

# KEEPING THE SAFETY IN SAFETEA: LIFE-SAVING VEHICLE SAFETY PROVISIONS ARE LONG-OVERDUE AND FEASIBLE

## TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	i
 <b>CHAPTER ONE: VEHICLE SAFETY STANDARDS SAVE MONEY AND LIVES</b>	 1:1
<b>Fact #1:</b> Title 4 of SAFETEA is Data-Driven.....	1:2
<b>Fact #2:</b> NHTSA’s Priorities Are Title 4’s .....	1:3
<b>Fact #3:</b> Major Title 4 Measures Are Thirty Years Overdue .....	1:5
<b>Case Study:</b> Rollover.....	1:5
<b>Case Study:</b> Vehicle Compatibility .....	1:6
<b>Fact #4:</b> Title 4 Closes Safety “Design Gap” with Feasible Solutions .....	1:7
<b>Case Study:</b> The Miracle of ESC .....	1:7
<b>Case Study:</b> The Feasibility of a Superior Dynamic Roof Crush Test .....	1:8
<b>Fact #5:</b> Title 4 Will Save Jobs and Money.....	1:9
<b>Fact #6:</b> Title 4 Defers to NHTSA’s Judgment on the Substance of Safety Rules.....	1:10
<b>Fact #7:</b> Reliance on Voluntary Safety Standards Provides No Assurance of Safety and Is Anti-Democratic.....	1:11
<i>Endnotes: Chapter One</i> .....	1:13
 <b>CHAPTER TWO: THE CHRONOLOGIES</b> .....	 2:1
The Sad History of Rollover Prevention.....	2:1
1971 Roof Strength Standard.....	2:7
Government Stalls on Reducing Ejections.....	2:11
Aggressivity and Vehicle Compatibility.....	2:14
Side Impact Protection .....	2:18
15 Passenger Van Safety Hazards .....	2:24
Power Operated Windows and Power Switches.....	2:28
Tire Safety Standards.....	2:28
Seat Belt Reminder Technology .....	2:32
<i>Endnotes: Chapter Two</i> .....	2:34
 <b>CHAPTER THREE: SAFETY EQUIPMENT AND SUPPLIERS</b> .....	 3:1
Automotive Safety Technologies Available from Automotive Suppliers .....	3:1
2004 Model Year Safety Equipment .....	3:4



# KEEPING THE SAFETY IN SAFETEA: LIFE-SAVING VEHICLE SAFETY PROVISIONS ARE LONG-OVERDUE AND FEASIBLE

## *Introduction*

The bipartisan McCain-Hollings-DeWine-Snowe vehicle safety provisions in S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA), would prevent thousands of needless deaths on American roads each year.

Vehicle crashes are the leading cause of death for Americans from ages 2 to 33, causing nearly 42,000 deaths and 3 million injuries each year. The numbers of Americans killed on the road remains at an unconscionably high level. The National Highway Traffic Safety Administration (NHTSA) estimates the direct cost in worker productivity and other economic losses from vehicle crashes is \$230 billion each year (in 2000 dollars), or \$820 for every man, woman and child in the U.S.

The problem is only getting worse. In 2002, highway deaths reached their highest level since 1990, and an astounding 82 percent of the increase in deaths between 2001 and 2002 occurred in rollover crashes. SUVs, pickups and vans now make up 49 percent of new passenger sales and 36 percent of registered motor vehicles – a 70 percent increase between 1990 and 2000. Although NHTSA and the auto industry have known about the dangers of vehicle rollover and aggressivity for several decades, safety rules continue to lag behind these market trends.

Federal regulators acknowledge that the number of lives lost is far too high. Dr. Jeffrey Runge, Administrator of NHTSA, predicted last year in *Newsday* that the total dead could reach **50,000 annually** in 2008. “*This is a Vietnam War every year,*” he said. “*That’s just not tolerable.*”

In 2000, Congress quickly passed the Transportation, Recall Enhancement, Accountability and Documentation (TREAD) Act in the wake of the Ford/Firestone tragedy – but as members stated on the floor, the bill was a first step, but major vehicle safety issues would have to be revisited. That bill, and NHTSA’s subsequent tire recall, did not address increasing vehicle-related hazards from the growing popularity of SUVs, with any new safety standards for these vehicles.

**Since the TREAD Act was passed in 2000, 30,755 people have died in rollover crashes – or a capacity crowd at Fenway Park. This death toll is more than 150 times the number (200) killed in the Ford/Firestone tragedy.**

Yet rollovers are among the most survivable kinds of crashes, because the change in velocity means that impacts typically are in the range of 12 to 20 mph. The lack of good safety design and occupant protection turns these crashes into killers.

Left unattended, as they have been for more than two decades, rollover crashes and crashes involving vehicle mismatch will claim more lives each year. But SUVs need not be so dangerous for occupants and others— technologies available in numerous vehicles currently on the market support a panoply of obvious fixes to build a better, safer vehicle for American families.

**Title 4 of SAFETEA includes the following “top ten” motor vehicle safety measures:**

- 1) Making Rollover-Prone Vehicles More Stable;**
- 2) Preventing Serious, Life-Threatening Injuries with Better Protection During a Rollover Crash;**
- 3) Improving Government Frontal Crash Tests to Prevent Intrusions and Injuries in the Passenger Compartment;**
- 4) Surviving Lethal Side Impact Crashes;**
- 5) Addressing the Rising Death and Injury Toll that Occurs When Mismatched Vehicles Collide;**
- 6) Reducing the Dangers of Transporting Children and Others in Unsafe 15-Passenger Vans;**
- 7) Stopping Unnecessary Child Deaths and Injuries in and Around Vehicles;**
- 8) Fixing a Flat – Completing the Unfinished Tire Safety Improvements Required in the TREAD Act;**
- 9) Buckling-Up with Safer, More Effective Restraint Systems;**
- 10) Providing Consumers with Better Safety Information on the Car at the Point-of-Sale.**

*All 10 address the right priorities:  
The bill would save thousands of lives cost-effectively  
with safety design improvements and technologies available today.*

The bipartisan safety provisions in S.1072, sponsored by Senators John McCain (R-Ariz.) and Ernest Hollings (D-S.C.), and including significant contributions from Senators Olympia Snowe (R.-Maine) and Mike DeWine (R.-OH), would complete the unfinished business of TREAD.

Hundreds of SUV owners who signed up for our campaign at [www.betterSUV.org](http://www.betterSUV.org) believe that American automakers *can* build a safer vehicle. So do crash survivors, who have testified to the tragedies in their lives – dealing with the wrenching deaths of family members and ongoing pain from serious injuries.

As Senator McCain said on the floor of the Senate on Oct. 11, 2000, during the vote on the TREAD Act:

*I say to my colleagues again that this issue isn't over. Tragically, I am in fear that there will be more deaths and injuries on America's highways before we finally make it much safer for Americans to be on America's highways.*

Millions of dangerous vehicles still remain on the highway, and people are dying in them. These losses are readily preventable with improved safety design. It is time to make a better vehicle for all Americans.

***SUV Owners Speak Out for Better Safety***

**Lynn Fuller, a California mother of 4 and driver of a 1997 Chevrolet Suburban:**

We need an extra-large vehicle for our children and special needs equipment, as well as dogs. We have been frustrated for years by the lack of fuel-efficient, safe vehicle choices that meet our needs. The refusal of the Detroit automakers to budge on fuel efficiency is inexcusable and the SUV safety problems are appalling....I think the SUV safety and fuel economy problems that have been allowed to mushroom over the last decade are a public policy disaster that shows the worst side of the automakers and an apathetic federal regulatory system.

---

## Chapter One:

# VEHICLE SAFETY STANDARDS SAVE MONEY AND LIVES

**Q: Who could be against improved motor vehicle safety?**  
**A: Well...**

It is hard to be against improving safety. So opponents argue that improving safety *is* a good idea – just not right now – just not in this way – just not as a *requirement* that benefits everybody:

- Last year, the Alliance of Automobile Manufacturers told Automotive News that “the low-hanging fruit [in auto safety] was harvested in the early years.”
- The Bush Administration, in Secretary Mineta’s Statement of Administrative Policy on the highway funding bill, S. 1072, challenged the need for new vehicle safety mandates on cost-benefit grounds and as an interference in agency priorities.
- In a February 26, 2004, article in *USA Today*, “Will more safety rules save many more lives?” National Highway Traffic Safety Administration (NHTSA) officials and the Alliance echoed these arguments.

We answer this on the merits, below, with **Seven Facts on SAFETEA**. The most important response? No one has suggested that McCain-Hollings-Snowe-DeWine would not prevent the needless and continuing loss of human life. In fact, thousands of innocent lives would be saved, and tens of thousands of injuries prevented annually, by measures in the bill:

- **A new roof crush resistance standard:** 1,400 deaths and 2,300 severe injuries, including paraplegia and quadriplegia, would be prevented each year by a more stringent standard.<sup>1</sup>
- **Improved head protection and side air bags:** 1,200 lives saved and 975 serious head injuries prevented, by a new requirement each year.<sup>2</sup>
- **Side window glazing (“safety glass”):** A requirement would save 1,305 lives and prevent 575 major injuries each year.<sup>3</sup>
- **Upgrade to door locks and latches standard:** An upgrade would help to prevent hundreds of the 2,500 door-related ejection deaths each year.<sup>4</sup>
- **Rollover prevention standard that evaluates the use of electronic stability control (ESC):** Studies estimate ESC reduces deaths and injuries by as much as *one-third* by preventing crashes from occurring, and could save as many as 2,100 lives a year in rollover crashes alone.<sup>5</sup>
- **Compatibility rules for light trucks:** NHTSA estimates 1,000 lives/year could be saved.<sup>6</sup>
- **Stronger seatback design:** 400 lives saved and 1,000 serious injuries prevented, each year.<sup>7</sup>
- **Effective seat belt reminders in all seats:** 900 lives each year would be saved by such a requirement.<sup>8</sup>
- **Applying new vehicles safety standards to vehicles up to 10,000 lbs.:** Would save hundreds of lives— some safety standards, such as the one for roof crush resistance, currently apply only to vehicles below 6,000 lbs., omitting the heaviest and most dangerous SUVs and trucks.

## FACT #1: TITLE 4 OF SAFETEA IS DATA-DRIVEN

Motor vehicle fatalities remain at an historic high and are the leading cause of death for Americans ages 2 to 34 – every 10 seconds an American is injured in a crash and someone is killed every 12 minutes.<sup>9</sup> The death toll on the road is equivalent to two fully loaded 747s (with 400 passengers) going down each week.

The problem is only getting worse. In 2002, highway deaths reached 42,815, the highest level since 1990. An astounding 82 percent of the increase in deaths between 2001 and 2002 occurred in rollover crashes. Rollover-prone SUVs and pickups, combined with vans, now are 49 percent of new passenger sales and 36 percent of registered motor vehicles – a 70 percent increase between 1990 and 2000.<sup>10</sup>

A recent federal study found that fatalities in rollover crashes in light trucks threaten to overwhelm *all other reductions in fatalities on the highway*, an astonishing fact when we consider that rates overall are improving: air bags are now a requirement for new vehicles and seat belt use keeps going up. NHTSA explained that “the increase in light truck occupant fatalities accounts for the continued high level of overall occupant fatalities, *having offset the decline in traffic deaths of passenger car occupants.*”<sup>11</sup>

**Each part of Title 4 – rollover prevention and survivability safeguards, ejection prevention measures, and vehicle compatibility measures, child safety, and 15-passenger vans – targets areas where cost-effective, feasible remedies are currently available to save lives.**

Moreover, in many areas the hazards are inter-related— for example, rollover crashes involve interactions among vehicle factors such as rollover stability, ejection, side impact air bags, safety belt pretensioners, and door locks and latches. For that reason, NHTSA should be asked to examine problems as a whole, and to address, at the same time, all of the design and technology issues which can improve the survivability of rollover crashes. A comprehensive approach is also more cost-effective for manufacturers, as any re-design can be phased in at the same time over the life of the model cycles.

In short, Title 4’s comprehensive approach will produce the most cost-effective and scientifically sound new safety standards.

### **Congressional Mandates Are Appropriate**

The Administration’s plan for reviewing safety standards outside of its “priority areas” is for a cyclical, 7-year review. While a more regular review of standards is a good idea (some have been on the books for more than thirty years!), such an approach is hardly “data-driven.”

