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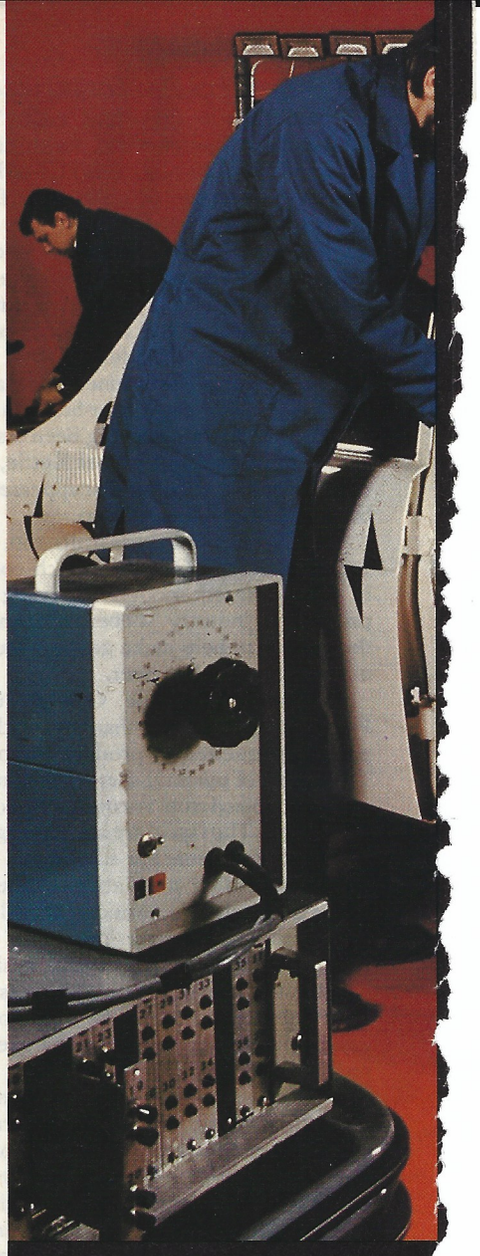
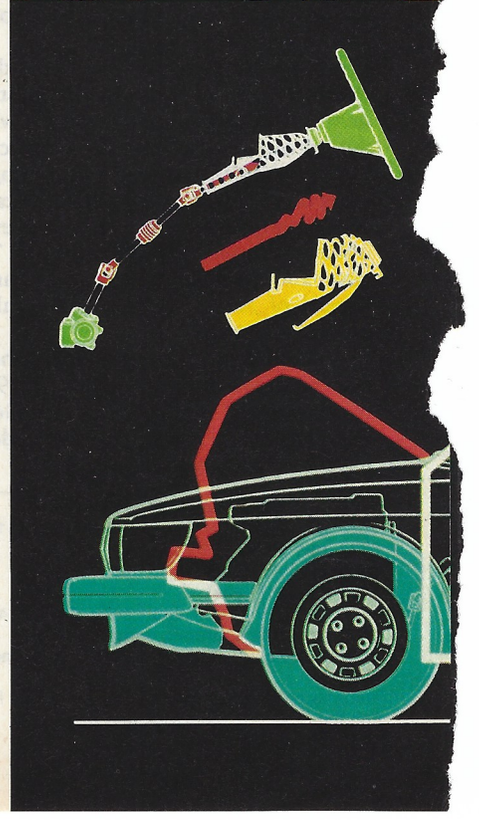
WOULD YOU SURVIVE?

This crash, part of a test mandated for all new cars, shows the severity of a 30-mph impact.





Today's cars are smaller and lighter than 20 years ago —but are they as safe?

BY GARY WITZENBURG

Considering the cars we grew up with, most of us are lucky to be alive.

In the mid-1940s, our parents' generation was reducing its number on America's highways at the rate of 10 fatalities per 100 million miles of travel. Cars and roads were better by the '50s, and the rate was down to 6.4 per 100 million miles. Most of us were youthful drivers when the grim statistic broke the 50,000-a-year mark in the '60s, with hundreds of thousands more crippled, maimed and disfigured.

That's when America began to get serious about highway safety. The National Traffic Safety Bureau (NTSB) was formed within the Federal Highway Administration (a branch of the Department of Transportation) in 1966. Four years later it was renamed the National Highway Traffic Safety Administration (NHTSA). Its mission was to reduce the death and injury toll on our roads.

