

STATUS REPORT

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

Vol. 47, No. 1, Jan. 24, 2012

ANTILOCK
BRAKES

2015

FRONTAL AIRBAGS

2016

ELECTRONIC
STABILITY
CONTROL

2029

SIDE AIRBAGS

2028

FORWARD COLLISION
WARNING

2049

ESTIMATED TIME OF ARRIVAL

Vehicles that warn drivers of hazards, put the brakes on for them, and keep themselves in their lanes already are on the road. Cars that can talk to each other are just over the horizon. Is the crash-free future here?

Not quite. It's true that safety features being introduced now could potentially eliminate millions of crashes. But even if these features were capable of preventing all crashes — and right now they're not — they won't be available in the vehicles most people drive for many years to come.

A new report from the Highway Loss Data Institute (HLDI) shows that it typically takes 3 decades for a promising safety feature first introduced in a few luxury cars to spread through the fleet. More precisely, it will take at least that long before 95 percent of vehicles on the road could have a given

feature either because it came as standard equipment or was offered as an option. For instance, it won't be until 2016 that 95 percent of all registered vehicles could have frontal airbags, the authors predict, even though manufacturers began adding frontal airbags in meaningful numbers during the mid-1980s. Forward collision warning, which was rolled out in the United States in 2000, could take

even longer. If it continues to follow its current trajectory, the crash avoidance technology won't be available in 95 percent of registered vehicles until 2049, HLDI predicts.

"Technology is changing fast, but it takes time for it to reach the majority of vehicles," says Matthew Moore, an author of the report and vice president of HLDI, an Institute affiliate. "New features that prove beneficial

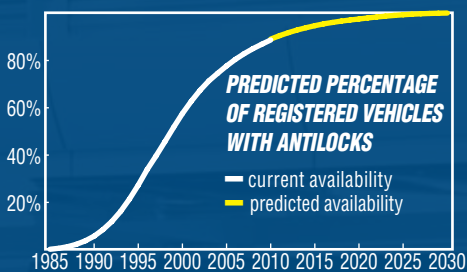
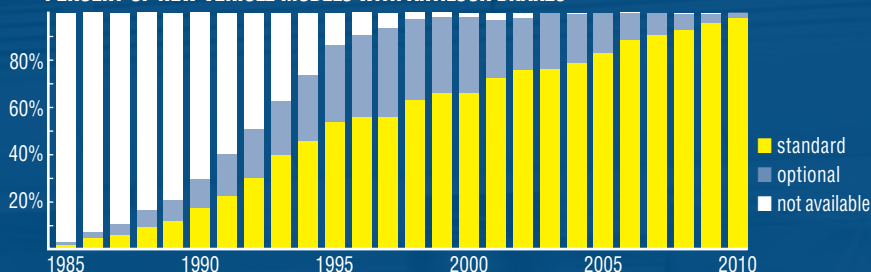
aren't instantly available in all new models. And once they are, not everyone rushes out to replace their old vehicle right away."

Crash avoidance systems introduced in the past few years in luxury vehicles could cut crashes substantially. The Institute has estimated that if all vehicles were equipped with forward collision warning, lane departure warning, side view assist, and adaptive

ANTILOCK BRAKES

Antilock brakes in their modern form were first introduced in 1985 models. Studies haven't shown large safety benefits for the feature on passenger vehicles, and NHTSA never required it. Nevertheless, antilocks spread quickly throughout the fleet. By 1990, they were standard on 17 percent of models and optional on an additional 12 percent. For the 2010 model year, they were standard on 99 percent and optional on 1 percent. HLDI predicts antilocks will be available for 95 percent of registered vehicles by 2015.