The number of lives that would be saved by Title 4 dwarfs the still-tragic number of people killed in the Ford-Firestone tragedy, yet NHTSA’s Administrator, Dr. Jeffrey Runge, suggested at a Mar. 18, 2004, hearing in the House of Representatives that asking NHTSA to act in a timely way in these areas is unreasonable. In response to questions, Dr. Runge also said that, in contrast, “[l]egislative mandates are important when we have a crisis situation like in the TREAD [Act].”

**Fact: Between 2000, when the TREAD Act was passed, and 2002, 150 times that many people were killed in the U.S. in rollovers alone.**

**This situation is a crisis.**

**FACT #2: NHTSA'S PRIORITIES ARE TITLE 4'S**

*None of the major SAFETEA provisions establishes new priorities for NHTSA – and many are identical to NHTSA's stated goals. The bill merely gives many of NHTSA's already-planned actions a timely certainty. The Administration's per se objection to a requirement in these areas is both misguided and misplaced.*

<i><b>SAFETEA Provision</b></i>	<i><b>NHTSA's Plans: On the Record</b></i>
<b>Rollover prevention:</b> A rollover prevention standard to improve vehicles' resistance to rollover and a study of electronic stability control.	Rollover, including prevention, is one of the agency's four major priority areas. NHTSA has plans to research ESC in 2004-05 and will also evaluate a vehicle handling test for the New Car Assessment Program (NCAP).
<b>Rollover survival:</b> An upgraded roof crush standard; improved seat structure and safety belt design (including belt pretensioners), side impact head protection airbags, and side head protection airbags and upgraded door locks.	NHTSA plans to upgrade the roof crush standard soon. NHTSA is currently researching belt pretensioners and side-window ejection mitigation and is plans to upgrade the door lock standard. NHTSA also plans to upgrade the side impact test to require head-protection side-impact airbags.
<b>Front Impact:</b> Upgrade the frontal impact test procedure, consider new barriers and head impact and neck injuries, as well as offset barrier testing.	NHTSA's on-record priorities include an upgrade of crash-test dummies now used in frontal crashes and evaluation of a frontal offset barrier test during 2004.
<b>Side Impact:</b> Upgrade the side impact standard by considering new barriers and measures of occupant head impact and neck injuries and upgrade to dummy tests.	NHTSA's priorities include an upgrade of the side-impact standard to address light trucks and upgrade of injury criteria and data from second-generation side impact dummies.
<b>Aggressivity/Compatibility:</b> Standard to reduce vehicle incompatibility; a standard rating metric to evaluate compatibility and aggressivity and a consumer information program to communicate this information.	NHTSA published a "Priority Plan" on vehicle compatibility, another of the agency's four major priority areas, and plans to evaluate the feasibility of a compatibility requirement by 2004 and to develop an aggressivity metric thereafter.
<b>15 Passenger Vans:</b> Include 15-passenger vans in relevant safety programs, require 15-passenger vans to comply with relevant safety standards, and evaluate technologies to assist drivers in controlling the vans.	NHTSA will continue public education on the hazards of 15-passenger vans, require lap and shoulder belts in the vans, and include them in the upgraded roof crush rule. NHTSA also plans to evaluate ESC for 15-passenger vans.
<b>Tire Safety:</b> Upgrade tire safety to improve strength, road hazard, bead unseating and aging performance criteria – all as asked for once in TREAD, and discarded by the agency.	NHTSA plans to research tire strength and aging (2003-2004).

<p>Child Safety – Booster Seats, Backover Avoidance, Power Windows, Test Dummies and Rollover: Establish a state incentive for booster seat laws. Increase the use of child dummies, develop a new child dummy for rollover testing, develop a consumer information program relating to child safety in rollover crashes, and report on the performance of safety belts for children in rollovers. Report on technologies used to prevent injuries and deaths caused by automatic windows and a standard to ensure safer switches, and study methods to reduce injury and death outside parked vehicles.</p>	<p>NHTSA is developing a 10-year-old child crash dummy and looking into developing a three-year-old child dummy. NHTSA is also establishing performance requirements for booster seats and planning to compile death certificates to look at off-road vehicular deaths, including driveway incidents.</p>
<p><b>Safety Belt Reminder Systems:</b> NHTSA to address alternate means to encourage increased belt use including consideration of audible or visual reminders.</p>	<p>NHTSA plans a study of the effectiveness of belt minders and evaluation of possible rulemaking (2003-2005).</p>

**In fact, there are no surprises in the bill. All the areas highlighted are areas of clear existing need that have been discussed for decades, as NHTSA’s plans show.**

Yet action is uncertain without deadlines. **As the chart at the end of Chapter One shows,** there is a long history of unfortunate slippage between plans and promises – and *NHTSA’s record on all of these issues is one of unreasonable delay and many broken promises to act.* **A mandate will assure that NHTSA’s activities achieve the greatest possible savings in lives.**

Some critics of the bill have suggested that safety belt use should be the only focus of efforts to save lives. Critical provisions relate to safety belt and child restraints in the bill, such as; 1) changes regarding safety belt reminder systems; a report on technologies to improve the performance of safety belts for children between the ages of 4 and 8; and establishment of a grant state incentive program for states that enact laws mandating booster seats for children who are too big for child safety seats.

And while increasing safety belt use is a critical goal, the statistics do little to explain the high death rates in SUVs. In fact, SUV occupants are just as likely as car occupants to wear safety belts:

- NHTSA statistics show that 78 percent of SUV and van occupants, and 77 percent of passenger car occupants, wear their belts.<sup>12</sup>
- In fatal rollovers, the most deadly of crashes, SUV and passenger car belt-use rates are virtually identical, *yet these crashes are 61 percent of SUV occupant deaths but comprise only 24 percent of car occupant deaths.*<sup>13</sup>

**In the face of preventable suffering,  
there is no good reason for delay.**

**FACT #3: MAJOR TITLE 4 MEASURES ARE  
THIRTY YEARS OVERDUE**

*As demonstrated by the 10 chronologies in Chapter Two, NHTSA and the auto industry have known about the risks areas addressed by Title 4 for more than thirty years.*

**CASE STUDY: ROLLOVER**

Despite years of improving belt use, rollover fatalities are at their highest level in a decade, mostly due to the rising rates of rollover deaths.

- Vehicle rollovers cause more than 10,000 fatalities each year—a full *third* of vehicle occupant deaths.<sup>14 15</sup>
- The 2002 highway death toll was the highest in over a decade — and rollover crashes accounted for over 80 percent of these increased deaths.<sup>16</sup>
- SUV and pickup rollovers account for nearly half of the increase in annual occupant fatalities.<sup>17</sup>
- Sixty-one percent of sport utility vehicle occupant fatalities occur in rollover crashes,<sup>18</sup> and SUVs roll over in fatal crashes at 3 times the rate of cars.<sup>19</sup>
- Shockingly, more than 20 percent of people killed in rollover crashes *were restrained* by safety belts at the time of the crash.<sup>20</sup>

*Rollover: Stymied Efforts Since 1973*

In April 1973, NHTSA first proposed a rulemaking for a rollover resistance standard, which was never finished.

Thirteen years later, in September of 1986, Congressman Tim Wirth called on NHTSA to pass a life-saving rollover standard. His petition to the agency was denied. In 1988, Consumers Union and the Center for Auto Safety again asked NHTSA to act, as rollovers killed 9,500 people each year.

In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act, which required NHTSA to address means of protecting motorists from “unreasonable risk of rollovers” in passenger vehicles.<sup>21</sup>

But in 1994, the agency terminated its work on a rollover propensity minimum standard, promising that a series of new standards for rollover crashworthiness and a consumer information program were forthcoming.<sup>22</sup>

**The rules promised in 1994 included: advanced window glazing to prevent ejections, and stronger roofs; in addition, NHTSA stated publicly that it would also require improvements in door latches and hinges and upper side-impact protection.**

**None of the promised regulations on rollover crashworthiness has since been issued, but all are contained in Title 4.**

\*\*\*\*

*The More Things Change...*

**The New York Times reported  
in September 2000 that:**

***[R]egulators have been studying rollovers for 27 years, but industry lobbyists have appealed to members of Congress from auto-producing states to block periodic efforts to adopt rules that would address the problem.***

---

## CASE STUDY: VEHICLE COMPATIBILITY

The design of light trucks — and large SUVs and pickup trucks in particular — with a high center of gravity, high bumpers, and steel bars and frame-on-rail construction, makes these vehicles act like battering rams in a crash.

The problem is a serious one:

- When an SUV strikes the side of a passenger car, the car driver is *22 times* more likely to die than is the driver of the SUV. When the striking vehicle is a pickup, the car driver is *39 times* more likely to be killed.
- NHTSA's Administrator estimated as long ago as 1997 that the aggressive design of light trucks kills 2,000 additional people needlessly each year.<sup>23</sup>
- Another analysis found that 1,434 passenger car drivers who were killed in collisions with light trucks would have lived if they had been hit instead by a *passenger car of the same weight as the light truck*.<sup>24</sup>

Yet, auto manufacturers continue to build ever-more heavy and aggressive SUVs and to market them as such. The chief designer of the 2006 Toyota Tundra recently bragged that his threatening design for the huge pickup truck is intended to highlight “the power of the fist.”<sup>25</sup>

Despite shocking highway statistics and mounting research, in its June report NHTSA focused on only the struck vehicle — *bulking up protection in cars, but ignoring the equally important challenge of changes to reduce the aggressiveness of pickups and SUVs*. While improving occupant protection is critically important, the total crash dynamic can and must be considered.

## *Resisting Real Action: Promises, Promises by Manufacturers, Ratified by NHTSA*

In December 2003, auto manufacturers announced a voluntary initiative to address incompatibility and aggressivity. The plan, currently to be phased-in on *most* vehicles by September 2009, would add side-impact air bags and lower the bumpers of SUVs or add a barrier to prevent them from riding over cars.

Yet the Alliance makes no specific commitments to redesign vehicles to be less aggressive. *Moreover, there is no requirement that all vehicles become compliant with the plan, and no outside body will verify vehicle compliance*. Voluntary “commitments” violate core principles of democratic accountability and transparency by involving closed, secret deliberations, no procedural or judicial oversight, no mechanisms for accountability, and no baseline for safety.

Even this new set of promises is only the latest in a series on compatibility issues. In 1998, the auto industry promised NHTSA Administrator Dr. Ricardo Martinez that it would make modifications to achieve safer designs, mainly by adjusting vehicle suspension. The industry refused to provide any details of their plans *and there is little evidence that any substantial design changes were made*. Consequently, the latest set of industry promises also raises questions, as vehicles continued to be designed to be large and aggressive, and the highway carnage continues.

As NHTSA states in the conclusion to its report making vehicle compatibility one of its four major priority areas, “[v]ehicle compatibility has been a concern for NHTSA since the 1970s.”

**The time for action is now.**

**FACT #4: TITLE 4 CLOSES SAFETY “DESIGN GAP”  
WITH FEASIBLE AND AVAILABLE SOLUTIONS**

*In spite of the absence of federal standards to improve occupant protection, there is a wide array of cost-effective safety technologies already available from automotive suppliers that could reduce deaths and injuries in crashes.*

**Chapter Three** of this report contains supporting detail on the range of safety equipment available for 2004 model year vehicles, including: side impact airbags, laminated side-window safety glass, rearview cameras, backover prevention technologies, and rollover safety belt pretensioners.

Forty-seven percent of 2004 model-year vehicles offered head-protection side air bags, but only 27 percent offered the protection as standard equipment.<sup>26</sup> In the 2003 model year, 40 percent of vehicle models offered head-protection side air bags, but only 24 percent offered it standard.<sup>27</sup>

Of model year 2003 cars tested by NHTSA in the New Car Assessment Program (NCAP), electronic stability control (ESC) was standard on 22 percent of cars and optional on 17 percent. At least six model year 2004 cars offer a rearview camera as an option, and at least one 2004 model offers as standard a rollover safety belt pretensioner in all seating positions.

**Safety technologies that are already widely available to luxury car buyers should not be limited to those consumers who can pay a premium — and requirements that enable technologies to become standard will lower prices for all consumers. A decent baseline for safety should not be available only to the rich.**

**CASE STUDY: THE MIRACLE OF ESC**

Electronic stability control (ESC) is an active safety system that helps drivers to maintain control of the vehicle and stay on the road. The system’s sensors compare the vehicle’s behavior in relation to the steering wheel position. When ESC detects a discrepancy, it intervenes to bring the vehicle’s direction back into line by transmitting the right commands to the antilock braking system and sometimes reducing the engine torque.