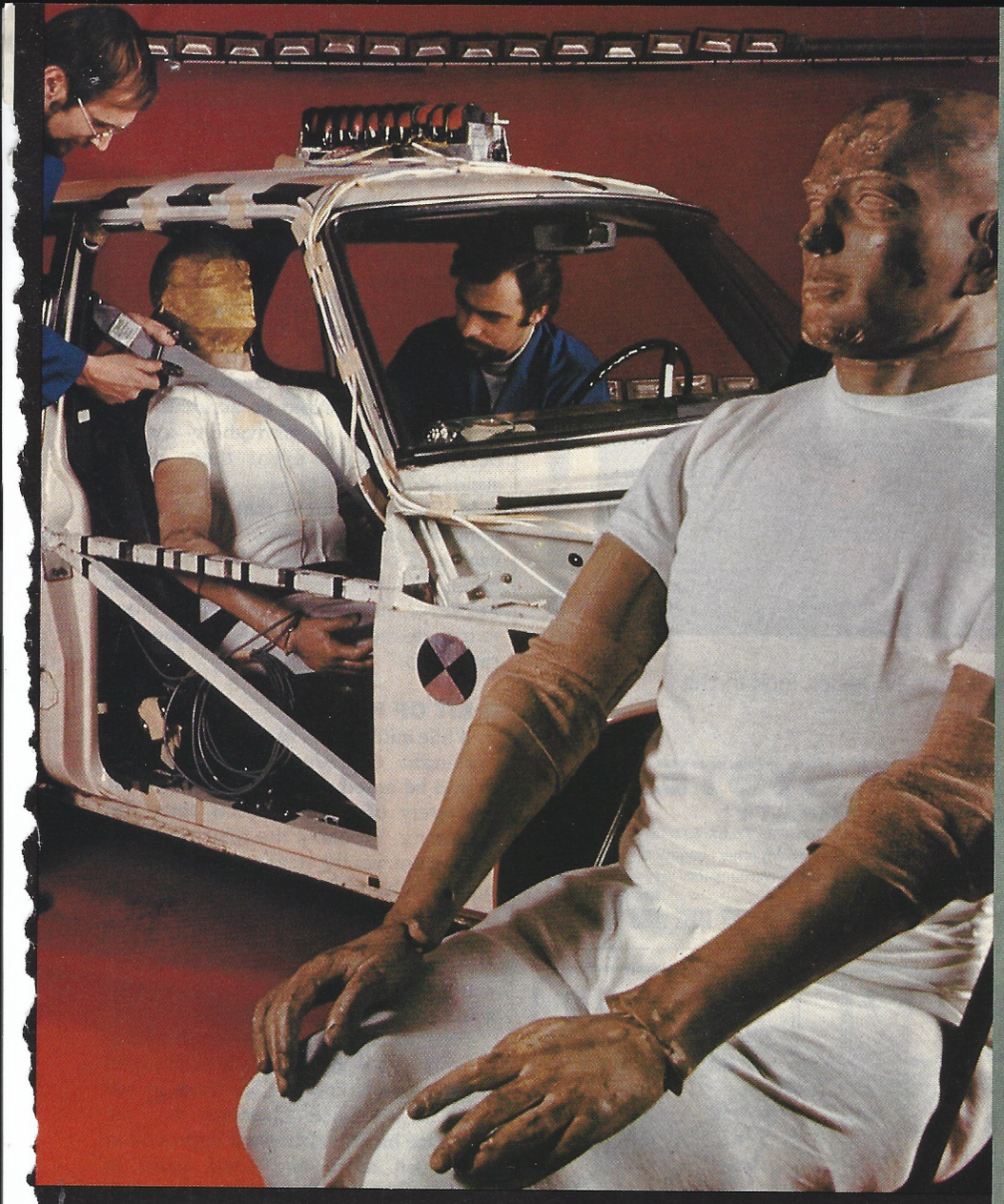
Spurred by consumer activist Ralph Nader, its efforts seemed heavy-handed at first—too many regulations too fast, and too much cost added to cars. But as safer new cars replaced older ones, positive results began to show up.

In 1967, the year before NTSB's first safety standards took effect, the traffic death toll was 53,000. In '68 it was 55,200, and in '69 it peaked at 56,400. But more importantly, the fatality *rate* per 100 million miles had dropped from 5.47 in 1967 to 4.91 in 1970. And by '85, it was 2.68.

Not all the credit is due to auto safety standards, of course, since recent drunk driving laws, tougher enforcement and other factors have contributed their share. Also, nearly half of the lives lost in any given year are those of pedestrians, bicyclists, motorcyclists, truck and bus passengers, even farmers on tractors. But the passenger car fatality rate is also down significantly, to about 1.4 in 1984.