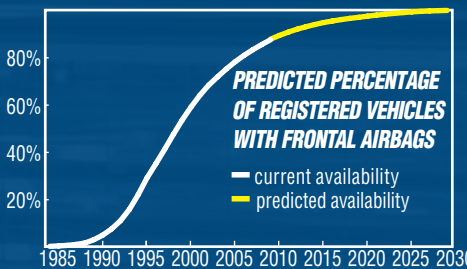
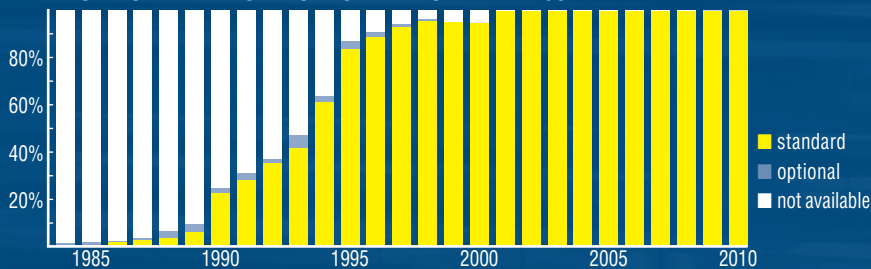
PERCENT OF NEW VEHICLE MODELS WITH ANTILOCK BRAKES



FRONTAL AIRBAGS

Frontal airbags came to the U.S. market in the 1984 model year, following a brief period in the 1970s when a limited number of airbag-equipped cars were produced. The government began requiring their installation in some vehicles in 1996, and they have been required in all new passenger vehicles except the very heaviest since 1999. Still, it won't be until 2016 that frontal airbags for drivers will be available for 95 percent of vehicles on the road.

PERCENT OF NEW VEHICLE MODELS WITH FRONTAL AIRBAGS



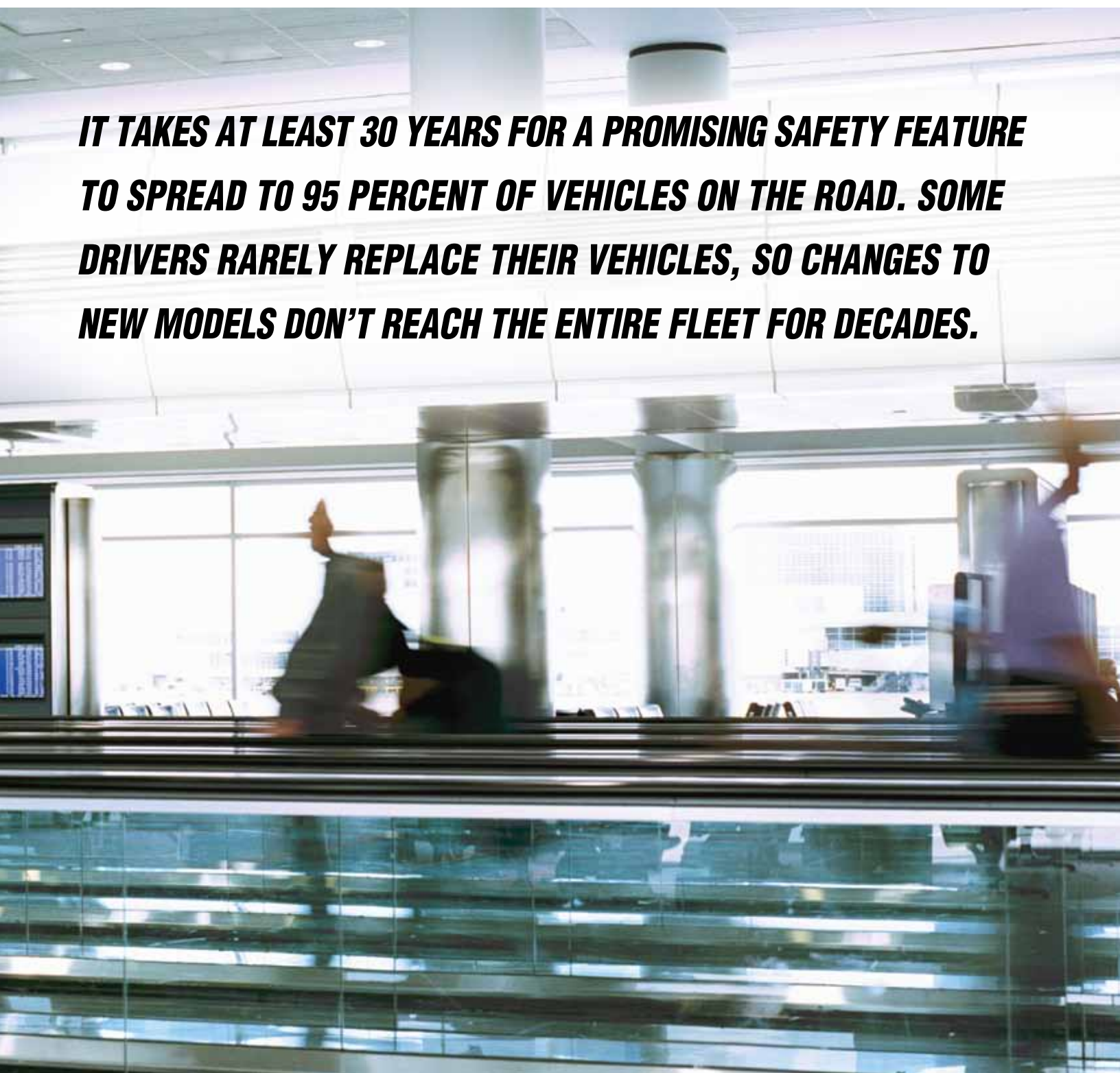
headlights, 1.9 million crashes — including 1 in 3 fatal crashes — could potentially be prevented or mitigated if the systems worked perfectly (see *Status Report*, May 20, 2010; on the web at iihs.org). In the first real-world study of one such feature, HLDI found that claims under property damage liability coverage were filed about a quarter less often for Volvo XC60s equipped with City Safety, a