The core benefit of ESC is increased driver control, which translates into crash prevention. Studies conducted by DEKRA Automotive Research, DaimlerChrysler, Toyota, the University of Iowa and others indicate that ESC could positively influence *as much as 25 to 43 percent of fatal rollover crashes in the U.S.*, not to mention lives saved other crash types.

For example, one study showed a 27-percent reduction in fatalities in single-vehicle rollover crashes when vehicles had ESC, meaning that **installing ESC in all vehicles could save more than 2,100 lives in the U.S. annually in rollovers alone, not including fatalities that could be prevented in other types of crashes.**

Even with all this evidence, Title 4 allows NHTSA to draw its own conclusions on ESC, asking that NHTSA **issue** a rollover resistance standard, but merely **consider** additional technologies to improve vehicle handling, **including electronic stability control systems.**

## CASE STUDY: THE FEASIBILITY OF A SUPERIOR DYNAMIC ROOF CRUSH TEST



The image above depicts the fixture used to conduct roof crush dynamic testing in a testing laboratory in Salinas, California. The road surface moves along the track, contacting the roof of the vehicle as it rotates on the spit. The test surface impacts both *sides of the roof on a single run*, imitating the first roll of a vehicle in a rollover crash. The picture shows a 1994 Chevrolet Suburban (*vehicle in white*).

The current federal test is a static test using a platen, or plate, on the roof, and measures the impact of force *on only one side of the roof* with the steady exertion of pressure.

A dynamic test is far superior because:

- 1) It measures the survivability of the rollover crash — the human impact;
- 2) It includes the lateral, or sliding, velocity of the road as it moves beneath the vehicle;
- 3) It tests *both sides* of the roof – the current test only tests one side, with the windshield intact. Yet research shows that passengers sitting in the seat below the second, or trailing edge, of the roll, are the ones severely injured or killed. At the second impact, the roof, already weakened, crushes downwards toward the occupants' heads.
- 4) It shows the harm after the windshield shatters in the first impact. Although a windshield breaks on the first impact with the roof, it typically provides up to one-third of the roof's strength in the static test.

- 5) The test shows the real dynamic of crush as a function of roof geometry (roundness, curvature, etc.). Because the static test is not designed to include roof geometry, it omits a major factor for survivability.

**While a static test measures the strength of the roof, a dynamic test measures injury to people.**

Dynamic drop tests for roof strength are repeatable. As a 2002 engineering paper states:

*The automotive industry and researchers have used drop testing for years to evaluate roof strength. In the late 1960s, SAE developed a standardized procedure to perform full vehicle inverted drop testing. Many domestic and import auto manufacturers have utilized the inverted drop test technique as far back as the 1960s and 1970s to evaluate roof strength.<sup>28</sup>*

### **Dynamic Tests Are Repeatable**

The auto industry first protested the “repeatability” of dynamic tests in the late 1960’s in opposition to NHTSA’s then-new frontal crash barrier tests – now a standard compliance test. Industry lodged similar objections over the crash test parameters for NHTSA’s New Car Assessment Program, now an accepted measurement.

*In each case, the industry claimed that a repeatable dynamic test could not be formulated — and yet one was developed and used.*

## FACT #5: TITLE 4 WILL SAVE JOBS AND MONEY

*“Overall, the U.S. automotive supplier industry employs approximately two million workers with operations and facilities in nearly all 50 states. Sales in the U.S. automotive supplier industry totaled approximately \$370 billion in 2002.”*

*-- Testimony of Jason Bonin, V. P. of Lighting Technology, Hella North America, before House Subcommittee on Commerce, Trade, and Consumer Protection.<sup>29</sup>*

### *Job Creation Benefits*

An analysis of SAFETEA by the Enhanced Protective Glass Automotive Association (EPGAA) concluded that between 10,000 and 12,000 jobs would be created by the bill at both major manufacturers and safety suppliers.

Enhanced safety will also help to assure the longer-range competitiveness of the automotive industry. Recent books, such as *The End of Detroit*, by Michelin Maynard, point out that unless the domestic auto industry acts quickly to improve safety and quality, they will keep losing market share to foreign manufacturers.

### *American Consumers Value Vehicle Safety*

- According to a JD Power and Associates 2002 study, nine of the top 10 features consumers most desired for their next new vehicle improve vehicle or occupant safety.<sup>30</sup>
- A study by Maritz Research found that more than two-thirds of consumers say they would definitely or probably buy high-tech safety equipment on their next vehicle.<sup>31</sup>
- “We’ve learned that safety sells. It sells today. It clearly will sell tomorrow,” National Transportation Safety Board vice chairman Mark Rosenkar told automakers in January 2004.<sup>32</sup>

**It is nearly always far cheaper to prevent harm in the first place. For families of crash victims, the most difficult fact is often how little it would have cost to build safety protections into the vehicle.**

### *A Comprehensive Approach Lowers Costs for Consumers and Society*

Highway crashes cost the U.S. economy, in direct costs only, \$230.6 billion a year (in 2000 dollars), or \$820 for every man, woman and child in the U.S. The average direct economic cost to society of each death is over \$977,000 and is \$1.1 million for each critically injured member of society.<sup>33</sup> The figures do not include the costs to families, the untold suffering, or stress of family dissolution following the death of a child.

**Society pays nearly three-quarters of all crash costs, primarily through insurance premiums, taxes and travel delay. In 2000, these costs totaled over \$170 billion.**

### *Improved Safety Costs Pennies Per Vehicle*

Some safety improvements, such as enhancing roof strength, cost very little, because they require mere improvements in design, rather than any new technologies. Others cost mere pennies. In contrast, automaker profit on SUVs is very high, as much as \$8,000 for each Ford Explorer.

### **\$ Dollars and Sense -- Wholesale Safety Costs per Vehicle**

- ¢ *Belt pretensioners: \$2.00*
- ¢ *Laminated safety glass: \$1.40/ window*
- ¢ *Cables to enhance door latch protection: \$1.70*
- ¢ *Automatic door locking via software to reduce ejection: free (programming change only)*
- ¢ *Roof strength reinforcements: \$8 to \$27*

**FACT #6: TITLE 4 DEFERS TO NHTSA'S  
JUDGMENT ON THE SUBSTANCE OF SAFETY RULES**

*The clear language of SAFETEA invests NHTSA with substantial discretion over the content of tests to meet safety goals and recognizes the agency's expertise.*

While Title 4 does specify *goals*, such as improving the safety of occupants in rollovers, **nothing in Title 4 predetermines an outcome or baseline for the new studies, test or safeguards.** The heart and soul of each new standard is entrusted to NHTSA. For example:

**On ejection:** “The Secretary of Transportation shall prescribe a safety standard ... to reduce complete and partial occupant ejection from motor vehicles. . . In formulating the safety standard, the Secretary shall consider the ejection-mitigation capabilities of safety technologies, such as advanced side glazing, side curtains, and side impact air bags.”

**On compatibility:** “The Secretary of Transportation shall issue motor vehicle safety standards to reduce vehicle incompatibility and aggressivity. . . In formulating the standards, the Secretary shall consider factors such as bumper height, weight, and any other design characteristics necessary to ensure better management of crash forces ... in order to reduce occupant deaths and injuries.”

**On rollover:** “The Secretary of Transportation shall prescribe a motor vehicle safety standard ... for rollover crashworthiness. . . In formulating the safety standard, the Secretary shall consider... a roof strength standard based on dynamic tests . . . and shall consider safety technologies and design improvements such as (A) improved seat structure and safety belt design, including seat belt pretensioners; (B) side impact head protection airbags; and (C) roof injury protection measures.”

**The clear language of the provisions enacts performance standards, and not technology requirements.**

Title 4 does not dictate effectiveness dates for any rule, *allowing NHTSA to write phase-in schedules that allow manufacturers considerable lead time to integrate changes into their platform re-design plans.* Wherever safety technologies are mentioned in the bill, Title 4 asks only that NHTSA consider or evaluate them. Whether to require the use of any technology is, in each instance, left to the agency's judgment and discretion.

Many vehicle safety issues, in the real world, are interrelated. For example, occupant protection in a rollover crash is related to: rollover propensity; ejection; side-impact airbags; window glazing; belt performance; and door latch and lock performance. *For this reason, Title 4 contemplates a holistic approach to vehicle safety, to encourage the agency to resist tradeoffs that compromise occupant problems, and to reduce the risk of unintended consequences.* The agency is also invited to apply current and available science on crash protection.

**In short, a clear Congressional mandate on the inter-related priorities in Title 4 will avoid a piecemeal, scatter-shot approach by NHTSA, and allow vehicle manufacturers to most cost-effectively design safer vehicles.** Agency discretion is actually enhanced by legislation which enables NHTSA to target safeguards that have long been the focus of concerted opposition from the auto industry.

Lastly, setting priorities for executive agencies is a core democratic responsibility of elected officials in Congress. Congress has fulfilled its duty in many recent laws, including ISTEA, and TEA-21. The history of ISTEA is instructive: **when Congress failed to direct NHTSA to issue a final rule, the result was either no rule or a very weak one, diminishing the impact of the law.**

**FACT #7: RELIANCE ON VOLUNTARY SAFETY STANDARDS  
PROVIDES NO ASSURANCE OF SAFETY AND IS ANTI-DEMOCRATIC**

*Give us a “Commitment” Instead of a Rule*

In December 2003, automakers announced a voluntary initiative to address incompatibility and aggressivity. The plan, currently to be phased-in on *most* vehicles by September 2009, would gradually increase the numbers of side impact air bags in vehicle and lower the bumpers of SUVs or add a barrier to prevent them from riding over cars.

Yet the Alliance made no specific or time-bound commitments to redesign these stiff vehicles to protect consumers, despite the fact that light trucks act as battering rams in crashes, and that the height and stiffness of SUVs makes them devastating on the highway.

*Moreover, there is no requirement that all vehicles become compliant with the plan, and no outside body will verify vehicle compliance.* While the commitment may increase occupant protection, it does little to address the violence that will be inflicted by the striking vehicle in crashes, ignoring the need to reduce stiffness and address ever-larger vehicle weights.

A voluntary “commitment” is a particularly inapt solution where, as here, thousands of lives are at stake. In fact, Congress rejected them almost three decades ago when it passed the National Traffic and Motor Vehicle Safety Act in 1966.

As the Senate Committee Report stated:

*The promotion of motor vehicle safety through voluntary standards has largely failed. The unconditional imposition of mandatory standards at the earliest practicable date is the only course commensurate with the highway death and injury toll.<sup>34</sup>*

The 1966 Congressional legislators were right. The historical path of automakers’ voluntary efforts is paved with broken promises.

From General Motors’ promises in 1970 to voluntarily put air bags in all its vehicles by the mid-1970s (GM installed just 10,000 in model year 1974 and 1975 vehicles, and then discontinued the program), to Ford, DaimlerChrysler and GM’s recent recanting of their widely publicized 2001 promises to voluntarily improve the fuel economy of their light trucks by 25 percent (withdrawn after the threat of Congressional action on fuel economy receded), “voluntary” is often just another name for tactical maneuvering and delay.

Moreover, government reliance on voluntary “commitments” violates core principles of democratic accountability and transparency, because such voluntary agreements:

- **Contain no mechanisms for accountability:** If the program proves dangerously deficient, there is no recourse for injured consumers, nor for the government to initiate a defect investigation or compel the industry to perform a recall;
- **Involve closed, secret processes and meetings:** The public, which is at risk, is shut out of development of the proposal, which is in secret by industry working groups not subject to oversight, compliance with statutory requirements, a responsibility to explaining their decisions, or judicial review of decisions;
- **Lack transparency:** The public has no means to secure an independent evaluation of the quality of the industry’s voluntary tests or standards. The public gets no verification that a particular vehicle complies with the voluntary tests, unlike a government standards;

- **Lack a baseline for safety:** High-income purchasers, who can afford safety extras may be protected, but low-income purchasers remain vulnerable to cost-related decisions by manufacturers;
- **Produce weak and non-binding results:** Proposals are invariably weak because they represent the lowest common denominator among companies looking out for their own costs and product plans, and there is no obligation to be or remain in compliance, so companies may change their minds at will and withdraw any protection offered;
- **Are replete with exemptions and limited remedies:** Voluntary “commitments” usually have exemption clauses permitting manufacturers to opt out of “compliance” because of marketing considerations, costs, or for other reasons. Voluntary “fixes” also do not help many drivers. For example, the Ford Explorer 2-door “Sport” was never re-designed to lower its rollover propensity, although it is more popular and more rollover-prone than the 4-door model which was subject to a well-publicized re-design.

