

STATUS REPORT

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

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Better airbags for everybody. This is the aim of new rulemaking by the National Highway Traffic Safety Administration. But it's far from clear whether the complex set of airbag test alternatives

set forth in the proposed standard would achieve the agency's aims.

Airbags already are a huge public health success. They've saved thousands of lives in serious crashes. But more than 100 people have been killed by inflating airbags. These were occupants very close to airbags as they began inflating. In most cases, the crashes were at slower speeds and, except for the airbags, there probably would have been no significant injuries.

NHTSA's main goal is to minimize inflation injury risks for people in various positions in their vehicles and with or without safety belts. These and other advancements would preclude airbag on/off switches, which no longer would be an option.

To meet the requirements NHTSA proposes, airbags will have to get smarter. For example, they might have to decide whether to deploy based on who's sitting in the seat, an adult or a child. Or airbags might be designed to always deploy, but with less force for smaller occupants.

Automakers and airbag suppliers are working on advanced airbags now, and some new designs will be introduced in 1999 and later models. It isn't clear whether NHTSA's proposals are compatible with what the manufacturers are planning to introduce. Still, the agency proposes to phase in its own concept of advanced airbags beginning with 2003 models. All 2006s would have to meet the standard.

More test dummies: Current airbag compliance tests specify a male Hybrid III dummy using a lap/shoulder belt in a frontal crash into a rigid barrier at 30 mph. The same dummy also has to be used without a belt in either the same test or a sled test. Introduced last year, the sled option facilitates airbags that deploy with less force to reduce inflation injury risks (see *Status Report*, Nov. 29, 1997; on the web at www.highwaysafety.org).

Now NHTSA proposes to add compliance tests with dummies representing 3- and 6-year-old children and a 12-month-old infant. A 5th percentile female dummy also would be used to represent small women and many teenagers. This family of

dummies would be subject to a battery of tests instead of putting just one dummy through 30 mph rigid-barrier impacts, as specified in the current standard.

Reducing the risks: Most of the new tests seek to minimize inflation injury risks among occupants who are so close to their airbags that the force of inflation could injure them. NHTSA is proposing two broad alternatives—suppressing airbag inflation when it could put someone at risk or designing systems that minimize the risks when airbags do deploy.

Specifically, NHTSA proposes 13 test alternatives, 2 of which involve infants. Automakers would have to demonstrate that a passenger airbag either wouldn't deploy

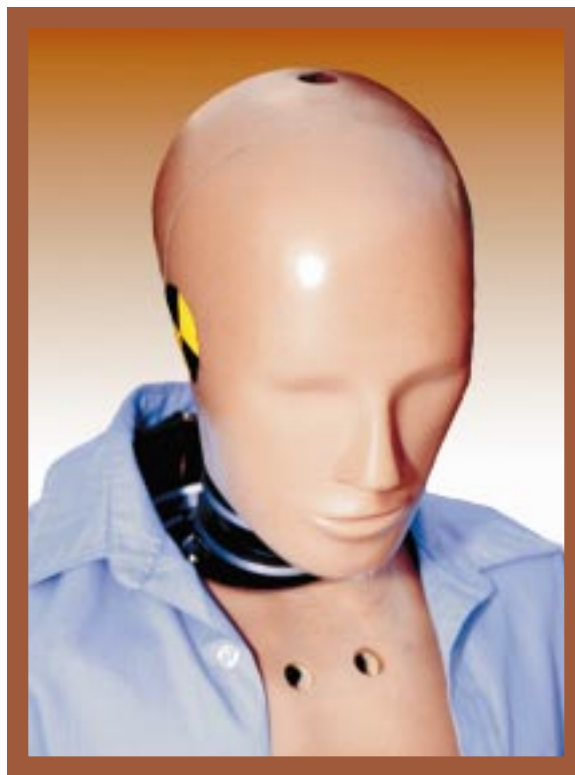
Another set of tests involves three- and six-year-old child dummies. Automakers would have to demonstrate that a passenger airbag would (a) not deploy at all when dummies representing small children are sitting in front of it, (b) deploy in most cases but not if the dummy were close to the airbag, or (c) deploy with a force that results in low injury measures recorded on the child-size dummies. A fourth option involves unbelted child dummies in a full-scale barrier crash test, during which a vehicle would have to brake and then crash with low injury measures.

