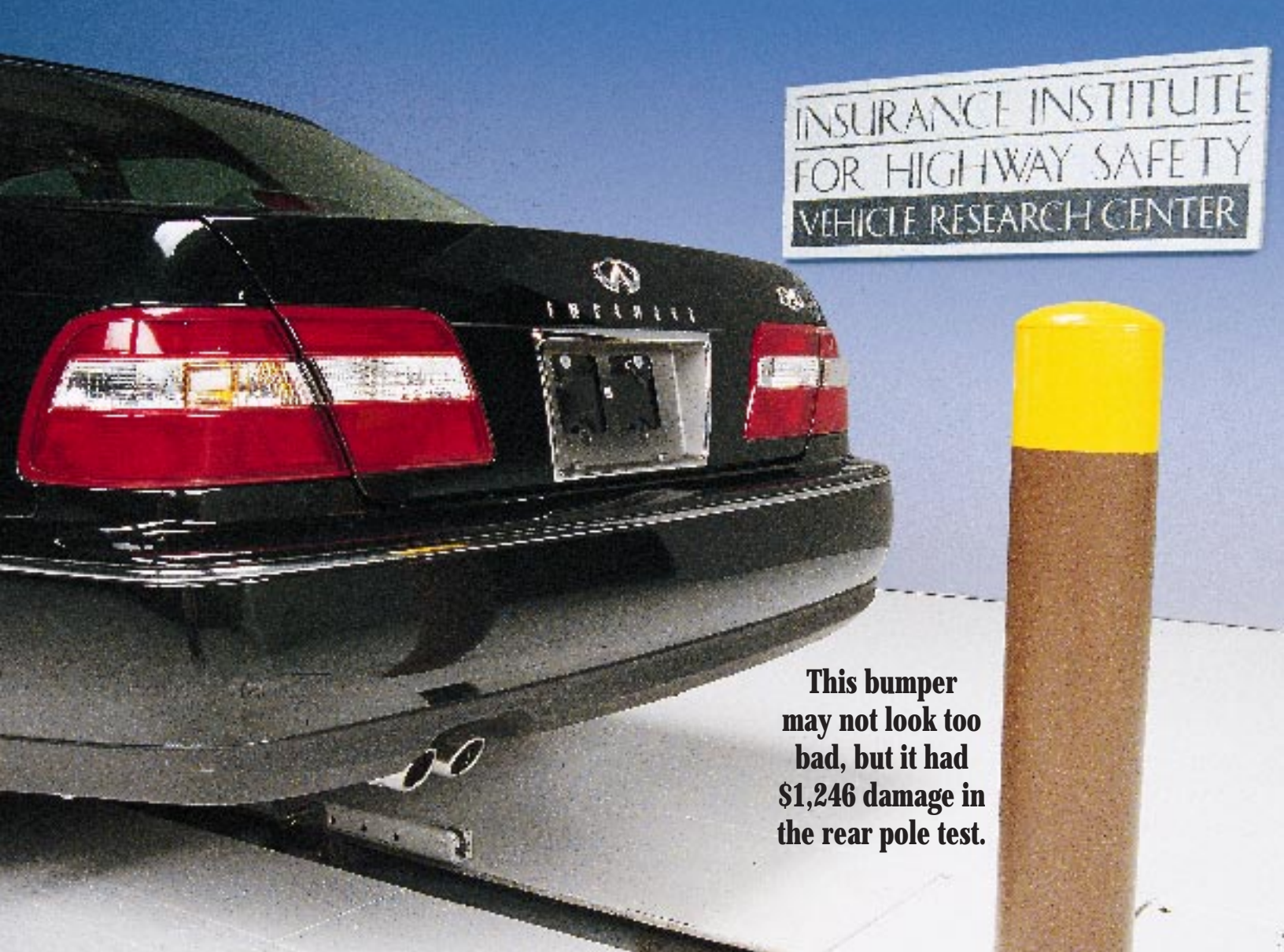
The pole penetrated the Lexus body, causing the trunk floor to buckle. The lid had to be replaced (\$648), along with the entire bumper assembly including the cover (\$401), bar (\$415), and chrome molding

DAMAGE REPAIR COSTS

Luxury Car Performance in Crash Tests at 5 Miles per Hour

	Front Into Barrier	Rear Into Barrier	Front Into Angle Barrier	Rear Into Pole	Total Damage
Lincoln Continental \$41,710	\$ 0	\$ 16	\$ 768	\$ 306	\$ 1,090
Cadillac Seville SLS \$42,320	292	160	536	759	1,747
BMW 540i \$51,120	454	351	1,672	1,119	3,596
Infiniti Q45 \$48,395	386	563	1,567	1,246	3,762
Mercedes E420 \$51,585	372	1,066	2,106	2,498	6,042
Lexus LS 400 \$58,587	748	0	2,154	3,293	6,195

Note: Cars tested are 1997 models. Repair costs reflect April 1997 prices. Car prices are manufacturers’ suggested retail including options and freight.