- **Undermine the efforts of regulatory agencies:** Voluntary efforts often sideline agency involvement and research into safety policy by allowing willing agencies to defer or avoid regulation in a timely and vigorous manner.

###

While automakers have spoken ominously about delay in their voluntary “commitments” if standards are enacted, **withdrawing safety protections from consumers, once they have been made available, would be both unwise and uncompetitive, in view of the strong consumer demand for safety technologies.**

In addition, Title 4 asks NHTSA to handle related vehicle safety issues as a package, and outlines a vigorous rulemaking schedule, to ensure that there will be little delay in achieving these crucial steps forward in safety.

### SUV Owners Speak Out

#### **Casey Ryan of Widlomar, CA father of 3 and driver of a 2003 Land Rover Discover:**

If Americans can put a man on the moon during in the 60's and develop abstract topics like artificial intelligence, computer science, bioinformatics and genomics, then Americans can do anything they put their minds to. We need to be putting those minds to work for something that affects Americans on a daily basis; more relevant and practical for those who pay taxes and work hard like myself: Build a better SUV. We are the customers. They are the servers. Let's see some real customer service.

## **Endnotes: Chapter One**

<sup>1</sup> Plungis, Jeff. "Lax auto safety rules cost thousands of lives." *Detroit News* 3 March 2002.

<sup>2</sup> "NHTSA's New Head Protection Rule Puts New Technology on Fast Track." Press Release. Washington: NHTSA, 30 July 1998.

<sup>3</sup> Willke, Donald; Stephen Summers; Jing Wang; John Lee; Susan Partyka; Stephen Duffy. *Ejection Mitigation Using Advanced Glazing: Status Report II*. Washington: NHTSA and Transportation Research Center, August 1999.

<sup>4</sup> Plungis, Jeff. "Lax auto safety rules cost thousands of lives." *Detroit News* 3 March 2002.

<sup>5</sup> Schöpf, Hans-Joachim. (2002). *Analysis of Crash Statistics Mercedes Passenger Cars Are Involved In Fewer Accidents*. Germany: DaimlerChrysler AG. 11.

<sup>6</sup> Joks, Hans. *Fatality Risks in Collisions Between Cars and Light Trucks*. Final Report. Ann Arbor: Transportation Research Institute, Sept 1998.

<sup>7</sup> Plungis, Jeff. "Lax auto safety rules cost thousands of lives." *Detroit News* 3 March 2002.

<sup>8</sup> *The UCS Guardian & Guardian XSE: A Blue Print For A Better SUV*. Washington: Union of Concerned Scientists, 2003. [www.suvsolutions.org/blueprint.asp](http://www.suvsolutions.org/blueprint.asp).

<sup>9</sup> See United States General Accounting Office, "Research Continues on a Variety of Factors That Contribute to Motor Vehicle Crashes," GAO-03-436 (Mar. 2003).

<sup>10</sup> U.S. Environmental Protection Agency, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003," EPA420-R03-006, April 2003.

<sup>11</sup> National Center for Statistics and Analysis (NCSA), *Characteristics of Fatal Rollover Crashes*, DOT HS 809 438, at 22 (Apr. 2002), at 13 (emphasis added).

<sup>12</sup> See National Center Statistics and Analysis, *Safety Belt and Helmet Use in 2002-Overall Results*, Sept. 2002, at 8.

<sup>13</sup> National Center for Statistics and Analysis, *Characteristics of Rollover Crashes*, April 2002, at 47 and National Center for Statistics and Analysis *Motor Vehicle Traffic Crash Fatality and Injury Estimates for 2002* at 50.

<sup>14</sup> *2002 Annual Assessment of Motor Vehicle Crashes*. Washington: NHTSA, July 2003. 64.

<sup>15</sup> *Initiatives to Address the Mitigation of Vehicle Rollovers*. Washington: NHTSA, 2003. 5.

<sup>16</sup> Hilton, Judith; Umesh Shankar. *Motor Vehicle Traffic Crash Injury and Fatality Estimates*. (DOT HS 809 586). Washington: National Center for Statistics and Analysis, 2003. 8.

<sup>17</sup> *Id.* at 1.

<sup>18</sup> *2002 Annual Assessment of Motor Vehicle Crashes*. Washington: NHTSA, July 2003. 60.

<sup>19</sup> *Characteristics of Rollover Crashes*. (DOT HS 809 4398). Washington: NHTSA, April 2002. 21.

<sup>20</sup> *Occupant Fatalities in Vehicles in Crashes with Initial Side, Rear, and Frontal Impact, and Rollover, by Year, Restraint Use, Ejection, and Vehicle Body Type. FARS 1992-2001 FINAL & 2002 ARF*. Data Request. Washington: NCSA, Sept. 2003.

<sup>21</sup> See the Intermodal Surface Transportation Efficiency Act of 1991: USCA § 1392 at sec. 2503.

<sup>22</sup> See 59 F.R. 33254, 33255 (June 8, 1994).

<sup>23</sup> Bradsher, Keith. *High and Mighty: SUVs-The World's Most Dangerous Vehicles and How They Got That Way*. New York: PublicAffairs 2002, at 193 (Referring to Hans C. Joks, "Vehicle Design versus Aggressivity," (April 2000), DOT HS 809 194. p. 40-42).

<sup>24</sup> Joks, Hans C. "Vehicle Design versus Aggressivity," at 41. Further calculations contained in an electronic mail communication between Public Citizen and safety researcher Hans Joks stated: "In 1996, 890 car occupants died in collisions with SUVs. If the risk in collisions with cars of the same weight had been half as high, as estimated at that time, 445 deaths would not have occurred if SUVs had been replaced by cars of the same weight." Email from Hans Joks to Laura MacCleery of Public Citizen, on Feb. 24, 2003 (on file with Public Citizen).

<sup>25</sup> Rechten, Mark. "Toyota Concept Truck hints at next Tundra." *Automotive News* 4 Jan. 2004.

[www.autonews.com/news.cms?newsId=7421&bt=fist](http://www.autonews.com/news.cms?newsId=7421&bt=fist)

<sup>26</sup> O'Donnell, Jayne. "Study: Side Air Bags Should Shield Head." *USA Today*, August 26, 2003

<sup>27</sup> Insurance Institute for Highway Safety Status Report, Vol. 38, No. 8, Aug. 26, 2003, at 2.

<sup>28</sup> Brian Herbst, Stephen Forrest, Steven E. Mayer and Davis Hock, *Alternative Roof Crush Resistance Testing with Production and Reinforced Roof Structures*, 2002-01-2076, SAE 2002.

<sup>29</sup> Hearing on Reauthorization of the National Highway Traffic Safety Administration, Washington D.C., March 18, 2004.

<sup>30</sup> Testimony of Robert Strassburger, Vice President, Safety & Harmonization Alliance of Automobile Manufacturers on the Reauthorization of the National Highway Traffic Safety Administration, before the Subcommittee on Commerce, Trade, and Consumer Protection, Mar. 18, 2004.

<sup>31</sup> Edward Lapham, "Most drivers want safety over entertainment," *Automotive News*, Feb. 20, 2004.

<sup>32</sup> Omar Sofradzija, "Automakers Told Features Necessary," *Law Vegas Review-Journal*, Jan. 31, 2004.

<sup>33</sup> Blincoe, L., A. Seay, E. Zaloshnja, T. Millar, E. Romano, S. Luchtner, R. Spicer. *The Economic Impact of Motor Vehicle Crashes, 2000*. (DOT HS 809 446). Washington: NHTSA, May 2002.

<sup>34</sup> Committee Report on S. 3005, The Traffic Safety Act of 1966, June 23, 1966, at 271, 273, 274.

## THE SLIPPAGE BETWEEN... MANDATES, PLANS AND PROMISES:

*or* Why the Safety Provisions in S. 1072 are the Right Solution on Long-Overdue Motor Vehicle Safety Standards

Safety Issue in S. 1072	Title 4 Provisions: Safety for All, By a Date Certain	Current NHTSA Regulatory Plans: Good Intentions, Few Assurances	Past NHTSA Broken Promises: Disappointments, Inaction, and Delay
<p>Vehicle Accident Ejection Protection (§4152)</p>	<p>Rule to prescribe a safety standard or upgrade the existing standard to reduce complete and partial occupant ejection. Safety technologies, such as advanced side glazing, side curtains, and side impact air bags, shall be considered for their ejection mitigation capabilities. <b>NPRM 6-30-2006, FR 6 not later than 18 months following NPRM.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b> <i>Research</i> pretensioners and side window ejection mitigation.</p>	<p>In 1994, upon terminating its work on developing a rollover propensity standard, NHTSA promised new crashworthiness measures, including examination of potential improvements to window glazing in order to reduce ejections. However, rulemaking on window glazing was terminated in 2002. The agency suggested regulation of side curtain air bags would be more efficient, but no such standard has been proposed to date. Further, while NHTSA contends that some forms of advanced side glazing increase particular neck-load responses on crash dummies, the testing procedure that yielded this finding was problematic and non-conclusive in terms of actual neck injuries. <i>Despite the inaction, NHTSA estimates that 537 to 1,305 lives would be saved annually if sturdier side windows were standard in vehicles!</i></p>
<p>Door Lock and Retention Standard (§4152)</p>	<p>Upgrade of current standard to require manufacturers to make modifications to door locks, door latches, and retention components of doors as the Secretary determines necessary to reduce occupant ejection. <b>NPRM 6-30-2006, FR not later than 18 months following NPRM. \$500,000 appropriated.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b> <i>Planning</i> to upgrade door lock standard and continue with harmonization efforts currently underway (<i>anticipated</i>: NPRM 2004, FR 2005). The effects of harmonization on standard are unknown.</p>	<p>In 1994, upon terminating its work on developing a rollover propensity standard, NHTSA promised new crashworthiness measures, including potential improvements to door locks. However, the agency has yet to improve standards for door locks and door retention. <i>Despite the inaction, NHTSA estimates that hundreds of the 2,500 annual door-related ejection deaths could be prevented if the door latches standard were updated.</i></p>

<p>Vehicle Backover Avoidance Technology Study (§4153)</p>	<p>Study of effective methods for reducing the incidence of injury and death outside of parked passenger vehicles attributable to movement of the vehicles. <b>Report to be completed within 1 year of enactment and to be presented to Congress within 5 months following enactment.</b></p> <p>NHTSA may establish a method to collect and maintain the number and types of injuries and deaths involving vehicles (under 10,000 GVWR) in non-traffic, non-accident incidents to assist in analysis on the inclusion of backover prevention technologies.</p>	<p>NHTSA has released only one report using cleansed birth certificates (from 1997) to look at trunk entrapment, hyperthermia deaths and power window strangulations).</p> <p><b>NHTSA 2003-06 Priority Plan:</b> <i>Compiling</i> death certificates to look at off-road vehicular deaths, including driveway incidents and power window-related child deaths by strangulation. <i>No report has been released yet and there is no deadline for publication of results.</i></p> <p><b>Final Report NHTSA Pilot Study: Non-Traffic Motor Vehicles Safety Issues (May 6, 2002):</b> NHTSA states that “NHTSA is also responsible, however, for motor vehicle safety when there is not a crash or the event occurs off the public trafficway.”</p>	<p>NHTSA has conducted another study using cleansed birth certificates and media searches to understand the circumstances of non-traffic, non-crash incidents with particular interest focused on hyperthermia, carbon monoxide poisonings, power window strangulations and children being backed over by vehicles. <i>This study was supposed to be released in August of 2003, but has yet to be published.</i></p> <p>Although NHTSA acknowledges its responsibility, it lacks a method to collect data, or an office in which these significant types of injuries and deaths are researched. Yet a 2002 CDC study shows that at least 9,160 children are treated in U.S. emergency rooms every year following involvement in non-traffic, non-crash events related to vehicles.<sup>3</sup> The non-profit group, Kids And Cars, documented at least 154 deaths in 2003 due to non-traffic, non-crash events.</p> <p><i>NHTSA is not proactively working to eliminate predictable and preventable child injuries and deaths, such as those caused by power windows, easily prevented with inexpensive safety technology.</i></p>
<p>Vehicle compatibility and aggressivity reduction standard (§4155)</p>	<p>Rule to reduce vehicle incompatibility and aggressivity for vehicles under 10,000 lbs GVWR addressing bumper height, weight, and any other design characteristics necessary to ensure better management of crash forces in frontal and side impact crashes in order to reduce occupant deaths and injuries.</p> <p>Develop a standard rating metric to evaluate compatibility and aggressivity. Create a public information program including vehicle rankings based on risks posed by vehicle incompatibility and aggressivity to occupants,</p>	<p><b>NHTSA 2003-06 Priority Plan:</b> <i>Evaluating</i> whether an average height of force (AHOF) compatibility requirement is feasible (decision <i>anticipated</i> 2004) and is pursuing the development of a higher resolution load cell barrier. NHTSA is also <i>planning</i> to upgrade the side impact protection standard (FR 2005), <i>reevaluate</i> the CAFE structure with aggressivity in mind, and <i>planning</i> to change the glare standards to mitigate the risks from high mounted headlights of light trucks (<i>anticipated</i>: NPRM 2004, FR 2005).</p>	<p>In 1998, the auto industry promised the NHTSA Administrator Dr. Ricardo Martinez that it would make modifications to achieve safer designs, mainly by adjusting vehicle suspension, but the industry refused to provide any details of their plans and automakers continue to design larger and more aggressive vehicles. Automakers promised to voluntarily fix aggressivity problems again in 2000, and most recently in a well-publicized but vague voluntary program in 2003. <i>Administrator Martinez announced in 1997 that an estimated 2,000 needless lives are lost</i></p>

