

STATUS REPORT

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

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Same cars? not exactly

It's more than a color difference
It's a difference your pocketbook would notice

Volkswagen New Beetles sold in the United States look exactly like the New Beetles sold in Europe. But underneath the bumper covers, the parts that attach the bumper bars to the cars are different. Those on U.S. Beetles do a whole lot better job of

European Beetle



The Institute conducted two crash tests involving the fronts of European Beetles striking the rears of European Beetles. Impact speeds were 20 mph.




Average damage European Beetles:

Front	\$3,217
Rear	\$3,940
Total	\$7,157

WHEN U.S. & EUROPEAN BEETLES →

WERE TESTED AT 20 MPH →

THE RESULTING DAMAGE

U.S. Beetle



The Institute conducted two crash tests involving the fronts of U.S. Beetles striking the rears of U.S. Beetles. Impact speeds were 20 mph.




Average damage U.S. Beetles:

Front	\$2,389
Rear	\$2,733
Total	\$5,122

preventing unnecessary damage in low-speed collisions — the kinds of crashes that frequently occur in heavy commuter traffic and can result in expensive repair bills.

In fact, the U.S. New Beetle is one of the best cars the Institute has ever evaluated for bumper performance (see *Status Report*, May 9, 1998; on the web at www.highway.safety.org). It sustained no damage in two of the Institute's four crash tests conducted at 5 mph, and damage to the New Beetle was minimal in the other two crash tests (see table, p.4).

The Institute, which routinely subjects new passenger vehicles to 5 mph barrier

and pole tests, more recently conducted a series of car-to-car crash tests of Beetles at 20 mph. Two of the tests involved the front of a U.S. Beetle hitting the stationary back of another U.S. Beetle. Two more tests (same configuration) involved Beetles equipped with the European bumpers.

The results show dramatic differences. The fronts of the striking U.S. Beetles sustained an average of \$2,389 damage compared with \$3,217 damage to the fronts of the European Beetles. Rear damage varied even more — an average of \$2,733 for the U.S. Beetles compared with \$3,940 for the European cars.

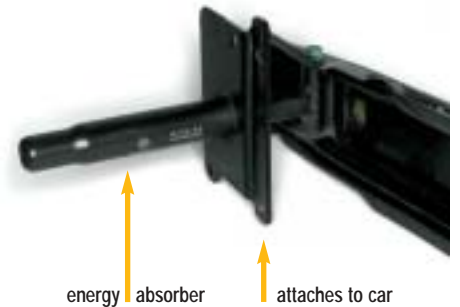
What accounts for the better performances of the U.S. versions? The bumper covers are the same, and both versions have steel bumper bars under the covers. The difference is that the bars on U.S. Beetles are attached to the cars with mounts that can absorb low-speed crash forces and then



On the European Beetle, front and rear bumper bars are attached with rigid brackets designed to buckle in a crash, sacrificing themselves to absorb energy and reduce damage in low-speed impacts. However, these so-called crush boxes don't perform as effectively as the energy-absorbers on U.S. Beetles.

DIFFERED GREATLY →

BECAUSE OF BUMPER DIFFERENCES.



On the U.S. Beetle, front and rear bumper bars are attached with mounts that can absorb low-speed crash forces and then return to their original positions, like shock absorbers. Because of these energy-absorbing units, damage to the front and rear of the U.S. Beetles was less than to the European Beetles in 20 mph front-into-rear crash tests.

BMW 3-series, BMW 5-series, BMW X5 (rear bumper only), Cadillac CTS, and Volkswagen Passat.

both striking and struck European Beetles than in the corresponding crash tests of the U.S. Beetles.

These tests demonstrate that “cars with bumpers that can absorb the energy of low-speed crashes without damage, like those on the U.S. Beetle, reduce repair costs after a range of impacts,” Institute president Brian O’Neill says. “The fact that the U.S. Beetle performed well in tests at both 5 and 20 mph indicates that cars that do well in the 5 mph barrier and pole tests also can perform well in real-world crashes at higher speeds.”

A number of manufacturers equip their cars for sale outside the United States with

return to their original positions, just like shock absorbers.

Only a few passenger vehicles in the United States are equipped with this kind of bumper to absorb low-speed crash energy. Besides the Beetle, the Institute has identified such parts on the Audi A4, Audi A6,

In contrast, the bumper bars on European Beetles are mounted with rigid brackets designed to collapse in a crash, sacrificing themselves to absorb energy and reduce damage. But these so-called crush boxes don't perform as effectively as the energy-absorbers on U.S. Beetles. Instead of crushing uniformly as intended, the boxes on the rears of the struck Beetles with the European bumpers bent upward, which encouraged major bumper over- and under-ride. This resulted in much more damage to

bumper systems that are different from — and less protective than — the ones on U.S. versions of the same cars. “This doesn’t mean the cars sold in the United States have good bumpers. Many of them don’t. It’s just that the bumper systems on cars sold outside the United States often are even worse,” O’Neill points out.