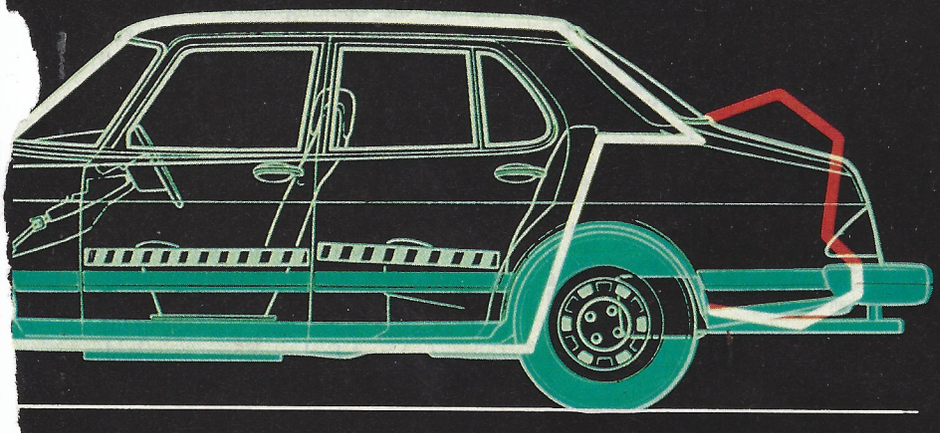
"Our program is 20 years old this year," says NHTSA Deputy Administrator Jeffrey R. Miller, "so it's appropriate

Gary Witzenburg, a free-lance writer well-versed on car safety, has a nationally syndicated newspaper column, many magazine articles and several auto books to his credit.



DESIGNING SAFETY INTO CARS

Modern cars are designed to protect their occupants in the event of an accident. All cars must meet certain requirements. The carmakers use sophisticated anthropomorphic dummies (above) and monitor their humanlike reactions in actual laboratory crashes. Computer-aided design now allows carmakers to solve safety problems before they build any parts. An example is the collapsible steering column (left), which absorbs impact of driver's body, thus reducing injury. And entire car, like this Saab, is designed to absorb crash forces around passenger compartment (below) while it remains intact.



Safety experts agree that the safest restraint for car occupants is a combination of the lap/shoulder belt—now in all cars—and an air bag. As this high-speed photo sequence shows, in the few milliseconds of a frontal collision the properly restrained driver lunges forward in the belt into the air bag and then safely back again.

HMI photos courtesy of the Insurance Institute for Highway Safety

to look back and see just how far we've come. We have better roads today, safer cars and safer drivers.

"Cars today are much safer and offer much more protection in collisions than they did 20 years ago. We don't tell automakers how to design a car, but we do set minimum standards for certain parts of a car: braking systems, windshields, collapsible steering columns and so on. Our research efforts and safety standards address both crash avoidance, or the ability to avoid an accident, and crashworthiness, or survivability for the occupants in the event there is an accident."

It should be noted that these safety standards are for passenger cars. Pickups, vans and other vehicles have to meet other, less stringent, safety standards. However, there is a strong move afoot to include these vehicles in the passenger car group.

A BIT OF HISTORY

While automakers resisted the original onslaught of federal regulations, it should be noted that they had upgraded the safety of their products since the beginning. Probably the first major improvement was the steering wheel, which replaced the awkward tiller around the turn of the century. Subsequent safety improvements ranged from rear-view mirrors to hydraulic brakes, laminated windshield glass, windshield wipers, washers and defrosters, among others.