For drivers, the option of always suppressing an airbag wouldn't be allowed. Instead, a small female dummy would be in the driver seat, and a vehicle would have to meet one of the other options described for children—suppression of deployment if the dummy is close to the airbag, inflation with low injury measures in a static test, or the full-scale crash test option with braking before impact.

Extending the benefits: NHTSA plans to keep the 30 mph belted and unbelted crash test requirements that have defined airbag testing for years (the sled test option would be eliminated). The agency also wants to extend these requirements to a 5th percentile female, upgrade chest injury criteria, and add neck injury criteria.

The small female dummy would be closer to the steering wheel (driver) or dashboard (passenger) than the 50th percentile male. NHTSA notes that many small females can sit farther back,

and Institute studies confirm this. But as the agency points out, the proposed tests would ensure protection "in a more extreme position, but one where airbags can still provide protection."



Instead of one dummy, a 50th percentile male Hybrid III ...

at all when a rear-facing restraint is in the right front seat or would deploy so injury measures on a dummy representing an infant in a rear-facing restraint would be lower than human injury thresholds.

A key provision addresses the problem of late airbag deployments. In crashes into “soft” objects or in highly localized impacts (into a pole, for example), the airbag sensors in some vehicles don’t determine that the collision is severe enough to warrant inflation until occupants have had time to move forward enough to risk injury from the deploying airbag. Compliance tests previously haven’t addressed this issue because the test barrier is rigid and the impact is spread across the whole front of a vehicle—not the kind of crash in which late airbag deployment is likely to occur. Therefore, NHTSA is proposing a 25 mph offset test into a deformable barrier with a 5th percentile belted female dummy. Danius Dalmotas of Transport Canada, where this test was developed, explains it’s “a more stringent and realistic way to assess airbag timing.”

Sled test alternative: Probably the most controversial aspect of the proposed requirements is NHTSA’s intent to end the option of a sled test instead of the 30 mph unbelted crash test. Conceding the sled option has been “an expedient and useful temporary” way to facilitate airbag depowering, NHTSA says it’s “insufficiently representative of fatal real-world crashes.”

The Institute and many others disagree about requiring the 30 mph unbelted test into a barrier. Last month, automakers and insurers joined in a statement warning that going back to this test “will undo the improvements in occupant safety that have resulted from depowering and inhibit manufacturers’ ability to maximize protection while minimizing risks to out-of-position occupants, infants, children, and small adults.”

Chrysler’s director of vehicle safety, Sue Cischke, says meeting unbelted crash test requirements means “you’re going to get an aggressive bag.” Ford’s Priya Prasad sums up the industry’s stance by insisting, “We never saw a need for that test, and we don’t see a need now.”

Institute president Brian O’Neill adds, “There’s no evidence from real-world crashes that airbags that comply with the sled test are offering inadequate protection. On

may eliminate the problems of aggressive inflators in low-speed crashes but not in the high-speed ones.”

Headed in the right direction?

There’s no question about the ambition inherent in NHTSA’s new airbag proposals. The larger question is whether the sum of these proposals will accomplish the purpose for which the agency is aiming. The jury is out while manufacturers, suppliers, researchers, and others grapple with the