Besides exemplary crash test performance, the U.S. Beetle has superior insurance claims results for damage in real-world collisions. Among small cars, the Beetle has the best damage claims experience under both collision and property damage liability coverages. (The former reimburses policyholders for damage to their own insured vehicles.

Bumpers on most small cars don’t bump as well as Beetle bumpers

Some automakers have shown how to make cars with bumpers that bump like they’re supposed to and prevent damage in low-speed collisions. But these are exceptions.

The Institute’s latest round of low-speed crash tests proves the rule. The Subaru Impreza, Mitsubishi Lancer, and Volvo S40 sustained total damage ranging from \$2,515 to \$3,169 in four tests at 5 mph (front- and rear-into-flat-barrier plus front-into-angle-barrier and rear-into-pole).

The Lancer sustained \$347 damage in the front-into-flat-barrier impact — the best result among the three cars in this test but poor compared with the Beetle, which sustained only \$19 damage in the same test and no damage in two of the other three impacts.

The Lancer replaces the four-door Mitsubishi Mirage (a two-door Mirage is still being sold), but the new model doesn’t improve on the predecessor’s performance. Both the 2002 Lancer and 1997 Mirage sustained more than \$3,000 damage in the 5 mph tests. Damage to the Lancer was the same or greater in three of the four impacts.

Sometimes auto manufacturers do pay attention to the bumpers when they re-



5 MPH CRASH TEST RESULTS

Repair costs reflect January 2002 prices

	Front into flat barrier	Rear into flat barrier	Front into angle barrier	Rear into pole	Total damage 4 tests	Average damage each test
Small cars						
2002 Subaru Impreza	\$413	\$456	\$1,040	\$606	\$2,515	\$629
2002 Mitsubishi Lancer	\$347	\$522	\$1,224	\$1,011	\$3,104	\$776
2002 Volvo S40	\$406	\$435	\$1,116	\$1,212	\$3,169	\$792
1998 Volkswagen New Beetle	\$19	\$0	\$190	\$0	\$209	\$52
Passenger van						
2002 Kia Sedona	\$4,305	\$1,246	\$1,225	\$2,971	\$9,747	\$2,437

The latter covers damage to other vehicles and property inflicted by the insured vehicles.) Such results reflect claims for damage in impacts from low to high speeds, but insurance losses for vehicle damage are dominated by low-severity impacts — the very ones in which good bumpers can prevent or reduce damage.

A European New Beetle might look like its U.S. counterpart. However, the design differences underneath the bumper cover can make big differences in how much it costs to repair the vehicles after impacts at low speeds.

“Bumpers that bump apparently weren’t a consideration when these three small cars were designed for 2002,” says Adrian Lund, Institute chief operating officer. All three cars have plastic bumper covers over steel bumper bars plus foam intended to absorb crash energy, “but these components don’t do the job nearly as well as the energy-absorbers on the U.S. version of the Volkswagen New Beetle. Foam can be an effective energy absorber, but it isn’t in these systems.”

The best performer among the three new models, the Impreza, sustained more than 10 times as much total damage as the Beetle.

design their passenger vehicles. For example, damage to the redesigned 1999 Hyundai Elantra in the Institute’s 5 mph rear-into-pole test was only \$8 compared with \$1,784 damage in the same test of a 1997 Elantra (see *Status Report*, April 24, 1999; on the web at www.highwaysafety.org). From the start, Volkswagen got the bumper systems right on the New Beetle.

“Designing good bumpers is no great engineering challenge. The automakers know how to do it, but unless this is a priority we’re going to continue seeing many manufacturers using inferior designs,” Lund concludes.



When the Kia Sedona hit the barrier in a 5 mph crash test, the airbags deployed. Total damage in this test alone topped \$4,000.

New minivan from Kia sustains \$9,747 damage in 5 mph bumper tests

The Kia Sedona passenger van sustained more than \$1,000 damage in each of the Institute's four crash tests at 5 mph. Damage in the simplest impact, front-into-flat-barrier, totaled more than \$4,000.

The big problem in the flat-barrier test was that the airbags deployed. Both driver and passenger airbags had to be replaced. The passenger airbag cracked the wind-

shield during deployment so it, too, had to be replaced, as did the top of the instrument panel. The cost of these and other repairs came to \$4,305.