low-speed forward collision avoidance system, than for similar SUVs without it (see *Status Report*, July 19, 2011).

Future technology could include other potential game-changers. A consortium of automakers is developing vehicle-to-vehicle and vehicle-to-infrastructure communications platforms that could take crash avoidance even further. Some manufacturers predict

these systems could appear in vehicles as early as 2015. Meanwhile, Google has a fleet of cars modified to operate without a driver and has been granted a patent for the technology.

To help understand how quickly new technology might spread, HLDI looked at five existing features: antilock brakes, electronic stability control (ESC), driver frontal airbags, side airbags, and forward (*continues on p. 5*)

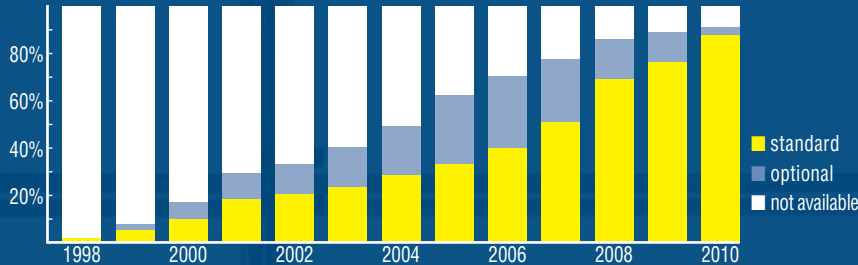


IT TAKES AT LEAST 30 YEARS FOR A PROMISING SAFETY FEATURE TO SPREAD TO 95 PERCENT OF VEHICLES ON THE ROAD. SOME DRIVERS RARELY REPLACE THEIR VEHICLES, SO CHANGES TO NEW MODELS DON'T REACH THE ENTIRE FLEET FOR DECADES.