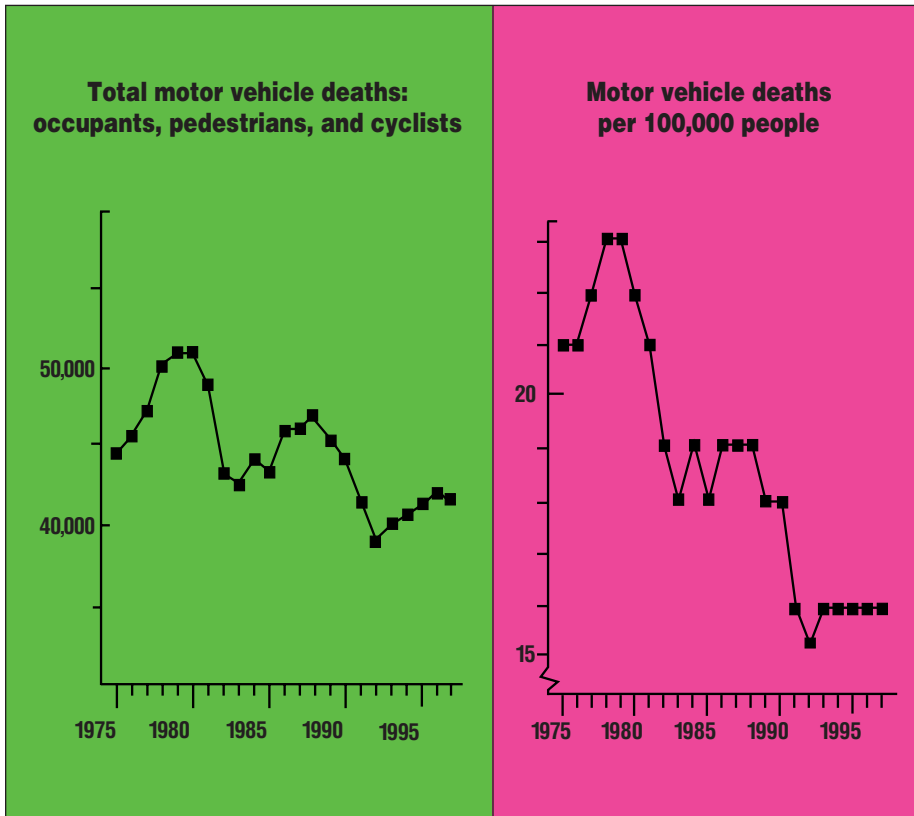


... a whole family of male, female, child, and infant crash test dummies would undergo a range of airbag tests.

the other hand, the evidence is compelling that aggressive airbags designed to comply with the unbelted test into a barrier have harmed people in low- and high-speed crashes. More advanced systems

complex proposals in which new tests are specified, new test configurations are proposed, and new dummies and injury criteria are introduced. The implications will take a while to sort out.

Motor vehicle deaths unchanged overall but important differences still apparent



Car occupants represent more than half of all motor vehicle deaths — about the same proportion as in 1975. Because trends in this large category dominate the overall statistics, it's important to note that car occupant deaths decreased 11 percent between 1975 and 1997. However, they've remained about the same for the past six years.

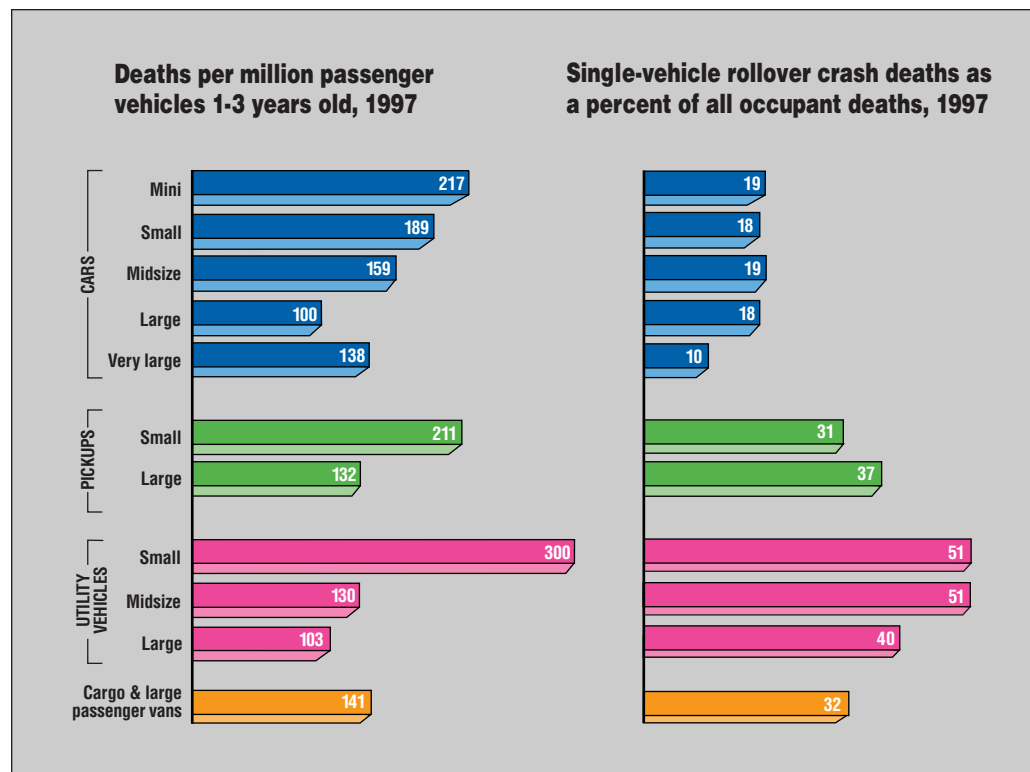
Deaths among occupants of pickup trucks and utility vehicles almost doubled from 4,166 in 1975 to 8,291 deaths last year. In the past six years, deaths in these vehicles have increased 21 percent. Such dramatic changes reflect the increased popularity of pickups and utility vehicles, which accounted for fewer than one in five passenger vehicle sales in 1975. By 1997, this proportion was up to one in three.