Airbags shouldn't deploy in low-speed impacts because they aren't needed, cost a lot to repair, and could harm out-of-position occupants. Airbags should deploy in the equivalent of a 12 to 14 mph barrier crash, not a 5 mph impact. Kia is investigating why this happened.

Other damage to the Sedona included \$2,971 in repair costs after the rear-into-pole test, in large part because the bumper

system doesn't incorporate adequate absorption capabilities. The result is that the tailgate and rear body panels were damaged beyond repair. Vehicle lights were damaged in both this test and the front-into-angle-barrier impact.

"It was a very poor performance," Adrian Lund, Institute chief operating officer, points out. "The Sedona's bumpers simply failed. The plastic bar cracked in all four tests, and the bumper cover had to be replaced after three of the four tests. The worst result was the airbag deployment in the flat-barrier test. This shouldn't happen."

State laws: few are being improved to enhance safety

Laws in every state aim to encourage safe driving practices and discourage dangerous behavior. How are the states doing in terms of passing new traffic safety laws and strengthening the ones on the books? There are a few bright spots, but the emphasis goes on "few." Little progress was made overall in 2001.

Safety belt laws: Every state except New Hampshire has a law requiring motorists to buckle their safety belts, but few states permit police to stop vehicles solely for belt violations (standard enforcement practice). Instead motorists have to be stopped first for another violation before

"Enforcement is key," says Susan Ferguson, Institute senior vice president for research. "There are states with primary laws that don't practice vigorous enforcement, and the result is low belt use. On the other hand, some secondary states have strong enforcement and high use rates."

Child restraint laws: In every state, child restraint laws provide for primary enforcement. However, older children often are covered by adult belt laws that allow only secondary enforcement. In Arkansas, Illinois, New Jersey, New Mexico, South Carolina, and South Dakota, the ages of the children covered by child restraint laws have been expanded.

Since 2000, seven states (Arkansas, California, New Jersey, Oregon, Rhode Island, South Carolina, and Washington) have added a requirement for older chil-

ering all riders, but many laws have been weakened to cover only younger riders. Twenty states and the District of Columbia retain universal coverage.

Efforts to change helmet laws in recent years have mostly aimed to weaken them, not extend coverage (see *Status Report*, Jan. 12, 2002; on the web at www.highwaysafety.org). None of these efforts succeeded in 2001, but further challenges are under way.

Camera enforcement: Red light cameras take pictures of cars whose drivers run signal lights. Violators then are ticketed by mail. As of December 2000 only California, Colorado, Delaware, the District of Columbia, Hawaii, and Maryland had laws specifically authorizing camera enforcement statewide. New York, North Carolina, Oregon, Virginia, and Washington conferred camera authority, but not statewide. In

On a recent episode of the popular TV series, "The West Wing," presidential assistant Sam Seaborn endorsed primary belt law enforcement, saying "secondary seat belt laws don't work Isn't it about time for a tougher law?" But the news in the real world isn't encouraging. No primary laws have been enacted in more than two years.

the belt law can be enforced (so-called secondary enforcement). Only 17 states and the District of Columbia permit primary enforcement, and there has been no recent move by any secondary enforcement state to upgrade its law. The last state to adopt primary enforcement was New Jersey in January 2000 and, before that, Alabama and Michigan in mid-1999.

Whether a belt law is primary or secondary doesn't tell the whole story in terms of its effectiveness. Exactly how the laws are written and enforced can make a big difference.

dren to ride in booster seats. But boosters might not always be a safety plus. They are when they help older children fit better into adult safety belts, but some boosters don't help and others worsen the fit. Parents should check to see that a booster they're considering does improve the fit of the belt for their child in their car.

Motorcycle helmet laws: If the laws cover all riders, they increase the proportion of cyclists who wear helmets and decrease the number of motorcycle deaths. Nearly all states once had helmet laws cov-

2001, Georgia passed a law permitting camera use (the previous basis for use was an opinion from the state attorney general). In Tennessee, the attorney general issued an opinion permitting red light cameras at local discretion.

DUI/DWI laws: The proportion of fatally injured drivers with high blood alcohol concentrations (BACs at or above 0.10 percent) steadily decreased from the 1980s through the early 1990s and then remained steady.



“This is one area where the states are taking action,” Ferguson points out. In 2001 10 states (Alaska, Arizona, Arkansas, Georgia, Indiana, Louisiana, Maryland, Missouri, Nebraska, and Oklahoma) reduced the threshold at or above which it’s illegal to drive from 0.10 percent BAC to 0.08 percent. Now 30 states and the District of Columbia have 0.08 BAC laws. Such laws reduce crash deaths involving alcohol by about 7 percent, according to estimates from the Centers for Disease Control and Prevention (see *Status Report*, June 30, 2001; on the web at www.highwaysafety.org).