This bumper may not look too bad, but it had \$1,246 damage in the rear pole test.

(\$127). Add another \$105 for the lamp assembly for the rear license plate and \$229 for the rear body panel. Damage in this test totaled \$3,293. The Lexus did badly mainly because of a weak reinforcement bar (see story, p. 5).

The Mercedes had \$2,498 damage in the rear pole test. For styling reasons Mercedes bumpers are close to the car body, and the reinforcement bar is welded directly onto the vehicle frame rails, unlike most cars. This increases the time needed to replace the bar. Mercedes bumpers also have very little energy-absorbing foam built in, particularly in the rear bumper, which has less than two inches of padding. This design allowed the pole to plunge far into the trunk, causing the floor to buckle and the trunk lid to open. The rear body panel, trunk lid, and nearly the entire bumper assembly had to be replaced.

Results in the front-into-angle-barrier test weren't any better for the more expensive models. The BMW 540i, Infiniti Q45, Mercedes, and Lexus all sustained more than \$1,500 damage in this test. Damage was more than \$2,000 for the Mercedes and Lexus.

The right headlight assemblies on four of the six cars tested had to be replaced after the angle barrier test. Although none of the headlight bulbs were broken, the plastic mounts securing the headlights snapped or corners of the headlight casings broke off in the test. This damage is considered safety related because the headlights wouldn't be properly aimed if they weren't securely attached. The luxury cars tested have single-unit headlights, so if any part of the support mounting or casing is damaged, the entire assembly must be replaced.

The Mercedes also has the distinction of the highest repair bill for the rear flat barrier test — \$1,066. The trunk floor and lid buckled during the test, and the rear body panel was damaged. The frame bent, too, and had to be pulled out afterward.

Like the Mercedes, the BMW has body-hugging bumpers and a hood that slopes to meet the front bumper. In the front flat barrier test, the hood area beneath the BMW emblem dented from contact with the barrier. The Mercedes sustained similar hood damage in the same test.

"Styling decisions like these can run up repair costs," O'Neill says. "Automakers are capable of making bumpers that are strong and stylish. It's not too much to expect good bumpers, no matter what a car costs. But it's particularly sad when a consumer pays a lot of money for a luxury car and gets lousy bumpers."

Bumper performance varies among models from same automaker

Toyota shows how to make good bumpers on Camry but uses flimsy ones on Lexus

Just because one model in an automaker's vehicle line has good bumpers doesn't mean all do. Bumper performance can vary widely among car models built by the same manufacturer.

Toyota is a case in point. Its 1997 Camry received an acceptable rating in the Institute's bumper tests, making it one of the best midsize cars the Institute has tested. It performed reasonably well in the 5 mph front- and rear-into-flat barrier and rear-into-pole tests. Damage in all four tests totaled \$1,370.

Compare the Camry's acceptable performance with the poor showing of the 1997 Lexus, also made by Toyota. The Lexus did poorly in three of the four tests, especially the rear-into-pole test during which the car's weak rear bumper allowed the pole to penetrate the vehicle body. The Lexus was the worst luxury car performer in this test, racking up \$3,293 in repair bills. In comparison, the Camry's rear bumper held up well in the rear-into-pole test, resulting in only \$590 damage. (Note: All repair estimates reflect April 1997 dollars.)

When appraisers removed the plastic bumper cover from the Lexus rear bumper to reveal the reinforcement bar after the rear pole test, the damage was easily seen. The aluminum bar was bent in the center where it contacted the pole. Removing the cover from the previously tested Camry, the appraisers saw that this car's steel reinforcement bar held up well in the rear pole test. There was just a small dent in the center from pole contact.

"Toyota engineers know how to make good bumpers," says Institute President Brian O'Neill. "But apparently the company has decided its expensive models will have inferior bumpers. This just doesn't make sense."