The 11 percent decrease in car occupant deaths since 1975 accompanied by the huge increase in deaths of pickup and utility vehicle occupants translates into an overall 5 percent increase in passenger vehicle occupant deaths. However, there are nine times as many registered passenger vehicles as there were in the mid 1970s, and during this period deaths per million

For the past three years, motor vehicle deaths have hovered around 42,000 per year. So one message from the National Highway Traffic Safety Administration's release of 1997 fatality data is that not much has changed.

More telling are trends in motor vehicle deaths across a longer time span. In 1975, the federal government started an annual census of deaths, recording information on crash type, vehicle type, road type, driver characteristics, and other factors. Since then, motor vehicle deaths have declined 6 percent overall. The category with the largest decline is motorcyclists, among whom deaths have declined 33 percent since 1975—58 percent since a high of 4,955 deaths in 1980.

Among pedestrians, deaths are down 29 percent since 1975. The decline is 34 percent when compared with a high of 8,096 pedestrian deaths in 1979.



registered vehicles declined across the board. In the smallest cars, the death rate declined 40 percent between 1978 and 1997. In large pickups, the rate declined 55 percent, and in utility vehicles of all sizes, the rate declined 67 percent.

In 1997 as in past years, a sizable proportion of utility vehicle occupant deaths occurred in single-vehicle rollover crashes. In fact, about half of all deaths in utility vehicles in 1997 occurred in this kind of crash, while only 18 percent of car occupant deaths occurred in rollovers.

Truck-car crashes: Tractor-trailers and other large trucks claimed 5,264 lives in 1997, and only 717 of the deaths were occupants of the trucks. Almost all the rest were people riding in passenger vehicles that collided with the trucks. This disparity in risk isn't surprising because the heavier weight and larger size of the trucks protect their occupants in collisions with smaller vehicles.

About 98 percent of all deaths in two-vehicle crashes involving trucks and passenger vehicles are the occupants of the passenger vehicles. This is the case year after year.

Youngest and oldest motorists: Motor vehicle death rates approach or exceed 40 per 100,000 people only among 16-24 year-olds and people 80 and older. But this is where the likenesses between young and old motorists end.

More than 1 of every 3 deaths of 16-19 year-olds from all causes is a motor vehicle death. The corresponding proportion among elderly people is less than 1 in 100. Pedestrian deaths account for a large proportion of the motor vehicle deaths among older people, but the same isn't true of teenagers. The pedestrian death rate per 100,000 people is 5 times higher among people 85 and older than it is among 16-19 year-olds.

The overall problem of motor vehicle deaths is much worse among teenagers than any other age group. Although beginners drive less than all but the oldest people, their crashes and crash deaths are disproportionately high. Teenagers ac-



Gender gap narrows

The way Cyndi Lauper sings it, "Mother dear we're not the fortunate ones. Girls just wanna have fun." Whether for fun or necessity, women are getting more licenses and driving more miles. Their miles are more likely to be at night.

But women are paying a price. Female passenger vehicle driver deaths increased 82 percent from 1975 to 1997 while male deaths decreased 5 percent.

"Daddy dear, you're still number one," Lauper sings, and when it comes to motor vehicle deaths, she's right. The gender gap is narrowing, but there's a long way to go before deaths are as big a problem for women as men. About 2 of every 3 passenger vehicle occupant and pedestrian deaths are men. About 9 of every 10 deaths of people on motorcycles and bicycles are men.



counted for about 10 percent of the U.S. population in 1997 but about 15 percent of all motor vehicle deaths.

This problem isn't uniform among teens of all ages. The motor vehicle driver death rate per 100,000 people peaks at age 18.