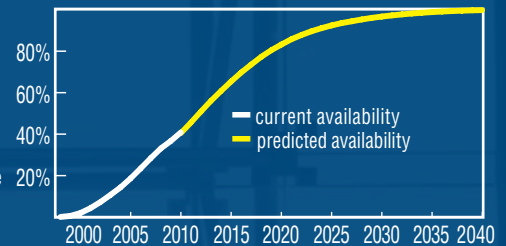
HEAD-PROTECTING SIDE AIRBAGS

Head-protecting side airbags were first introduced in model year 1998. By 2005, they were standard for drivers on 33 percent of models and optional on 29 percent. The Institute's side-impact tests, a voluntary agreement among manufacturers to improve vehicle compatibility in crashes, and, more recently, a strengthened federal side crash protection standard have led to near universal availability of the feature in new models. They are expected to be available for 95 percent of vehicles on the road in 2028.

PERCENT OF NEW VEHICLE MODELS WITH HEAD-PROTECTING SIDE AIRBAGS



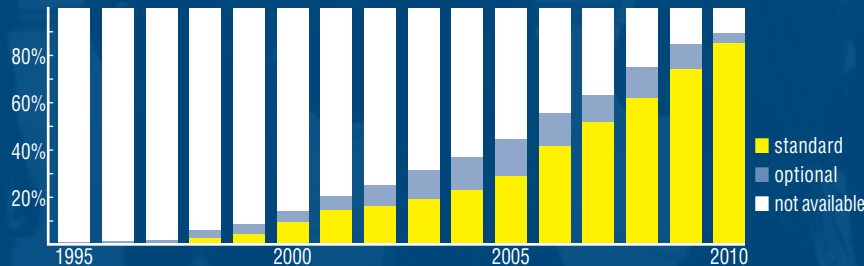
PREDICTED PERCENTAGE OF REGISTERED VEHICLES WITH HEAD-PROTECTING SIDE AIRBAGS



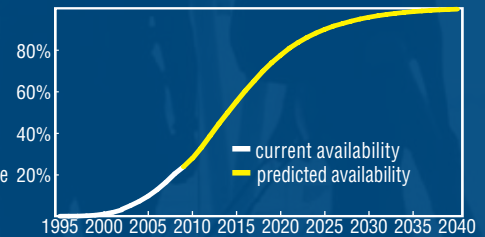
ELECTRONIC STABILITY CONTROL

ESC was introduced in 1995 models and was standard on 10 percent of 2000 models and optional on 4 percent. The technology dramatically cuts crashes, particularly rollovers. As a result, NHTSA required that ESC be standard on all passenger vehicles as of model year 2012. HLDI predicts that 95 percent of registered vehicles in 2029 will have either come with ESC standard or had it available as an option.