	<p>other motorists and combined risks by make and model.  <b>NPRM 1-31-07, FR not later than 18 months following NPRM.</b></p>	<p><b>NHTSA Compatibility Plan:</b>  Proposed initiatives in arena of AHOF, compatibility testing, side impact upgrade, and an upgraded glare standard – <i>no deadlines</i>.  NHTSA plans a restructuring of the CAFE program (ANPRM published in 2003). <i>Note: While the ANPRM was issued 12-03, the notice raises the specter of rulemakings that would actually increase vehicle incompatibility hazards, such as a weight-based standard.</i></p> <p><b>NHTSA 2003-06 Priority Plan:</b>  <i>Planning an upgrade of roof crush test and standard (anticipated: NPRM 2004, FR 2005).</i></p> <p><b>NHTSA 2004-07 Evaluation Plan:</b>  <i>Evaluating pretensioners next 2-3 years. Research and testing on head impact injuries for 4+ years. Research on cost and effectiveness of side and head airbags on ejection prevention and injury/fatality risk 2-3+ yrs.</i></p> <p><b>NHTSA Rollover Plan:</b>  Mentions upgrade of roof crush test, but <i>no deadline.</i></p> <p><b>NHTSA 2003-06 Priority Plan:</b>  <i>Research ESC (2004-2005), analysis of benefit cost analysis and decide on next steps (2005). Evaluating the possibility of adding a handling rating to its New Car Assessment Program (NCAP) (2006-2007).</i></p> <p><b>NHTSA 2004-07 Evaluation Plan:</b>  <i>Research on cost and effectiveness of ESC 2-3+ years. Evaluation of Static Stability Factor (SSF) and rollover rates 1 yr.</i></p>	<p><i>each year because of the aggressive design of light trucks.</i><sup>4</sup></p>
<p>Rollover  Crashworthiness  Standard  (§4156)</p>	<p>Rule to establish rollover crashworthiness standards for passenger vehicles (under 10,000 GVWR). The rule shall be promulgated with the consideration of the prescription of a roof strength performance standard based on dynamic tests that realistically duplicate actual forces.</p> <p>Rulemaking shall consider: improved seat structure and safety belt performance (including seat belt pretensioners), side impact head protection airbags, and roof injury protection measures.</p> <p><b>NPRM 6-30-04, FR not later than 18 months following NPRM.</b></p>	<p>In 1994, upon terminating its work on developing a rollover propensity standard, NHTSA promised new crashworthiness measures including improving interior protection safety standards, examining improvements for side window glazing and door latches, and a strengthened roof crush resistance requirements.</p> <p>However, rulemaking on window glazing was terminated in 2002. The agency suggested regulation of side curtain air bags would be more efficient, but no such standard has been proposed.</p> <p><i>The agency has yet to fulfill these promises, despite NHTSA's own estimates which predict that up to 1,500 deaths each year could be saved by a tougher roof-crush standard.</i><sup>5</sup></p>	<p>As early as April 1973, the National Highway Traffic Safety Administration (NHTSA) proposed a rule for a rollover resistance standard, which was never issued.</p> <p>In September of 1986, Congressman Tim Wirth called on NHTSA to issue a life-saving rollover standard. His petition to the agency was denied.</p> <p>Two years later, in 1988, Consumers Union and the Center for Auto Safety followed in Wirth's footsteps with petitions that were also rejected by NHTSA.</p> <p>In 1991, Congress passed the Intermodal</p>
<p>Rollover  Resistance  Standard  (§4156)</p>	<p>Rule to establish rollover prevention standard to improve on the performance characteristics of passenger motor vehicles (under 10,000 GVWR) to increase their resistance to rollover. Rulemaking shall consider additional technologies to improve handling and reduce the likelihood of vehicle instability and rollovers.</p> <p><b>NPRM 6-30-04, FR not later than 18 months following NPRM.</b>  Study on Electronic Stability Control (ESC) and other technologies designed to improve handling, report to Congress by <b>12-31-05</b>.</p>	<p>As early as April 1973, the National Highway Traffic Safety Administration (NHTSA) proposed a rule for a rollover resistance standard, which was never issued.</p> <p>In September of 1986, Congressman Tim Wirth called on NHTSA to issue a life-saving rollover standard. His petition to the agency was denied.</p> <p>Two years later, in 1988, Consumers Union and the Center for Auto Safety followed in Wirth's footsteps with petitions that were also rejected by NHTSA.</p> <p>In 1991, Congress passed the Intermodal</p>	<p>As early as April 1973, the National Highway Traffic Safety Administration (NHTSA) proposed a rule for a rollover resistance standard, which was never issued.</p> <p>In September of 1986, Congressman Tim Wirth called on NHTSA to issue a life-saving rollover standard. His petition to the agency was denied.</p> <p>Two years later, in 1988, Consumers Union and the Center for Auto Safety followed in Wirth's footsteps with petitions that were also rejected by NHTSA.</p> <p>In 1991, Congress passed the Intermodal</p>

		<p><b>NHTSA Rollover Plan:</b> Assessing the feasibility of a handling consumer information program, ESC rulemaking actions, rollover sensor performance tests, and a window curtain standard – <i>no deadline or solid commitment.</i> Plans to implement a marketing plan to increase consumer knowledge about NCAP ratings, now only on NHTSA’s web site – <i>no deadline.</i></p>	<p>Surface Transportation Efficiency Act, which required NHTSA to address means of protecting motorists from “unreasonable risk of rollovers” in passenger vehicles. But in 1994, the agency terminated work on a rollover propensity standard.</p>
<p>Frontal Impact Standards (§4156)</p>	<p>Rule to improve frontal impact protection for vehicles under 10,000 GVWR. Evaluate additional barriers and measurements of occupant head impact and neck injuries and measures of head and neck injuries and a review frontal impact criteria, including those established by the IIHS. <b>NPRM 6-30-04, FR not later than 18 months following NPRM.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b> Planning to improve crash-test dummies. Evaluating performance of integrated seats (anticipated: NPRM 2003, FR or termination 04). Evaluating frontal offset test, request comments, determination 2003-2004. Advanced airbag rule work <i>planned</i> (respond to petitions 2003, additional research 2003+).</p>	
<p>Side Impact Standards and Tests (§4156)</p>	<p>Rule to upgrade current standard to improve side impact protection to occupants of vehicles under 10,000 GVWR. Evaluation of additional barriers and measurements of head and neck injuries, consideration of the need for new dummies for full range of occupants and a review side impact criteria, including those established by IIHS. <b>NPRM 6-30-04, FR not later than 18 months following NPRM.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b> Planning to improve crash-test dummies. Planning a full upgrade of FMVSS 214 that would address light trucks and narrow objects (poles) as well as upgraded injury criteria and data from second generation side impact dummies. <i>Note – this test will have no ejection mitigation requirement.</i> The proposal will also consider performance requirements for head protection and evaluate possible harm from side airbags and to monitor their performance. (anticipated: NPRM 2004, FR 2005.)</p> <p><b>NHTSA 2004-07 Evaluation Plan:</b> Researching upgrade FMVSS 214 – <i>analyzing</i> NCAP and FARS data relating to 214 in two stages, one that will take 2-3 years and one that will take 4-5 years.</p>	<p>In October 1999, NHTSA granted a petition from Advocates for Highway and Auto Safety on improving side impact standards, but no rulemaking has occurred to date. <i>This is despite a recent study showing that side air bags can reduce side impact crash fatalities by up to 50 percent.</i><sup>6</sup></p>

<p>15-Passenger Vans: Rollover Testing Program and FMVSS Safety Standards (§4157)</p>	<p>Rule to include 15-passenger vans** under 10,000 GVWR in NHTSA’s dynamic rollover testing program and require them to comply with all existing and prospective FMVSS Safety Standards for occupant protection and vehicle crash avoidance that are relevant to such vehicles.  <b>FR 9-31-05.</b></p> <p>-----  ** Exclusions for all 15-passenger vans provisions include: ambulances, tow trucks or vehicles designed primarily for transportation of property or special purpose equipment.</p>	<p><b>Action Plan for 15-Passenger Vans:</b>  Issue further warnings on dangers of 15 Passenger Vans and add information about vans on Agency’s Rollover site (10-03) – <i>as of February 2004 this has not happened.</i>  NHTSA issued an NPRM (8-03) on including lap and shoulder belts in all seating positions in all vehicles under 10,000 lbs, including 15-passenger vans (planned FR 12-04).  Include 15-passenger vans in upgrade of roof crush rule – only to test front seating positions (<i>anticipated</i> NPRM for upgrade 2004).  Countermeasure research on doing rear seat testing as well (2-04).</p>	<p><i>Despite recommendations from the National Transportation Safety Board given to the Agency two years ago, the Action Plan for 15-Passenger Van Safety presented by NHTSA in September, 2003, fails to address a number of safety standards from which 15-passenger vans are currently exempt, including Occupant Protection in Interior Impact, Head Restraints, and Door Locks and Door Retention Components.</i>  In NHTSA’s Action Plan for 15-passenger Van Safety, the agency will only test NCAP rollover resistance maneuvers on two 15-passenger vans.  In August, 2003, FMCSA ruled that 15-passenger vans must comply with the same safety regulations that apply to buses, <i>but there are few safety rules for large buses and the rule only applied to those vans carrying passengers long distances and cross state or international borders.</i></p>
<p>15- Passenger Vans: NCAP (§4157)</p>	<p>Inclusion of 15-passenger van under 10,000 GVWR in NCAP programs.  <b>FR 9-31-05.</b></p>	<p><b>Action Plan for 15-Passenger Vans:</b>  In NHTSA’s Action Plan for 15-passenger Van Safety, the agency will only test NCAP rollover resistance maneuvers on two 15-passenger vans, <i>and the results will not be published as part of the NCAP program.</i></p>	<p><i>NHTSA has not plans to include 15-passenger vans tests in its NCAP program.</i></p>