Part of what makes a good bumper is the strength of its reinforcement bar, which is hidden beneath the bumper cover. In the bottom photo, the Lexus reinforcement bar (top) bent during the rear-into-pole test at 5 mph, allowing the vehicle body to be dented as well. The Camry's reinforcement bar held up well in the rear pole test, minimizing damage to the vehicle body.

Ignition interlocks help curb violations among repeat DUI/DWI offenders

Ignition interlock devices, which prevent vehicles from starting if the driver has been drinking, are effective with repeat violators of drinking and driving laws, says a new University of Maryland study. The research was funded by the Institute and

dering their results inconclusive, according to study authors. The state motor vehicle department provided an opportunity to conduct a definitive study by randomly assigning offenders to the interlock program or the standard treatment program.

repeat offenders continue to drive even with suspended or revoked licenses.

"The results of this evaluation show that an administrative interlock program can significantly reduce alcohol traffic recidivism — at least during the first year



Ignition interlock devices require drivers to pass a breath alcohol concentration test before the vehicle motor will start. The device is attached to the ignition system.

conducted with the Maryland Motor Vehicle Administration.

More than 1,380 multiple alcohol offenders in Maryland treated and deemed eligible for license reinstatement by a medical advisory board were randomly assigned to either a continuing treatment program or a treatment and interlock program. A year later, 2.4 percent of offenders in the interlock program had committed an alcohol traffic violation compared with 6.7 percent in the control group.

"This was a statistically significant difference and indicated that being in an interlock program reduced the risk of an alcohol traffic violation within the first year by about 65 percent," says principal investigator Kenneth Beck, professor of health education at the University of Maryland.

While there have been prior positive evaluations of interlock devices, none has been based on random assignment, ren-



Participants in the interlock program were issued restricted licenses that allowed them to drive a vehicle only if it was equipped with an ignition interlock. Participants who didn't own cars had to sign waivers agreeing not to drive a car unless it was so equipped.

The study highlights the importance of devising effective countermeasures for repeat violators of laws against drinking and driving. Other programs for repeat offenders such as mandatory incarceration or vehicle impoundment are helpful but have drawbacks, notes Beck. In addition, many

when the restriction is in effect," the study concludes. Interlocks could be removed after the first year, and many of the participants had them removed. The researchers will continue tracking offenses during the second year to determine if recidivism is reduced after the interlock restriction is lifted.

For a copy of "The Effects of Alcohol Ignition Interlock License Restrictions on Multiple Alcohol Offenders: a Randomized Trial in Maryland" by K.H. Beck, W.J. Rauch, and E.A. Baker, write: Publications, Insurance Institute for Highway Safety, 1005 N. Glebe Rd., Arlington, VA 22201.

It's in by 9 p.m. for beginning drivers in N.C.

When North Carolina's graduated licensing law takes effect in December, new drivers will have to be off the road by 9 p.m.

The night driving restriction is a central feature of the state's new licensing law, which transforms the licensing process for young people in North Carolina.

Currently, teenagers don't have to get a learner's permit and can attain a full license at age 16. Under the new graduated licensing system, learner's permits are required, there is a 9 p.m. driving restriction for initial license holders, and the minimum age for an unrestricted license is 16 years and 6 months.

"North Carolina has taken a giant step forward," says Institute Senior Vice President Allan F. Williams. "This is a superior graduated licensing system."

Under the new law, drivers younger than 18 will be eligible for an unrestricted license only after getting at least 18 months of driving experience. Teenagers will be subject to a mandatory 12-month holding period for a learner's permit before acquiring a limited provisional driver's license.

The 12-month period must be completed without a moving violation or safety belt violation. The limited provisional license, once obtained, must be held an additional six months with no moving or belt violations before a teen is eligible for an unrestricted license.

The 9 p.m. driving restriction is for teenagers holding a limited provisional license, unless they're supervised or going to and from work. States considering night driving restrictions typically establish them later than 9 p.m., usually 11 p.m. or midnight. But most of the nighttime crashes of 16- and 17-year-old drivers occur prior to midnight.

"Legislators generally think mid-night for night driving restrictions," says Rob Foss of the University of North Carolina Highway Safety Research Center. "But with a midnight driving restriction in North Carolina you are missing more than three-quarters of the nighttime crashes of 16 and 17 year-olds. Earlier driving restrictions will address many more nighttime crashes."