PERCENT OF NEW VEHICLE MODELS WITH ELECTRONIC STABILITY CONTROL



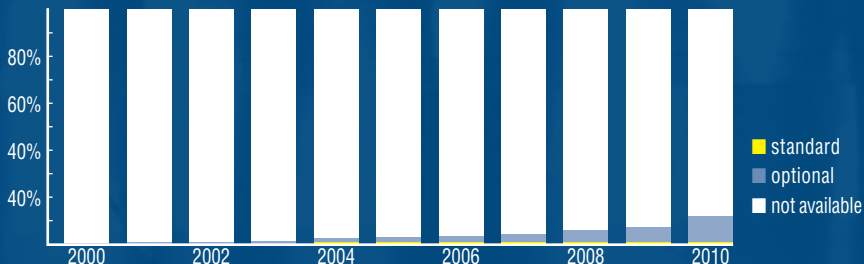
PREDICTED PERCENTAGE OF REGISTERED VEHICLES WITH ELECTRONIC STABILITY CONTROL



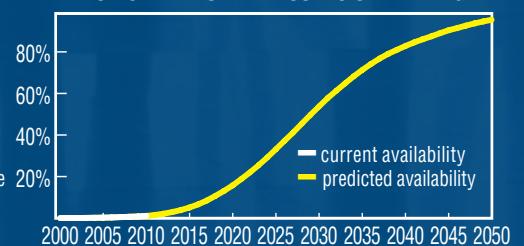
FORWARD COLLISION WARNING

Forward collision warning is available primarily on luxury vehicles, although recently it also has been offered by Ford, Chrysler, and other non-luxury brands. It first appeared on a U.S. car in model year 2000 and was standard on just 1 percent of 2005 models and optional on 2 percent. In 2010, it was standard on 1 percent and optional on 11 percent of models. If it continues to follow this pattern, it will be available on 95 percent of registered vehicles in 2049. However, if further research confirms the benefits of the technology, it could be expected to move faster.

PERCENT OF NEW VEHICLE MODELS WITH FORWARD COLLISION WARNING



PREDICTED PERCENTAGE OF REGISTERED VEHICLES WITH FORWARD COLLISION WARNING



(continued from p. 3) collision warning. All of them come with different expectations of potential safety benefits. Some are required by the National Highway Traffic Safety Administration, and some aren't.

Researchers used HLDI data on the availability of features in each model and registration data from R.L. Polk & Co. If a feature was either standard or optional, it was considered available. Future availability was predicted by extrapolating the historical trends in the registration data. The researchers assumed that the number of new vehicles added each year and the attrition rate of older vehicles would stay the same.

Although the report projects availability in 100 percent of the fleet, safety features never become universal in the real world. Collectors own and drive classic vehicles, and some people keep very old cars for sentimental reasons. Leaving aside such holdouts, it would take a minimum of 24 years for the fleet to completely turn over under current conditions of approximately 240 million registered passenger vehicles and about 10 million new vehicles registered a year. In reality, it takes longer because not every new vehicle replaces one of the oldest.

Despite very different histories, all the features in the report take about the same time from the moment they're first introduced to the point when they're available in 95 percent of registered vehicles. Other than forward collision warning, which is still in its early stages, the most gradual spread is for ESC (34 years). The fastest moving features are head-protecting side airbags and anti-lock brakes (31 years). These estimates only reflect the maximum percentage of vehicles that could have a feature. The actual percentage that have it would be lower, since for some vehicles the technology would have been offered only as an option.

The path each feature takes on the way to 95 percent varies somewhat. Head-protecting side airbags, for example, shot up quickly in the beginning. It took 10 years for them to be available in 25 percent of the registered fleet, and it's expected to take 15 years to reach 50 percent. In contrast, ESC reached the one-quarter mark after 16 years and is expected to be in half the fleet after 20 years.

It takes a decade or more for a feature to go from 95 percent availability in the fleet to just shy of 100 percent, thanks to the small percentage of drivers who rarely replace their vehicles.

Federal mandates, safety ratings that reward certain features, and other factors can speed up the rate at which technology ends up in new models and therefore in registered vehicles. For example, if all new vehicles were equipped with forward collision warning starting in 2013, it would take until 2034 instead of 2049 for 95 percent of vehicles to have been sold with that feature available.

Interestingly, antilock brakes have spread quickly even though they were never required. Despite promising results on the test track, real-world crash data haven't shown large benefits from the technology.

"Antilocks quickly went mainstream when General Motors made them standard on some big-selling models," Moore says. "They got another boost from ESC because an antilock braking system is a prerequisite for stability control. Now that the government requires ESC on new vehicles, antilocks have essentially become mandatory, too."



NEW BUMPER TESTS SHOW EASY FIX FOR MISMATCH PROBLEM

The problem of mismatched bumpers on cars and SUVs could be solved with some simple modifications, saving consumers thousands of dollars on repairs after low-speed collisions, Institute tests show.