<p>15-Passenger Vans: Vehicle Control Technology (§4157)</p>	<p>Evaluation and testing of potential technological systems to assist drivers in controlling 15-passenger vans under 10,000 GVWR.</p>	<p><b>Action Plan for 15-Passenger Vans:</b>  <i>Planned</i> testing (12-03) and report (2-04) on evaluation of ESC in 15-passenger vans.</p>	<p>In November, 2002, the National Transportation Board requested that NHTSA test electronic stability control systems on 15-passenger vans. However, in response, NHTSA performed J-Turn and fishhook rollover resistance maneuvers on only <i>one</i> 15-passenger van with an electronic stability control system.  <i>Neither Ford nor General Motors, the two producers of 15-passenger vans, currently provide electronic stability control systems for this vehicle type, and Ford has no intention of providing such systems on their 15-passenger vans.</i></p>
<p>Tire Safety Upgrade (§4158)</p>	<p>Rule to upgrade tire safety standard, to improve strength and road hazard protection safety performance criteria for light vehicle tires (criteria not addressed in rules mandated by TREAD)  <b>NPRM 6-30-05, FR not later than 18 months following NPRM</b>  Rule upgrade to enhance resistance to bead unseating and aging safety performance criteria (also not addressed following TREAD).  <b>NPRM 12-31-05, FR not later than 18 months following NPRM</b>  Reconsider use of shearography analysis and determine cost effective methods of using such technology. <b>Report to Senate Commerce Committee within 2 years following enactment.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b>  Issued final rule on tires (mandated by TREAD) in 6-03. <i>Continue to research</i> tire strength and will <i>begin researching</i> tire aging (2003-2004). “Decision on next step” for tire safety (2005).</p>	<p>In June, 2003, in response to directives in the 2000 TREAD Act, NHTSA issued a ruling updating safety performance standards for tires. However, counter to Congressional intent, NHTSA left serious holes in the updated standard. <i>Despite the clear mandate, the new rule failed to adequately address tire strength and road hazard protection, or to establish minimum standards for bead unseating resistance and aging.</i></p>
<p>Safety Belt Minders (§4159)</p>	<p>Rule to address alternate means to encourage increased belt usage in vehicles under 10,000 GVWR. Rule should consider alternative means to encourage increased usage including intermittent or continuous audible or visual reminders, features to prevent operation of convenience or entertainment features, and</p>	<p><b>NHTSA 2003-06 Priority Plan:</b>  <i>Study</i> effectiveness of belt minders and evaluate possible rulemaking (2003-2005). NAS is currently working on a study.  <b>NHTSA Rollover Plan:</b>  <i>Support voluntary installation</i> of minder</p>	<p>Current law limits audible belt minders to 8 seconds. Thus, despite evidence that enhanced belt reminder systems such as Ford’s BeltMinder™ system <i>can increase belt use by five percent</i>, and in spite of the National Academy of Sciences’ recommendation that such systems be standard in all new vehicles,</p>

	<p>other technologies described in NAS report.</p> <p><b>NPRM 12 months following enactment, FR 24 months following enactment.</b></p> <p>Provisions also include a change to the current buzzer limit law.</p> <p>Establishment of a grant incentive program that encourages states to enact laws mandating booster seat use for children too big for child safety seats. The grants will be allotted proportionately on the basis of state population and will be split by the state between education and dissemination programs.</p> <p>Appropriations (in millions) out of the Highway Trust Fund: \$18 for FY 2006, \$20 for FY 2007, \$25 for FY 2008 and \$30 for FY 2009.</p>	<p>systems.</p> <p><b>NHTSA 2003-06 Priority Plan:</b> Establishing <i>performance requirements</i> for child restraint systems for larger children per Anton's Law (<i>anticipated</i>: NPRM 2004, FR 2005). <i>Planned</i> development of a 10-year-old crash dummy (<i>anticipated</i>: NPRM 2004, FR 2005).</p> <p><b>NHTSA 2004-07 Evaluation Plan:</b> <i>Survey</i> on effectiveness of booster seats – 2005.</p>	<p>NHTSA cannot now require improvements extending the existing and like systems.</p>
<p>Booster Seat Incentive Grants (§4161)</p>	<p>Rule to increase utilization of child dummies in safety tests, including crash tests that will lead to understanding of crash dynamics with respect to children and measurably improved child safety.</p> <p><b>Rulemaking within 2 years of enactment.</b></p> <p><b>Report published on implementation within 1 year of enactment.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b> <i>Research</i> (2003-04) on new three-year-old dummy, Q3S, for side impact, and Hybrid III 10-year-old dummy (<i>anticipated</i> NPRM on HIII 10yr in 2004, FR required in 2005). <i>Research</i> on pediatric thorax, head and neck injuries to improve child dummy development (2004). A child injury tolerance <i>investigation</i> through case reconstruction to improve injury assessment reference values for use with child dummies (2004). Testing to improve vehicle side crash performance of child restraint systems, including developing a sled test procedure (2006). Testing, evaluation and harmonization of side impact dummies — new child Q series and child HIII series (2006+).</p> <p><i>There are no current agency plans regarding child safety in rollovers.</i></p>	<p>As part of the requirements of Anton's Law, NHTSA has developed a weighted six-year-old dummy but has yet to develop a ten-year-old dummy, as mandated by Anton's Law, which required the extension of the child restraint standard to children heavier than 50 lbs.</p>
<p>Child Safety in Rollovers (§4173)</p>	<p>Implement a consumer information program relating to child safety in rollover crashes.</p> <p><b>Within two years following enactment.</b></p>	<p>June 2003 NHTSA publishes Rollover Report <i>but it makes no mention of child safety in rollovers.</i></p>	<p>June 2003 NHTSA publishes Rollover Report <i>but it makes no mention of child safety in rollovers.</i></p>

<p>Child Dummy Development (§4173)</p>	<p>Develop a child dummy to be used in simulated rollover crashes.  <b>Report to Congress within 1 year of enactment and again within 3 years of enactment.</b></p>	<p><b>NHTSA 2003-06 Priority Plan:</b>  <i>Research</i> (2003-04) on new three-year-old dummy, Q3S, for side impact, and Hybrid III 10-year-old dummy (<i>anticipated</i> NPRM on HIII 10yr in 2004, FR required in 2005).  <i>Research</i> on pediatric thorax, head and neck injuries to improve child dummy development. A child injury tolerance <i>investigation</i> (finishing in 2004) through case reconstruction to improve injury assessment reference values for use with child dummies.  Testing, evaluation and harmonization of side impact dummies — new child Q series and child HIII series (2006+).</p>	<p>NHTSA has developed a weighted six-year-old dummy but has yet to develop a ten-year-old dummy, as mandated by Anton’s Law, which required the extension of the child restraint standard to children heavier than 50 lbs.   June 2003 NHTSA publishes Rollover Report <i>but it makes no mention of child safety in rollovers.</i></p>
<p>Child-Safe power windows (§4173)</p>	<p>Report on technologies designed to prevent and reduce the number of injuries and deaths of children because of automatic windows.  <b>Report to Congress within 2 years of enactment.</b>   Complete rulemaking <b>within 180 days of enactment</b> that would require window switches be designed to reduce the accidental closing by children of power windows and issue performance-based regulations <b>that take effect by 9-1-2006</b> that child-safe switches or related technologies be designed to prevent accidental closing.</p>	<p><b>NHTSA 2003-06 Priority Plan:</b>  <i>Compiling</i> death certificates to look at off-road vehicular deaths, including driveway incidents and power window-related child deaths by strangulation. <i>No report has been released yet and there is no deadline for publication of results.</i></p> <p><b>Final Report NHTSA Pilot Study: Non-Traffic Motor Vehicles Safety Issues (May 6, 2002):</b>  NHTSA states that “NHTSA is also responsible, however, for motor vehicle safety when there is not a crash or the event occurs off the public trafficway.”</p>	<p>April 1991 NHTSA issues FR adopting FMVSS 118 to minimize risks from accidental operation of power windows, partitions, and roof panels. <i>But evidence increases that children nevertheless continue to be injured and entrapped.</i>  Sept. 1995 NHTSA receives petition to open rulemaking to prevent inadvertent power window closings and adopt power window automatic reversal safety features.  August 1996, NHTSA proposes amending FMVSS No. 118 to permit, but not require, infrared detection systems to stop power windows, partitions and roof panels from closing when there is an intervening object.  NHTSA also questions but does not offer regulatory proposals concerning the safety of “express up” power window functions.  November 1996, NHTSA proposes a rule to make it more difficult for children to inadvertently trigger a power window switch, but safety organizations point out in docket comments that the design is not sufficient to stop children from activating the switches with their elbows. <i>To date, no further rulemaking is conducted by the agency.</i></p>

Child belt report (§4173)	Report on technologies designed to improve the performance of safety belts with respect to the safety of children between 4 and 8. <b>Report to Congress within 2 years of enactment.</b>	<p><b>NHTSA 2003-06 Priority Plan:</b> Establishing performance requirements for child restraint systems for larger children per Anton's Law (anticipated: NPRM 2004, FR required 2005). In fulfillment of Anton's Law, NRPMP to require rear center lap/shoulder belts in passenger vehicles with GVWR less than 10,000 lbs. (Agency planned to issue NRPM in 2003, but it has not been issued to date. FR due in 2004.)</p> <p><i>There are no current agency plans regarding safety labeling.</i></p>	January 2003, the Zoie Foundation petitions NHTSA to change the power switches on passenger vehicles to prevent children from being crushed by power windows. <i>No reply from the agency has been received to date.</i> September 2003, national safety organizations petition NHTSA to change the standard to prevent power window closing by changing the power switch operations and also to require automatic reversal systems to prevent deaths and injuries. <i>To date, no action has been taken on the merits of this petition.</i>
Safety Labeling Requirement (§4172)	Require vehicle disclosure stickers to include a "Government Safety Information" disclaimer that provides, when available, the NCAP ratings for frontal, side, and rollover ratings for a vehicle as well as an explanation of what those ratings mean. <b>Regulation prescribed requiring label by 1-1-2005. Changes must take place by 9-1-2006.</b>	<p>Agency planned to issue an NPRM in 2003 to require rear center lap/shoulder belts in passenger vehicles with GVWR less than 10,000 lbs., <i>but no rulemaking has taken place to date.</i> In their 2003-2006 Priority Plan, NHTSA announced a planned 2003 report to Congress on child restraint standard issues not included in its 2003 final regulatory action, <i>but no such report has been issued to date..</i></p> <p><i>Although the New Car Assessment Program (NCAP) was started in 1978, NCAP vehicle crash test ratings are still only available on the NHTSA website, not on the vehicles at the dealers where they will be used the most.</i></p>	<p>Although the New Car Assessment Program (NCAP) was started in 1978, NCAP vehicle crash test ratings are still only available on the NHTSA website, not on the vehicles at the dealers where they will be used the most.</p>

## Glossary of Abbreviations Used

AHOF	- Average Height of Force
ANPRM	- Advanced Notice of Proposed Rulemaking
CAFE	- Corporate Average Fuel Economy
DOT	- Department of Transportation
FMCSA	- Federal Motor Carrier Safety Administration
FR	- Final Rule
IIHS	- Insurance Institute for Highway Safety
NAS	- National Academy of Sciences
NHTSA	- National Highway Traffic Safety Administration
NPRM	- Notice of Proposed Rulemaking
TREAD Act	- Transportation Recall Enhancement, Accountability and Documentation Act

## End Notes

<sup>1</sup> Plungis, Jeff. "Lax auto safety rules cost thousands of lives." *Detroit News* 3 March 2002.

<sup>2</sup> *Id.*

<sup>3</sup> CDC "Injuries and Deaths among Children Left Unattended in or Around Motor Vehicles," *Morbidity and Mortality Report* Vol. 51. No. 26. July 5, 2002.

<sup>4</sup> *Referring to* Hans C. Joksch, "Vehicle Design versus Aggressivity," (April 2000), DOT HS 809 194. p. 40-42

<sup>5</sup> *Id.*

<sup>6</sup> Insurance Institute for Highway Safety Status Report, 6-28-2002.