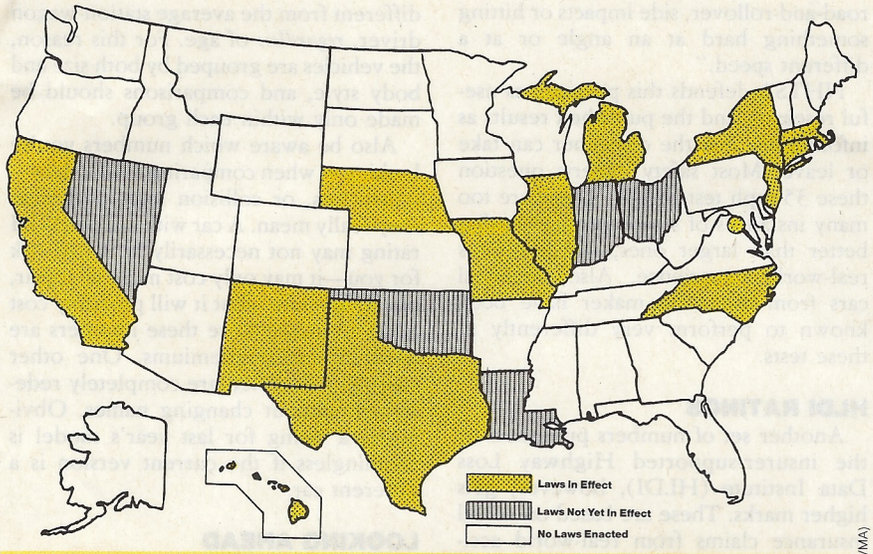
Ford Motor Co. began crash-testing cars in 1954, made some meaningful improvements and in '56 tried to sell safety as a feature. Chevrolet won the sales race handily. But Ford improved its cars even more and tried again in '58 . . . and was beaten even more decisively. Safety in the late '50s was less important than styling and performance—or at least was not perceived as a problem.

But voluntary improvements kept on coming: seat belts, stronger door hinges and latches, high-penetration-resistant (HPR) windshields, dual-circuit brakes. Seat belts were required by law for the '64 model year, and HPR windshields were adopted in '66.

When the opening salvo of Federal Motor Vehicle Safety Standards (FMVSS) hit for the '68 model year, all of these items were included. "In fact," says the Automotive Information Council, "15 of the first 20 federal automotive safety standards were adaptations of industry standards or were based on industry-sponsored research."

The regulatory pace through the '70s was fast, and automakers found themselves straining to keep up, especially as ever-tougher emissions, damageability (bumpers) and fuel economy standards added to their engineering burden. Looking back, however, most agree that

STATUS OF SAFETY BELT USE LEGISLATION FEBRUARY 1986



SAFETY BELT USE LEGISLATION OVERVIEW

LAWS APPROVED

In Effect
California 1/1/86
Connecticut 1/1/86
Dist. of Columbia 12/12/85
Hawaii 12/16/85
Illinois 7/1/85
Massachusetts 1/1/86
Michigan 7/1/85
Missouri 9/28/85
Nebraska 9/6/85
New Jersey 3/1/85
New Mexico 1/1/86
New York 12/1/84
North Carolina 10/1/85
Texas 9/1/85

Not Yet In Effect
Indiana 7/1/87
Louisiana 7/1/86
Nevada—*Effective if Federal government allows 70 mph speed limit.*
Ohio 5/6/87
Oklahoma 2/1/87

PENDING LEGISLATION
Alabama
Alaska
Arizona
Colorado
Delaware
Florida
Georgia
Idaho
Iowa-Passed two houses
Kansas
Kentucky
Maryland-Passed one house
Minnesota-Passed one house
Mississippi
New Hampshire
Pennsylvania-Passed one house
Rhode Island
South Carolina
South Dakota
Tennessee-Passed one house
Utah-Passed one house
Vermont
Virginia
Washington-Passed one house
West Virginia
Wisconsin

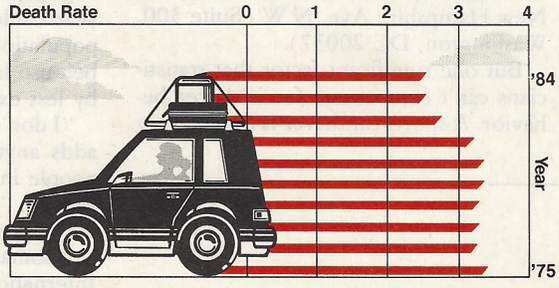
Source: Motor Vehicle Manufacturers Association (MVMA)

Individual states are responsible for their own safety laws. If enough states enact seat belt legislation, carmakers will not have to install passive restraints.

it was worthwhile. "We think the earlier standards, which were just plain common sense, were good ideas and probably worked rather well," says Christopher M. Kennedy, Director of Government Affairs for Chrysler Corp.

"I think we need standards, and most of them are pretty good," adds Roger Maugh, Ford's Auto Safety Director. "There aren't many that you could say are useless or not needed."

DEATH RATE PER 100 MILLION VEHICLE MILES



The downward trend in deaths per miles traveled should continue with more smaller, safer cars.

CRASH TESTING

Witnessing a 30-mph barrier crash (the standard speed for these tests) is a revelation. Most of us don't realize how fast 30 mph really is or how violently the sacrificial car attacks that unforgiving wall. Since the wall is completely unforgiving, the car absorbs all the impact. In a real-world situation this test is equivalent to a 60-mph head-on of two cars.