In 2010, a series of low-speed tests involving SUVs and cars highlighted the expensive damage that results when bumpers don't line up (see *Status Report*, Dec. 2, 2010; on the web at iihs.org). Seven pairs of cars and SUVs from the same manufacturers were crashed into each other. Damage to both vehicles in each of the 10 mph collisions ranged from about \$3,000 to nearly \$10,000.

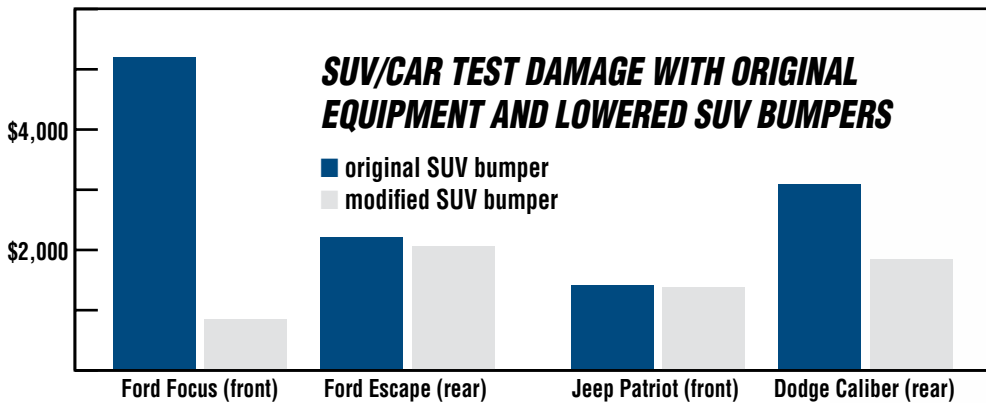
Now the Institute has teamed up with Tech-Cor, Allstate's auto-repair research center, to show how lowering SUV bumpers a few inches can reduce crash damage. Engineers picked 2 of the previously tested SUVs and modified their bumpers. The crashes were then repeated, resulting in big reduc-

tion in repair costs for both cars. In the case of a Ford Focus that was crashed into the back of a Ford Escape, the damage plummeted 84 percent to less than \$1,000 after the Escape's rear bumper was lowered.

Improving the placement of the Escape's rear bumper was straightforward. Tech-Cor engineers added bumper brackets from another SUV to the existing rear frame, then attached the bumper bar, bringing it down 3 1/2 inches from its original location. When the vehicles were crashed again, the only damage to the Focus was to the bumper cover and grille — an \$853 repair job. The damage to the Escape fell slightly as well, to \$2,070.

The result is high repair costs for even minor crashes. When bumpers work as intended, they absorb most of the energy in a low-speed crash. When they don't line up, the vehicle body bears the brunt of the crash energy. Damage to headlights, grilles, radiators, and other parts adds up to big bills.

In the 2010 tests, the crash of the Focus into the Escape resulted in one of the highest damage totals. The lower edge of the Escape's rear bumper is 23 inches off the ground — the highest of all the SUVs tested — and the Focus' front bumper missed it by more than an inch. The result was that the Focus went under the Escape and ended up needing a new hood, headlights, air-conditioning condenser, and other parts for a total of \$5,203. The Escape wasn't unscathed, either, with \$2,208 worth of damage.



tions in repair costs for both cars. In the case of a Ford Focus that was crashed into the back of a Ford Escape, the damage plummeted 84 percent to less than \$1,000 after the Escape's rear bumper was lowered.

Bumpers generally consist of a reinforcement bar under a plastic cover. When it comes to limiting crash damage, it's what's hidden under the plastic that counts, and sometimes there isn't much. A federal stan-

Improving the placement of the Escape's rear bumper was straightforward. Tech-Cor engineers added bumper brackets from another SUV to the existing rear frame, then attached the bumper bar, bringing it down 3 1/2 inches from its original location. When the vehicles were crashed again, the only damage to the Focus was to the bumper cover and grille — an \$853 repair job. The damage to the Escape fell slightly as well, to \$2,070.