Cornerstones of efforts to reduce DUI/DWI are laws permitting administrative revocation of the licenses of drivers who’ve been arrested. Eight states didn’t have such laws as of December 2000 (Kentucky, Michigan, Montana, New Jersey, Pennsylvania, Rhode Island, South Dakota, and Tennessee), and none of these states has enacted an administrative license revocation law since then. Nor have any states with such laws strengthened them by extending the suspension period.

Graduated licensing: Alabama, Kansas, Montana, Nevada, Oklahoma, and Wyoming still haven’t adopted any key provisions of a graduated licensing system. Such provisions include prohibitions on unsupervised driving in high-risk situations like at night or with passengers. Also important is an initial learning phase lasting at least six months when only driving under supervision is allowed.

In 2001 Texas mandated a six-month learner’s phase, raised the minimum age for unrestricted licensure from 16 to 16½, and prohibited both night driving and passengers during the initial licensing stage. Utah added a passenger restriction. Virginia’s law, which had consisted solely of a six-month learner’s permit period, was amended in 2001 to include passenger and night driving restrictions. The age for getting a learner’s permit was raised to 15½.

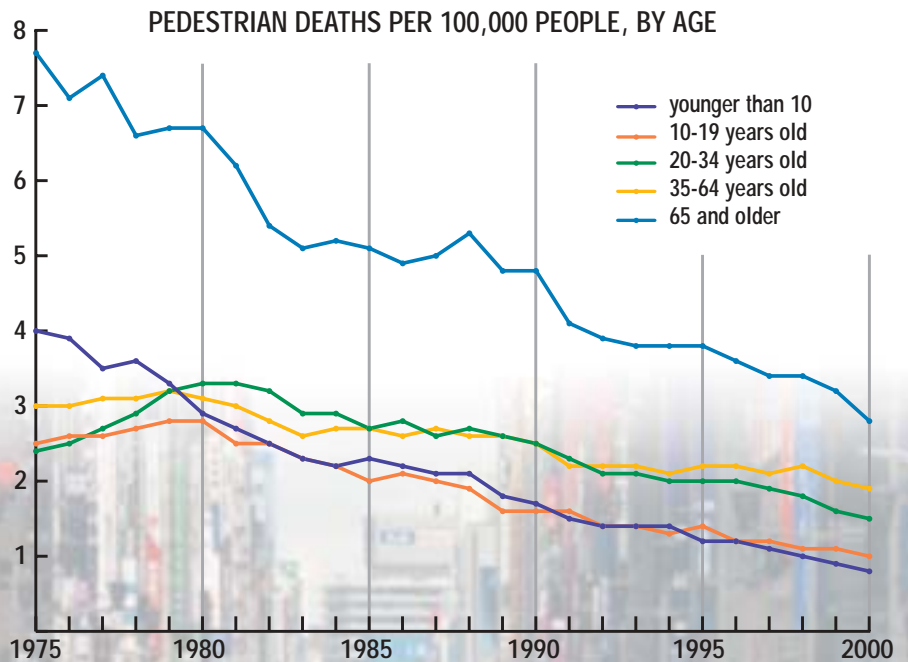
The Institute’s website includes updated details about selected traffic laws. Go to www.highwaysafety.org, click on “safety facts,” and then see “state laws.”

Pedestrian deaths on long downward trend

Motor vehicle deaths have plateaued at around 42,000 a year. In some categories, notably among motorcyclists, deaths have been going up (see *Status Report*, Jan. 12, 2002; on the web at www.highwaysafety.org). Meanwhile, pedestrian deaths continue a long-term decline. Since 1975, they’ve gone down 51 percent. This is the largest decline in any category of motor vehicle deaths.

All age groups are affected. Among people 65 and older, pedestrian death rates have dropped about 60 percent since 1975, though the elderly still have the highest rates. The greatest progress has been made among pedestrians age 9 and younger, whose death rates have dropped 80 percent since 1975. Children this age now have the lowest rates. “There have been some street and highway improvements, but the decline in pedestrian deaths among children most likely reflects declining exposure. Kids aren’t out walking unsupervised as much as they used to. I think they’re being driven more, and in many cases parents are exercising more caution over where they allow their children to go by themselves,” Institute senior transportation engineer Richard Retting explains.

Pedestrian deaths still account for about 11 percent of all traffic deaths. They’re frequent enough that people are starting to demand more pedestrian-friendly streets, especially in cities and suburbs where people and traffic are concentrated. About 70 percent of all pedestrian deaths occur in urban areas.



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