Inside are one or more "anthropomorphic" dummies, weighted and jointed to simulate the human body, and equipped with sensors that allow the crash's effect to be monitored. Upon impact, the hood buckles upward, the front wheels are displaced rearward into the inner fenders, but the passenger compartment—amazingly—remains intact. Such is the crashworthiness of the modern automobile.

If the dummies are properly restrained, they'll be reused. If not, they fly forward and crash into the dashboard, steering wheel and windshield with a force up to 20 times their weight. Their knees hit the lower instrument panel, their legs buckle beneath it, their chests hit the upper panel and their faces punch large dents into the upper windshield. Unrestrained dummies in the rear simultaneously smash themselves against the front seat backs, often continuing over them and into the backs of their front-seat companions.

Besides these straight barrier tests, there are also angled frontal crashes, rear crashes, car-to-car crashes, rollovers and other variations.

35-MPH TESTS

Every car sold in the U.S. must meet all federal safety standards and pass the 30-mph barrier test.

In 1979, however, NHTSA invented a new test which carmakers are not—as yet—required to pass.

A selection of new cars was purchased and crashed head-on into barriers at 35 mph with restrained dummies in their front seats. Head and chest accelerations and forces on the dummies' legs were measured, "pass/fail" grades were assigned and the results were publicized as consumer information. Write to NHTSA, Dept. of Transportation, 400 7th St. S.W., Washington, DC 20590 (or call 1-800-424-9393 toll-free).

This is not an unreasonable way to grade the manufacturers' products on their crashworthiness, you might think—until you examine the program a little more closely. The additional 5 mph adds a significant 36 percent to the crash forces. Second, the measured numbers that could not be exceeded for a car to pass (a head injury criteria, HIC, of 1,000, for example) were simply the levels beyond which NHTSA estimated that serious injuries were likely to occur.

Makers of cars that showed poor results screamed "foul!" Even some who made products that did well were skeptical. "We're very supportive of crash testing," says Ford's Roger Maugh. "But there's just no relationship at all between those numbers and what's going to happen to real people in real accidents."

"The test they have chosen is probably one of the rarest of all accidents," Chrysler's Kennedy points out. "Much more typical are car-to-car, run-off-the-road-and-rollover, side impacts or hitting something hard at an angle or at a different speed."

NHTSA defends this program as useful research, and the published results as information that the consumer can take or leave. Most safety experts question these 35-mph test results. There are too many instances of small cars performing better than larger ones, which refutes real-world experience. Also, identical cars from the same maker have been known to perform very differently in these tests.

HLDI RATINGS

Another set of numbers published by the insurer-supported Highway Loss Data Institute (HLDI), however, gets higher marks. These are based on actual insurance claims from real-world accidents, taking into account both accident frequency and how much the insurers pay out per incident in order to fix or replace the vehicles and to patch up the victims.

The HLDI figures even try to factor out the driver's age, since younger drivers typically have more and worse accidents than older ones. This data is presented as a percentage above or below the average of all cars, which is assigned the value 100. Thus, a car rated 140 has cost its insurers 40 percent more than average, while one rated 80 has a loss record 20 percent below average. (Write the Highway Loss Data Institute, 600 New Hampshire Ave. N.W., Suite 300, Washington, DC 20037).

But one significant factor that statisticians can't compensate for is driver behavior. A sports-car driver is usually very different from the average station-wagon driver, *regardless* of age. For this reason, the vehicles are grouped by both size and body style, and comparisons should be made only within each group.

Also be aware which numbers you're looking at when comparing HLDI data—injury loss, or collision loss—and what they really mean. A car with a high HLDI rating may not necessarily be a bad risk for you—it may only cost more to repair, not be less safe—but it will probably cost more to insure since these numbers are used in setting premiums. One other caution: Cars often are completely redesigned without changing names. Obviously, a rating for last year's model is meaningless if the current version is a different car.

LOOKING AHEAD

Chrysler's Kennedy says, "I think the public perceives the air bag to be a high-tech, space-age improvement over safety belts. But someone seated behind an air bag without a belt on is less safe than he was wearing his lap and shoulder belt in his previous car."

All the experts agree that the safest possible situation is lap/shoulder belts in combination with an air cushion restraint. Mercedes-Benz now has standard driver-side bags, Ford is offering driver-side bags (for $815) in a small number of compact Tempos this year, and others will soon follow. But the current law that begins phasing in passive restraints next year (unless two-thirds of the country's population is covered by effective state belt-use laws) will be met in most cases by less expensive automatic belts.