FINAL HOURS-OF-SERVICE RULE LEAVES 11-HOUR SHIFT INTACT

Truck drivers can continue to spend as many as 11 hours a day on the road under a final hours-of-service rule the Federal Motor Carrier Safety Administration (FMCSA) issued in December. The agency had proposed shortening the daily allowable driving time but said “compelling scientific evidence” is needed to support the move.

Other tenets of the rule are in line with the agency’s 2010 notice of proposed rulemaking (see *Status Report*, April 26, 2011; on the web at ihs.org). Commercial carriers must comply by July 2013.

Hours-of-service regulations are intended to help alleviate fatigue by regulating drive and rest times. The new rule limits use of the so-called restart provision that permits truckers to begin a new workweek after 34 hours off duty. Restarts will be restricted to 1 every 7 days, or 168 hours, compared with the 2 restarts now allowed. Drivers who use them will have to get at least 2 nights’ rest from 1 to 5 a.m.

While the rule reduces the hours truckers can work in a week, it still allows them to spend more time on the road in a day than they could before FMCSA changed hours-of-service rules in 2003 (see *Status Report*, June 16, 2003). Previously truckers had been held to 10 hours of driving a day.

FMCSA said it determined that the economic benefits of the current 11-hour maximum trump the safety gains associated with limiting truckers to 10 hours on the road.

“There is solid scientific evidence to support restoring the 10-hour daily driving limit,” said Anne McCartt, the Institute’s senior vice president for research. “Numerous studies show that crash risk increases long before 11 hours of driving. We hope the agency will reconsider its decision.”

A federal appeals court has twice overturned prior hours-of-service rules in response to lawsuits filed by Advocates for Highway and Auto Safety, Public Citizen, the International Brotherhood of Teamsters, and others. The latest rule grew out of the agency’s 2009 settlement with these groups (see *Status Report*, June 19, 2010).

“By keeping the unsafe portion of the rule that permits truckers to drive for 11 consecutive hours, department officials have broken their promise to make safety their No. 1 priority,” said Henry Jasny, vice president and general counsel of Advocates for Highway and Auto Safety. The group “is confident that the court will reach the same result when this new rule comes before it for judgment.”

The American Trucking Associations, which lobbied to retain current regulations, opposes the new provision requiring drivers to rest during overnight hours as part of a 34-hour restart.

“This rule will put more truck traffic onto roadways during morning rush hour, frustrate other motorists, and increase the risk of crashes,” said Bill Graves, the group’s president and chief executive.

FMCSA said the overnight periods are in keeping with circadian sleep patterns and will help drivers get better quality rest.



The other SUV selected for modification was the Jeep Patriot, which had inflicted \$3,095 worth of damage on the Dodge Caliber when it crashed into the Caliber’s rear. Since the 2 vehicles share a platform, engineers were able to simply bolt the front bumper of a Caliber onto the Patriot. This lowered the SUV’s bumper nearly 3 inches. The Patriot’s new front bumper and the Caliber’s rear bumper overlapped more than 3 ½ inches, compared with less than an inch of overlap for the original equipment.

Damage to the Caliber fell 40 percent to \$1,847, and the change shaved \$34 off the Patriot’s \$1,415 repair bill.

For both SUVs, the lower bumpers fit under the original covers, so the modified vehicles didn’t look any different. Nor was there any change in approach or departure angles that could affect a vehicle’s usefulness off-road and at loading ramps.

“This experiment shows just how easy it would be to design SUVs with effective bumpers,” says Joe Nolan, the Institute’s chief administrative officer. “By making simple tweaks, manufacturers could help consumers save on repairs and insurance premiums without compromising on styling or function.”