---

## Chapter Two: The Chronologies

---

<p><b>THE SAD HISTORY OF ROLLOVER PREVENTION:</b> 30 Years, Thousand of Deaths and Injuries, and Still No Safety Performance Standard</p>
---

*Rollover crashes are responsible for a full one-third of all vehicle occupant fatalities, yet meaningful federal action to reduce these crashes has been delayed for more than three decades.*

---

- |                |  |
|----------------|--|
| Apr. 1973      | The National Highway Traffic Safety Administration (NHTSA) issues an Advanced Notice of Proposed Rulemaking (ANPRM) on a rollover resistance standard “that would specify minimum performance requirements for the resistance of vehicles to rollover in simulations of extreme driving conditions encountered in attempting to avoid accidents.” No safety standard has ever been issued. |
| 1986           | NHTSA analysis shows that rollover crashes are the most dangerous collision type for passenger vehicles.   |
| Sept. 1986     | Rep. Tim Wirth, Chairman of the House Commerce Committee, petitions NHTSA to issue a rollover standard based on Static Stability Factor (SSF) – a geometric measurement concerning the relationship between vehicle height and track width.  |
| Dec.1987       | Rep. Tim Wirth petition denied by NHTSA on the basis that SSF does not accurately predict rollover propensity. SSF was later adopted in the year 2000 as the basis for the agency’s rollover resistance consumer information program, but not as a minimum safety standard.  |
| Feb./July 1988 | The Center for Auto Safety (CAS) and the Safety First Coalition (SFC) petition NHTSA to initiate a defect investigation on the highly rollover-prone Suzuki Samurai.   |
| June1988       | Consumers Union petitions NHTSA to protect occupants against “unreasonable risk of rollover.”  |
| Sept. 1988     | NHTSA grants Consumers Union petition and states that it is already undertaking research into rollover safety and that the petition is consistent  |

with the agency's "steps to address the rollover problem." NHTSA simultaneously denies the CAS and SFC petitions to investigate the Samurai

- 1988 -1993 NHTSA conducts an investigation and data analysis of more than 100,000 single-vehicle rollover crashes.
- Oct. 1991 Congress requests report from NHTSA regarding rollover and roof crush standards (FY'92 DOT Appropriations Act, Pub. L. 102-143, S. Rept. 102-148).
- Dec.1991 Congress requires NHTSA rulemaking to prevent unreasonable risk of rollover. An ANPRM or Notice of Proposed Rulemaking (NPRM) was required no later than May 31, 1992 and completion of a rulemaking action on rollover within 26 months of publication of the ANPRM. Yet Congress allowed the rulemaking to be considered completed when NHTSA either published a final rule or announced that the agency would not promulgate a rule.
- Jan. 1992 NHTSA publishes an ANPRM proposing multiple options for establishing a reasonable metric baseline for acceptable rollover propensity. The ANPRM states that NHTSA is considering regulatory action to reduce the frequency of rollovers and/or the number and severity of injuries resulting from vehicle rollovers. A Technical Assessment Paper is also published discussing testing activities, results, crash data collection and data analysis (NHTSA-1996-1683-4).
- Apr. 1992 NHTSA issues Report to Congress, *Rollover Prevention and Roof Crush*, highlighting the research and its plans to address rollover prevention and survival.
- Sept. 1992 NHTSA delivers the agency's planning document, *Planning Document for Rollover Prevention and Injury Mitigation*,<sup>1</sup> at Society of Automotive Engineers Conference, giving an overview of the rollover problem and the action NHTSA was examining to address it, including vehicle measures for rollover resistance, improved roof crush resistance to prevent head and spinal injury and improved side window glazing and door latches to prevent occupant ejection.
- June 1994 Rollover standard rulemaking terminated following a cost-benefit analysis that used outdated late 1980s data regarding the prevalence of light trucks in the vehicle population and ignored the significant trend of increasing rollover-prone vehicles, namely SUVs, as a percentage of new vehicle sales and an increasing presence on the highway.
- June 1994 Secretary of Transportation, Federico Peña, announces NHTSA's plans to

substitute a “comprehensive regulatory and information strategy” for the rollover propensity standard. This strategy included 1) a safety sticker to be placed on all vehicles that includes their rollover likelihood rating (watered down following industry complaint, it now only mentions a generic likelihood of rollover); 2) the consideration of new standards for side windows and door latches (yet to be promulgated); and 3) examination of an upgraded roof crush standard (yet to be promulgated).

- July 1994 NHTSA issues a notice of rulemaking on a vehicle safety consumer information label for rollover stability.
- July 1994 Advocates for Highway and Auto Safety (Advocates) and Insurance Institute for Highway Safety (IIHS) petition NHTSA to reconsider decision to terminate rulemaking on rollover standard.
- Sept. 1994 Congress requires National Academy of Sciences (NAS) study of vehicle safety consumer information (FY’95 DOT Appropriations Act, Pub. L. 103-331, *see* H. Rept. 103-543, Part 1); NHTSA suspends rulemaking on vehicle rollover safety consumer information labeling until study is completed.
- Aug. 1995 Responding to a 1991 ISTEA requirement that NHTSA initiate and complete a rulemaking to address “improved head impact protection from interior components of passenger cars (i.e., roof rails, pillars, and front headers),” the agency issues a final rule amending FMVSS 201 to require passenger cars and light trucks with a GVWR of 10,000 pounds or less to provide greater protection when an occupant’s head hits upper interior components (such as A-pillars and side rails) during a crash.
- March 1996 NAS issues study of vehicle safety information, *Shopping for Safety*<sup>2</sup>, on NHTSA’s proposed consumer information program, stating that consumers need more information than they are currently provided and that a safety label, like the one currently used for displaying fuel economy, should be displayed on all new passenger vehicles sold at U.S. dealerships listing standardized safety ratings.
- May 1996 NHTSA issues *Status Report for Rollover Prevention and Injury Mitigation*, with a description of NHTSA’s planned development of a dynamic rollover propensity test.
- June 1996 NHTSA re-opens 1994 rulemaking docket on a rollover consumer warning label.
- June 1996 NHTSA denies Advocates/IIHS July 1994 petition for reconsideration of decision to terminate rulemaking on rollover prevention standard, stating that a standard based on static vehicle measurements would eliminate a

“very popular vehicle type” – the compact SUV and was not justified on cost-benefit grounds.

- Aug. 1996 Consumers Union (CU) petitions NHTSA to develop a standard that would produce meaningful, comparative data on the emergency-handling characteristics of various SUVs and to provide test results to the public as consumer information.
- May 1997 NHTSA grants CU petition, stating: “NHTSA will initially focus on exploring whether it can develop a practicable, repeatable and appropriate dynamic emergency handling test that assesses, among other issues, a vehicle’s propensity for involvement in an on-road, untripped rollover crash.”
- Apr. 1998 NHTSA issues an NPRM on a SUV rollover warning label for the vehicle visor.
- Mar. 1999 NHTSA issues final rule on revised SUV rollover warning label, requiring a rollover warning sticker on the vehicle’s visor or window that says “Warning: Higher Rollover Risk” and instructions to avoid abrupt maneuvers and excessive speed, and to buckle up, are written beneath the heading.
- June 2000 NHTSA proposes rollover consumer information program based on static stability factor (SSF) measurements as part of the agency’s New Car Assessment Program (NCAP) that provides comparative vehicle performance information on the agency’s Web site, but declines to require that the information be placed on the window sticker at the point-of-sale.
- Oct. 23, 2000 Congress funds NAS study of NHTSA proposed rollover information rating based on SSF.
- Nov. 2000 Following the Ford Explorer/ Firestone tire tragedy, Congress requires dynamic testing of vehicle rollover be added to NHTSA’s consumer information rating program with testing to begin by November 2002 (TREAD Act, Sec. 12, Pub.L. 106-414).
- Jan. 2001 NHTSA begins publishing rollover ratings based on a vehicle’s static stability factor (SSF) on the agency’s Web site.
- July 2001 NHTSA issues request for comments on developing dynamic test as basis for rollover rating consumer information program beginning in 2003.
- Sept. 2001 According to a Louis Harris poll commissioned by Advocates for Highway and Auto Safety, 85 percent of Americans support a federal rollover prevention minimum standard.

Feb. 2002	NAS study, <i>Rating System for Rollover Resistance, An Assessment</i> , issued. The report recommends that NHTSA expand the scope of its program, consider metrics other than stars, and develop an overall measure of vehicle safety to be integrated into the vehicle label. The NAS also points out that NHTSA should evaluate the appropriateness of a rollover rating program in the absence of a minimum standard (the other consumer information ratings, for frontal and side impact crashes, reward performance above a minimum compliance standard).
Oct. 2002	NHTSA issues NPRM on dynamic test procedure for rollover consumer information.
Feb. 26, 2003	Senate Commerce Committee holds a hearing on SUV safety where senators, auto industry representatives, the administrator of NHTSA and spokespeople from consumer safety groups speak about the rollover prevention and survivability.
Apr. 2003	NHTSA publishes <i>Characteristics of Fatal Rollover Crashes</i> <sup>3</sup> and reports the following: <ul style="list-style-type: none"> <li>- Rollovers are more likely to result in fatality than other crashes;</li> <li>- Rollovers constitute about one-fifth of all fatal crashes;</li> <li>- SUVs have the highest rollover fatality rate at 11.06 per 100,000 registered SUVs, followed by pickups at 7.52, vans at 4.09 and cars at 3.48 (for 1999).</li> </ul>
June 2003	NHTSA issues <i>Initiatives to Address the Mitigation of Vehicle Rollover</i> <sup>4</sup> – reporting that rollover mitigation is one of its four major priority areas, but proposing few concrete actions or deadlines. The other three priority areas include vehicle compatibility, safety belt use and impaired driving.
July 2003	NHTSA issues <i>Motor Vehicle Traffic Crash Injury and Fatality Estimates: 2002 Annual Report</i> <sup>5</sup> , finding that rollover crashes accounted for 82 percent of the total fatality increase between 2001 and 2002. The report also reveals that in 2002, 10,666 occupants were killed in rollovers – one-third of all occupant deaths.
Oct. 2003	In accordance with the TREAD mandate, NHTSA adopts a “fishhook” maneuver as the dynamic test procedure to be combined with SSF in rollover consumer information ratings and to be used beginning with its 2004 model year tests.
Feb. 4, 2004	NHTSA issues first round of rollover ratings for 14 vehicle models and their corporate twins, based on a new dynamic test/SSF measurement. While the dynamic test provides an indication of on-road performance, the absence of a standard, or performance “floor” means that every vehicle starts with at least one star, and inflates the performance results on the

tests (*i.e.*, with a two-star “floor,” vehicles now earning three stars would receive substantially lower ratings).

Feb. 12, 2004

Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes safety provisions concerning rollover that would:

- Mandate a rollover prevention standard that would assure the improvement of the basic design characteristics of vehicles under 10,000 lbs. to increase their resistance to rollover (NPRM 6-30-04, final rule not later than 18 months following NPRM);
- Require the consideration of additional technologies that would increase handling and reduce the likelihood of instability (NPRM 6-30-04, final rule not later than 18 months following NPRM); and
- Assign NHTSA to study Electronic Stability Control systems and report to Congress on their findings (due 12-31-05).

## **1971 ROOF STRENGTH STANDARD:**

### **33-Year Old Standard Does Not Provide Basic Rollover Crashworthiness Protections**

*The auto industry and government have known about the deadly consequences of vehicle roof crush since 1960s, yet have never upgraded the 1971 standard nor extended it to vehicles weighing more than 6,000 lbs.*

---

- July 13, 1965 Both General Motors (GM) and Ford highlight the importance of roof strength in rollovers in testimony before Congress.
- Apr. 13, 1966 GM Engineering Staff memo describes the company's plans to develop a dynamic roof strength drop test from 5 ½ feet.
- Aug. 1, 1966 Ford test report describes dynamic roof crush "roof drop test."
- Sept. 9, 1966 President signs National Traffic and Motor Vehicle Safety Act.
- Oct. 11, 1967 Federal Highway Administration (FHA) of the National Traffic Safety Bureau (NTSB) issues an Advanced Notice of Proposed Rulemaking (ANPRM) on 47 issues, including roof intrusion, seeking public comment.
- Jan. 6, 1971 The National Highway Traffic Safety Administration (NHTSA, formerly NTSB), issues a Notice of Proposed Rulemaking on roof intrusion protection for passenger cars that would statically test both front corners of the roof on passenger vehicles.
- Apr. 1971 General Motors Corporation (GM) and the Automobile Manufacturers Association (which later became the Alliance of Automobile Manufacturers) argue in comments to the docket that testing both sides of the roof is unnecessary. It was later revealed in litigation that GM had used NHTSA's two-corner test on six of its production model vehicles and that only one vehicle tested had passed. GM nevertheless argued to NHTSA that only one side should be tested because the roof was "symmetrical," in addition to pushing for other changes to weaken the test. Moreover, GM withheld its testing results from the agency.
- Dec. 8, 1971 NHTSA issues final rule establishing a roof crush standard for passenger cars to take effect in 1973. This standard, which today is virtually the same as in 1973, measure the result of pressure to only one side of a vehicle's roof.
- Mar. 22, 1973 The Center for Auto Safety petitions NHTSA to apply federal motor

vehicle safety standards, including the roof crush standard, to light trucks and multipurpose passenger vehicles with gross vehicle weight rating (GVWR) of 10,000 pounds or less.