"I don't think there's a passive belt that adds anything to the ability to protect people in accidents," says Ford's Roger Maugh. "The benefit the passive belt may have is in raising usage rates."

Thomas J. Carr, director of Safety and International Technical Affairs for the Motor Vehicle Manufacturers Association (MVMA) adds that belt-use laws, and how well they're enforced, are the real keys to highway safety. "You still have to have belts with an air bag," he emphasizes, "and if you're going to have automatic belts, you've got to have something to cause people to leave them in place and use them."

"Our role in the next few years," says NHTSA's Jeffrey Miller, "is to continue looking for improvements in safety standards when they're justified and cost-effective. We don't want to burden the industry with changes that aren't going to make much difference. A good example is the new center high-mounted stoplight: It costs about $4 to $7 per car, but will avert tens of thousands of rear-end accidents every year and save hundreds of millions of dollars in property damage."

Brian O'Neill, president of the Insur-

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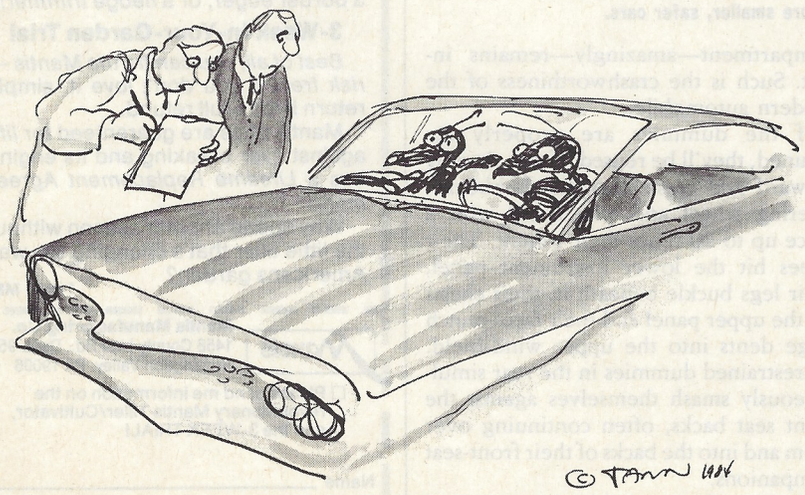

"Of course, we haven't gotten all the bugs out of it yet—!"

ance Institute for Highway Safety, believes there are substantial vehicle improvements yet to come: "In the next few years we will see increasing numbers of cars with antilock braking systems and antilacerative windshields. And in the next two or three years we will see almost every manufacturer that sells cars in the U.S. offering air bags as either standard or optional equipment."

Finally, additional progress will come from upgrading of existing standards as well as new test procedures and equipment.

Increasingly sophisticated computer simulations of what happens to vehicles and components in crashes are allowing much earlier application of safety improvements—well before prototype parts are actually built. GM, which developed the Hybrid II crash dummy currently used in government-mandated tests, is trying to convince NHTSA to adopt its much more sophisticated and humanlike Hybrid III dummy.

WHAT IT MEANS

If driving safety is high on your priority list, as well it should be, consider: There's no question that *if* you're going to have an accident, larger, heavier vehicles are statistically safer *to crash in* than smaller, lighter ones.

All new cars, of course, meet the same standards, and even the smallest ones sold in the U.S. can be classified as "safe" in the terms of their minimum ability to protect belted occupants. But larger cars, in general, have more structure to absorb impact energy on all sides. They are also more aggressive (more dangerous to everyone else on the road) and have much more kinetic energy to be absorbed in a crash at any given speed.

On the other hand, smaller cars take up less space on the road and are better able to avoid an accident, *provided* that the driver has the necessary skills to use their higher maneuverability. And since federal fuel economy laws have put all new cars on strict diets in recent years, the small-car/large-car mix will become less of a safety problem as the entire U.S. fleet of automobiles becomes smaller as well as lighter.

Second, newer cars are safer than older ones. But keep in mind that a vehicle's introduction year is probably even more important than its chronological age. In other words, a car that is all new or completely redesigned for 1986 is almost certain to offer better protection than the 1986 version of one designed several years ago.

Finally, remember that no auto safety feature ever invented has more life- and injury-saving potential than the safety belts built into all cars for more than 20 years. But *no* car is safe unless *everyone* in it is securely buckled up, even for short, local trips. **HM**