STATUS REPORT

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

1005 N. Glebe Rd., Arlington, VA 22201
Phone 703/247-1500 Fax 247-1588
Internet: www.iihs.org
Vol. 47, No. 1, Jan. 24, 2012

New safety features take 3 decades on average to spread through the vehicle fleet, a HLDI report says1

Bumper demonstration test shows easy way to solve mismatch problem when SUVs and cars collide6

Final hours-of-service rule still allows truck drivers to spend up to 11 hours a day at the wheel7

Copy may be republished with attribution.
Images require permission to use.

The Insurance Institute for Highway Safety is a nonprofit scientific and educational organization dedicated to reducing deaths, injuries, and property damage from crashes on the nation's highways. The Institute is wholly supported by auto insurers:

AAA Northern California, Nevada, and Utah
ACE Private Risk Services
Affirmative Insurance
Agency Insurance Company of Maryland
Alfa Alliance Insurance Corporation
Alfa Insurance
Allstate Insurance Group
American Family Mutual Insurance
American National Property and Casualty Company
Ameriprise Auto & Home
Amica Mutual Insurance Company
ARI Insurance Companies
Auto Club Enterprises
Auto Club Group
Bankers Insurance Group
Bituminous Insurance Companies
California Casualty Group
Capital Insurance Group
Chubb & Son
Colorado Farm Bureau Mutual Insurance Company
Concord Group Insurance Companies
Cotton States Insurance
COUNTRY Financial
Direct General Corporation
Discovery Insurance Company
Erie Insurance Group
Esurance
Farm Bureau Financial Services
Farm Bureau Insurance of Michigan
Farm Bureau Mutual Insurance Company of Idaho
Farmers Insurance Group of Companies

Farmers Mutual Hail Insurance Company of Iowa
Farmers Mutual of Nebraska
Fireman's Fund Insurance Company
First Acceptance Corporation
Florida Farm Bureau Insurance Companies
Frankenmuth Insurance
Gainsco Insurance
GEICO Group
Georgia Farm Bureau Mutual Insurance Company
GMAC Personal Lines Insurance
Grange Insurance
Hallmark Insurance Company
Hanover Insurance Group
The Hartford
Haulers Insurance Company, Inc.
Homeowners of America Insurance Company
Horace Mann Insurance Companies
ICW Group
Imperial Fire & Casualty Insurance Company
Infinity Property & Casualty
Kemper Preferred
Kentucky Farm Bureau Insurance
Liberty Mutual Insurance Company
Louisiana Farm Bureau Mutual Insurance Company
Maryland Automobile Insurance Fund
Mercury Insurance Group
MetLife Auto & Home
MiddleOak
Mississippi Farm Bureau Casualty Insurance Company
MMG Insurance
Mutual of Enumclaw Insurance Company
Nationwide
New Jersey Manufacturers Insurance Group
NLC Insurance Companies, Inc.
Nodak Mutual Insurance Company
Norfolk & Dedham Group
North Carolina Farm Bureau Mutual Insurance Company

Northern Neck Insurance Company
Old American County Mutual Fire Insurance
Oregon Mutual Insurance
Pekin Insurance
PEMCO Insurance
Plymouth Rock Assurance
Progressive Corporation
The Responsive Auto Insurance Company
Rockingham Group
Safeco Insurance
Samsung Fire & Marine Insurance Company
SECURA Insurance
Sentry Insurance
Shelter Insurance
Sompo Japan Insurance Company of America
South Carolina Farm Bureau Mutual Insurance Company
Southern Farm Bureau Casualty Insurance Company
State Auto Insurance Companies
State Farm
Tennessee Farmers Mutual Insurance Company
Texas Farm Bureau Insurance Companies
Tower Group Companies
The Travelers Companies
United Educators
USAA
Viceroy Insurance Company
Virginia Farm Bureau Mutual Insurance
West Bend Mutual Insurance Company
Young America Insurance Company
Zurich North America

FUNDING ASSOCIATIONS

American Insurance Association
National Association of Mutual Insurance Companies
Property Casualty Insurers Association of America