Alcohol-impaired driving: Alcohol is a serious problem in motor vehicle crashes, but for a number of years this problem has been lessening. In all age groups, the proportions of fatally injured passenger vehicle drivers with blood alcohol concentrations (BACs) at or above 0.10 percent are lower than they were in 1980.

The greatest improvements are among drivers 16-20 years old. In 1980, more than half of all fatally injured drivers in this age group had BACs of at least 0.10 percent. By 1995, the proportion was down to less than one in four. However, this proportion increased in 1996 and again last year, thus reversing the downward trend.

The group with the worst problem is 21-30 year-olds. Despite a sizable improvement in 1997, 43 percent of fatally injured drivers in this group still had high BACs.

The problem of alcohol-impaired driving is much worse at night than during the day. Two of every three passenger vehicle drivers fatally injured between midnight and 3 a.m. have high BACs.

At all times of the day, about one in every three fatally injured passenger vehicle drivers, motorcyclists, and pedestrians age 16 and older have BACs of 0.10 percent or more. The corresponding proportion among tractor-trailer drivers is much lower — only about 3 percent.

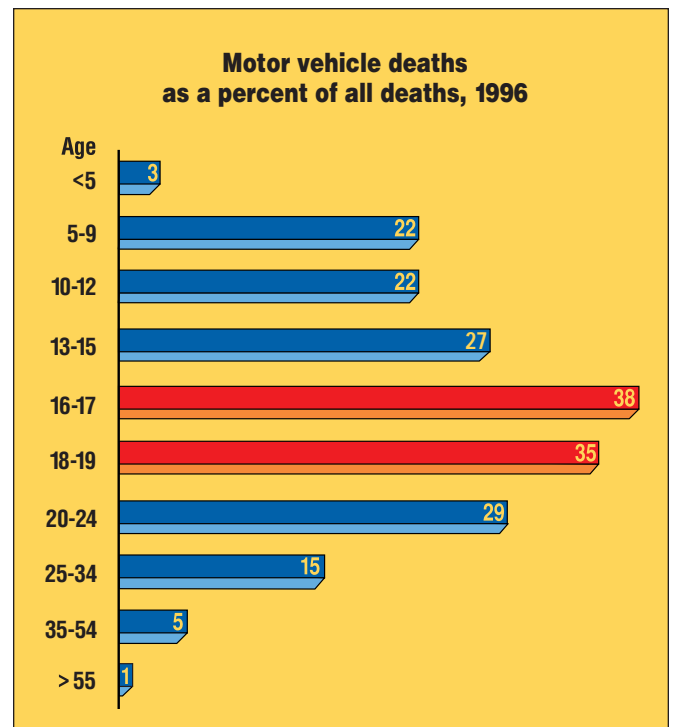
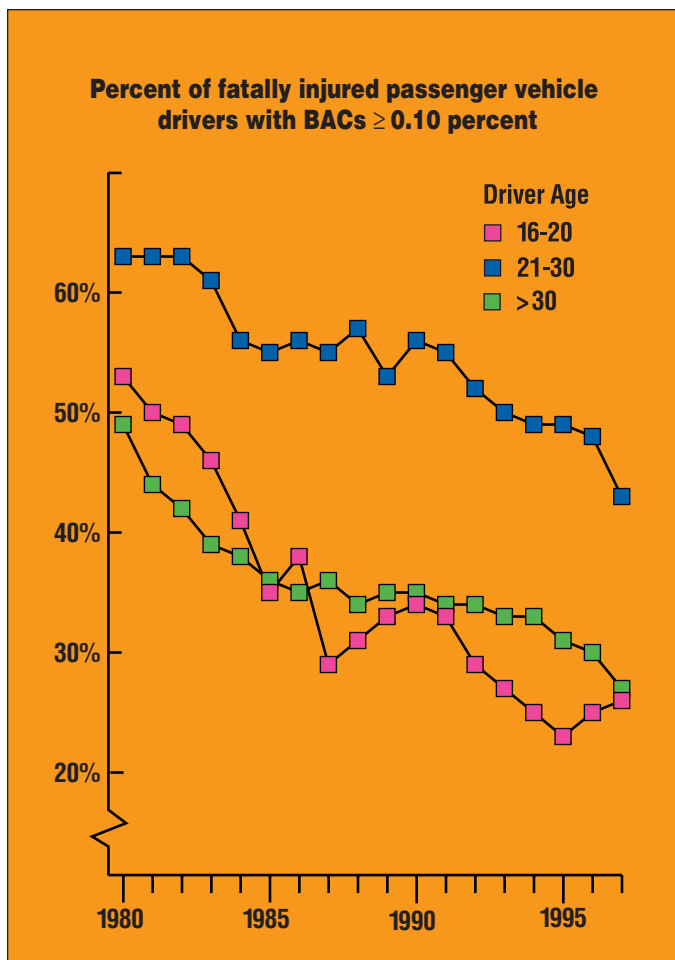
More fatality facts: Deaths of adult bicyclists are an increasing problem. Sixty-nine percent of all bicyclist deaths in 1997 occurred among riders 16 and older. This compares with 32 percent in 1975. Among children younger than 13, bicyclist and pedestrian deaths have declined 67 percent since 1975.