North Carolina Governor Jim Hunt says the new law attempts to train young people properly before they get behind the wheel on their own. "The fact is, young drivers don't have the experience at their age to know all the things a vehicle can and cannot do," Hunt explains. "They will get that experience with this plan. They will get vital training in safe settings and in a variety of driving situations."

Foss says preparation and patience were crucial to getting effective graduated licensing legislation passed in his state. "We got out in front of the issue with strategy and science," he says, adding that there generally was no existing knowledge

or pre-conceived notions about graduated licensing and young driver crashes. He credits the distribution of handouts and data to the legislature, public, and media for getting North Carolina to pass the new law. "We framed the issue in a way that people first heard and saw it from our perspective."

Georgia recently passed its version of a graduated licensing program, which includes a 0.02 percent blood alcohol concentration for drivers younger than 21, a mandatory 12-month period for holding learner's permits, and a 1 a.m. driving restriction. The law also prohibits a young driver from transporting more than three passengers younger than 21 unless they are members of the driver's immediate family. In addition, Georgia teenagers aren't eligible for unrestricted licenses until they're 18.

Graduated licensing legislation is being considered in Alaska, California, Hawaii, Illinois, Louisiana, Nebraska, New Hampshire, Ohio, Tennessee, and Texas.



STATUS INSURANCE INSTITUTE FOR HIGHWAY SAFETY REPORT

1005 N. Glebe Rd., Arlington, VA 22201 703/247-1500 Fax 247-1678 Internet: www.hwysafety.org

NON-PROFIT ORG.
U.S. POSTAGE
PAID
PERMIT NO. 252
ARLINGTON, VA

Vol. 32, No. 5, May 10, 1997

Luxury car bumpers flunk low-speed impact tests p.1

Bumper performance varies among cars from same automakerp.5

Ignition interlocks deter repeat alcohol driving law violatorsp.6

North Carolina adopts strong new graduated licensing lawp.7

Editor: Kim Stewart
Writer: Mike Davis
Art Director: Joyce Thompson

Contents may be republished with attribution.
This publication is printed on recycled paper.

ISSN 0018-988X

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 highways. The Institute is wholly supported by automobile insurers:

- | | | |
|---|---|---------------------------------------|
| Alfa Insurance | Foundation Reserve | Nationwide Insurance Enterprise |
| Allstate Insurance Group | Frankenmuth | North Carolina Farm Bureau |
| American Family Insurance | The GEICO Group | Northland Insurance Companies |
| American National Property and Casualty | General Accident Insurance | Oklahoma Farm Bureau |
| American States Insurance Companies | General Casualty Insurance Companies | Old Guard Insurance |
| Amica Mutual Insurance Company | Grange Insurance | Omni Insurance Group |
| Auto Club South Insurance Company | Guaranty National Corporation | Pekin Insurance |
| Automobile Club of Michigan Group | The Hanover Insurance Company | PEMCO Insurance Companies |
| Brethren Mutual Insurance Company | Harleysville Insurance Companies | The Progressive Corporation |
| Brotherhood Mutual | The Hartford | The Prudential |
| California Insurance Group | Heritage Mutual Group | Ranger Insurance |
| Cameron Companies | Kansas Farm Bureau | Royal Insurance |
| Chubb Insurance Companies | Kemper Insurance Companies | SAFECO Insurance Companies |
| Church Mutual | Liberty Mutual Insurance Group | SECURA |
| CNA Insurance Companies | Maryland Insurance Group | Selective Insurance |
| Colonial Penn | Merastar | Shelter Insurance Companies |
| Concord Insurance Companies | Mercury General Group | Southern Heritage |
| Cotton States | Metropolitan | State Auto Insurance Companies |
| Country Companies | Michigan Educational Employees | State Farm Insurance Companies |
| CUNA Mutual | Middlesex Mutual | The St. Paul Companies |
| Direct Response Corporation | Milwaukee Insurance Group | Tokio Marine Group |
| Erie Insurance Group | Montgomery Mutual | United Auto Insurance Company |
| Farm Bureau of Idaho | Motor Club of America Insurance Company | USAA |
| Farm Bureau of Iowa | Motorists Insurance Companies | US Fidelity & Guaranty |
| Farmers Insurance Group of Companies | Motors Insurance | USF Insurance Company |
| Farmers Mutual of Nebraska | Mutual Service Insurance | Viking Insurance Company of Wisconsin |
| Fidelity & Deposit | National Grange Mutual | Wisconsin Mutual |
| | | Yasuda Fire and Marine of America |