children in this age group have declined only 4 percent.

Thirteen states recorded 1,000 or more motor vehicle deaths in 1997. In most cases, these high totals are associated with large and/or heavily populated states. California and Texas, for example, rank first and second in population among U.S. states, and their rankings are the same in terms of motor vehicle crash deaths. But there are a few surprises. Alabama ranks 23rd in population, for example, and 13th in crash deaths.

State law facts: This information is from the Institute's *Fatality Facts*, a set of 13 fact sheets analyzing motor vehicle deaths by crash type, driver characteristics, and other factors. The Institute publishes 4 more fact sheets that summarize the provisions of child restraint and safety belt use laws, DUI/DWI laws, motorcycle helmet use laws, and laws applying to young drivers.

Both *Fatality Facts* and *State Law Facts* are on the web at www.highwaysafety.org. Or write: Publications, Insurance Institute for Highway Safety, 1005 N. Glebe Rd., Arlington, VA 22201.



Side airbag for the head

The National Highway Traffic Safety Administration (NHTSA) has modified the rules aimed at protecting people's heads. This clears the way for airbags that deploy from vehicle roofs in side impacts.

Before the rule covering impacts with vehicles' upper interiors was changed, it would have been difficult to equip cars with this type of airbag and still meet the federal head protection requirements being phased in beginning with 1999 models. "If NHTSA hadn't changed the requirements, manufacturers would have been forced to replace their advanced side airbag systems with less effective interior padding," says Institute president Brian O'Neill.

The sticking point was a compliance test that involves propelling a dummy headform into the upper interior of a vehicle at 15 mph. This test, developed before introduction of the new airbags, would have hindered their use because the amount of padding needed to pass the headform test could have interfered with airbag deployment.

Now NHTSA will allow cars with airbags that deploy from the roof to meet a side-into-pole crash test at 18 mph. The vehicle will be aligned so the dummy's head, if it isn't protected, would strike the pole. Cars that pass this demanding test then will have to meet the headform test at 12, instead of 15, mph in areas where the airbags are stored.

The Institute has conducted similar pole tests at 20 mph. Two BMW 5-series were tested, one with the airbag to protect the head and one without (see *Status Report*, Dec. 27, 1997; on the web at www.highwaysafety.org). In the test without this system, the dummy's thorax was protected by the door-mounted side airbag, but its head struck the pole with more than enough force to kill a real person in a real crash. The head injury measure was 4720, more than 4 times the value of 1000 that indicates a skull fracture or other serious head injury. The test with the head protection system was a survivable impact with a head injury criterion of 620.



Mercedes and Volvo as well as BMW are equipping some models with head protection systems that inflate from the roof. Saab and Ford have airbags that protect people's heads in side impacts, too, but because these airbags don't deploy from the roof, they're unaffected by the rule change.

The change in the federal standard is important because head injuries are a leading cause of death when vehicles are struck from the side. NHTSA estimates that head airbags can save about 600 lives each year. They also can prevent serious injuries in rollovers because they stay inflated for several seconds, long enough to protect people when a vehicle turns over.

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Advanced airbags are the focus of new NHTSA rulemaking p.1

Patterns of highway fatalities didn't differ much in 1997 from previous years p.4

Gender gap is beginning to narrow as more women die in motor vehicle crashes; meantime, male deaths decline p.5

Side airbags for people's heads are facilitated by new NHTSA rule p.7

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