- Sept. 1, 1973      Roof Crush Resistance standard, FMVSS No. 216, takes effect for passenger cars.
- 1974              NHTSA contracts with Minicars for development of a research safety vehicle that protects occupants in serious rollover crashes at 50 mph.
- Apr. 30, 1976     Engineer killed during accidental rollover at GM proving grounds during a tire evaluation test. GM institutes a new policy requiring roll cages on all test vehicles and all test drivers and test occupants to wear helmets.
- Apr. 17, 1991     NHTSA issues a final rule, effective Sept. 1, 1993, extending the application of FMVSS 216, the existing car roof crush resistance standard to light trucks, vans, buses and multipurpose passenger vehicles (MPVs) with GVWR of 6,000 lbs. or less, specifically declining to extend the standard to light trucks, vans, buses and MPVs with a GVWR of up to 10,000 lbs.
- Dec. 18, 1991     Intermodal Surface Transportation Efficiency Act (ISTEA) requires application of passenger car safety standards to light trucks, vans, buses and MPVs with GVWR of 6,000 lbs or less. ISTEA also requires issuance of a standard to improve head impact protection from interior components (roof rails, pillars, and front headers) of passenger cars. ISTEA additionally directs NHTSA to commence a rulemaking proceeding on a standard to prevent rollover crashes.
- Jan. 3, 1992      NHTSA issues an advanced notice of proposed rulemaking (ANPRM) to establish a rollover prevention standard, as required by ISTEA.
- Sept. 23, 1992     NHTSA releases *Planning Document for Rollover Prevention and Injury Mitigation* listing alternative actions agency could take to address rollover problem, including research into improved roof crush resistance to prevent head and spinal injury.
- Jan. 22, 1993     NHTSA delays by one year, until Sept. 1, 1994, effective date for application of FMVSS 216, the roof crush standard to light trucks, vans, buses and MPVs with gross vehicle weight rating of 6,000 lbs. or less.
- June 23, 1994     NHTSA terminates rulemaking on rollover prevention and stability standard. In the notice of termination, the agency promises that it will instead address factors involved in preventing rollover casualties, including roof strength requirements.

May 6, 1996	R. Ben Hogan, Smith and Alspaugh, PC, a law firm, petitions NHTSA for rulemaking, and requests that the agency require “roll cages” as standard equipment on passenger cars.
Jan. 8, 1997	NHTSA grants petition requesting rulemaking to require “roll cages.”
Apr. 27, 1999	FMVSS 216, the roof crush standard procedure clarified for placement of the test device to accommodate certain vehicles that have raised and/or highly sloped roofs. This change in the standard does not address or upgrade underlying roof crush testing and strength requirements.
Sept. 2000	In wake of the exposé of Firestone tire/Ford Explorer rollover fatalities, NHTSA Administrator states that agency needs to improve roof crush safety standard for rollover protection in testimony before Congress.
Oct. 22, 2001	NHTSA publishes notice and request for comments on roof crush resistance, describing agency roof crush research and testing as a part of its rollover protection program over the past 30 years.
2002	Herbst, B., Forrest, S., Meyer, S., Hock, D. publish their “Alternative Roof Crush Resistance Testing with Production and Reinforced Roof Structures,” <sup>6</sup> that discusses the feasibility of a dynamic roof crush test, stating that “[t]he automotive industry and researchers have used drop testing for years to evaluate roof strength. In the late 1960s’s, Society of Automotive Engineers (SAE) developed a standardized procedure to perform full vehicle inverted drop testing. Many domestic and import auto manufacturers have utilized the inverted drop test technique as far back as the 1960s and 1970s to evaluate roof strength.
Apr. 2002	NHTSA publishes its report <i>Characteristics of Fatal Rollover Crashes</i> <sup>7</sup> and notes that rollover crashes are more likely to be fatal than other crashes.
Sept. 17, 2002	NHTSA Administrator Dr. Jeffrey Runge states that roof crush intrusion potentially contributes to serious or fatal injury in 26 percent of rollover crashes. <sup>8</sup>
Feb. 26, 2003	Senate Commerce Committee holds a hearing SUV safety where senators, auto industry representatives, the administrator of NHTSA and spokespeople from consumer safety groups speak about the problems of roof crush in SUV rollovers.
March 3, 2003	<i>Detroit News</i> series “Deadly Driving” highlights the failure of NHTSA to upgrade its roof strength standard and cites NHTSA data indicating that 1,400 deaths and 2,300 serious injuries could be prevented if the standard were more rigorous.
July 15, 2003	National Transportation Safety Board (NTSB) concludes roof crush

contributed to severity of driver injuries and diminished passenger survivable space in Henrietta, Texas crash of 15-passenger van that killed four occupants and seriously injured eight others.

- July 2003 NHTSA issues *Motor Vehicle Traffic Crash Injury and Fatality Estimates: 2002 Annual Report*, finding that rollover crashes accounted for 82 percent of the total fatality increase between 2001 and 2002. The report also reveals that in 2002, 10,666 occupants were killed in rollovers – one-third of all occupant deaths.
- July, 2003 NHTSA estimates that 1,339 serious or fatal injuries caused by roof crush intrusion are suffered by belted occupants each year. NHTSA lists a proposed rule to upgrade roof crush resistance as a possible 2004 action, and final rule as a possible 2005 action, in *Vehicle Safety Rulemaking Priorities and Supporting Research 2003-2006*, with little description of a rule's possible contents. No proposal for rulemaking or an upgraded standard has yet been issued.
- Nov. 25, 2003 S.1978 reported out of Senate Commerce, Science and Transportation Committee containing a mandate for NHTSA to issue a dynamic roof crush standard and upgrade of rollover crashworthiness in vehicles up to 10,000 lbs.
- 2003 - Jan. 2004 Safety researchers at Xprts, Inc., conduct roof crush dynamic tests using the Jordan Rollover System (JRS) on Chevrolet Blazers, Chevrolet Suburbans and Ford Explorers. During the JRS tests, the roadway surface moves forward along a track, contacting the roof of the vehicle as it rotates on the spit. The test surface impacts *both sides of the roof a single time*, imitating the first roll of a vehicle in a rollover crash. The results show that while the current static test measures only the weakness of the roof, dynamic tests measure occupant injury, safety belt performance, window glazing, side impact air bags, seatback strength, and door locks and latches, as well as roof strength.
- Feb. 12, 2003 Senate passes S.1072, the Highway Funding Bill, which includes safety provisions from S.1978 that would:
- Require NHTSA to issue a rollover crashworthiness standard by June 30, 2006, for passenger vehicles under 10,000 lbs. that will consider the prescription of a dynamic roof strength standard that realistically duplicates actual forces;
  - Require NHTSA consideration of improved seat structure and safety belt design (including seat belt pretensioners), side impact head protection air bags and roof injury protection measures.

## **GOVERNMENT STALLS ON REDUCING EJECTIONS:**

**No Standard for Windows that Reduce Ejection Door Lock Retention;  
Standard Remains Unchanged for over 30 Years**

*Each year 7,300 people are killed each and nearly 8,000 are severely injured when partially or fully ejected through vehicle doors, windows and moon roofs. An estimated 1,300 lives could be saved each year by improving the strength of side and rear windows enough to retain occupants. And many of the 2,500 annual door ejection deaths could be prevented with upgraded locks and retention components that keep doors from flying open during crashes.*

---

- Jan. 1, 1968      Standard 206 - Door Locks and Door Retention Components – takes effect and is aimed at “minimizing, the likelihood of occupants being thrown from the vehicle as a result of impact.”
- Jan. 26, 1981      NHTSA seeks public comment on the safety advantages of advanced window glazing (the addition of materials, such as plastic, to side and rear windows to increase elasticity of windows and decrease complete breakage of window upon impact).
- Aug. 1988      NHTSA issues two advanced notices of proposed rulemakings (ANPRMs) on side impact protection, seeking comment on increasing resistance to occupant ejection through side windows – one for both cars and another for light trucks (SUVs, pickups and vans). NHTSA conducts testing on improved glazing materials between 1988 and 1995.
- Jan. 3 1992      NHTSA publishes an ANPRM on rollover protection which includes discussion of preventing ejection through glazing during rollovers.
- June 1994      NHTSA cancels its proposed rule to establish a vehicle stability standard to reduce rollover crashes and promises to pursue multiple strategies to reduce occupant injury and its severity when vehicles do suffer rollovers. One of the initiatives is anti-ejection countermeasures including improved door locks and latches and window glazing.
- July 1995      NHTSA holds public meeting on improvements in door latch and lock standards and asks for public comments on the issue.
- Sept. 1995      NHTSA publishes final rule extending the requirements of the 1968 door lock standard to the back doors of passenger cars and multi-purpose vehicles (hatchbacks, station wagons, SUVs, and passenger vans) after finding that weak locks are often the cause of rear doors popping open in rear crashes and killing children.

- Nov. 1995 NHTSA issues “Ejection Mitigation Using Advanced Glazings: A Status Report”<sup>9</sup> on positive safety effects of anti-ejection glazing.
- Feb. 1, 1996 NHTSA holds public meeting on glazing and occupant ejection and to discuss the findings of the ejection mitigation status report released the previous November.
- Sept. 1999 NHTSA proposes that no doors open in frontal crash testing, but at least one door should be able to be opened following the test.
- Nov. 1999 NHTSA deletes proposed door retention/opening requirements.
- Nov. 1999 NHTSA issues “Ejection Mitigation Using Advanced Glazing, Status Report II.”<sup>10</sup> Findings in both the 1995 and 1999 status reports show that advanced glazing is capable of preventing approximately 1,300 fatalities per year and that feasible and practical prototypes exist.
- Nov. 2000 NHTSA issues an ANPRM on safety benefits of anti-ejection glazing.
- Nov. 2001 NHTSA issues a report, “Ejection Mitigation Using Advanced Glazing” to Congress, reversing its previous decision that the safety benefits of advanced glazing are very high.
- March 3-6, 2003 *Detroit News* series “Deadly Driving” highlights window strength and door locks/hinges as primary ways NHTSA could enhance safety. The report cites government statistics to show that between 537 and 1,305 fatalities could be prevented annually from improved side windows and that updated door latch standards could prevent hundreds of the 2,500 door-related ejection deaths each year.<sup>11</sup>
- Apr. 2002 NHTSA publishes its report “Characteristics of Fatal Rollover Crashes” and notes that 62 percent of occupants killed in vehicle rollovers were ejected during the crash and that only 23 percent of survivors of rollovers were ejected.
- June 18, 2002 NHTSA withdraws its side glazing rulemaking notices and closes the two dockets established in 1988. The chief decision to terminate was based on the finding of an increased risk of neck injury, yet the test used to measure neck injury was problematic and non-repeatable, and only one of a number of vehicles tested had these negative results.
- Feb. 2003 NHTSA proposes development of global technical regulation governing the design and performance of door locks, latches, and retention components pursuant to the 1998 U.N. Economic Commission for Europe Global Agreement.

- Feb. 26, 2003      Senate Commerce Committee holds a hearing on SUV safety where senators, auto industry representatives, the administrator of NHTSA and spokespeople from consumer safety groups speak about the problems of ejection in SUV rollovers.
- Dec. 2003      In NHTSA's 2003-2007 Priority plan, the agency promises to propose a rule upgrading door lock and latch design and performance by Apr. 2004 and a final rule by 2005.
- Feb. 12, 2004      Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes safety provisions concerning ejection that would:
- Mandate a standard be set to reduce occupant ejection including the consideration of advanced side glazing, side curtain airbags and side impact airbags; and (Notice of Proposed Rulemaking (NPRM) 6-30-2006, Final Rule not later than 18 months following NPRM);
  - Assure the creation of a standard that would require manufacturers to strengthen door locks, latches and retention components of doors to prevent occupant ejection (NPRM 6-30-2006, Final Rule not later than 18 months following NPRM).

## **AGGRESSIVITY AND VEHICLE COMPATIBILITY:**

### **Three Decades of Research: Growing Knowledge Requires Government Action**

*The dangerous design of SUVs and pickups has been responsible for thousands of unnecessary deaths on U.S. highways.*

---

- June 1974 National Highway Traffic Safety Administration (NHTSA) researcher Jerome Kossar presents “Big and Little Car Compatibility”<sup>12</sup> calling for safer bumpers for heavy cars.
- March 1978 NHTSA begins evaluating structural parameters that contribute to vehicle aggressiveness in frontal crashes in its “Five Year Plan.”<sup>13</sup>
- 1979 The American Automobile Association (AAA) commissions a University of Michigan study on aggressivity.
- 1982 The University of Michigan analysis is completed and highlights the growing violence of crashes involving cars, pickups and vans (SUVs are not yet numerous enough to warrant analysis).<sup>14</sup>
- 1984 The Motor Vehicle Manufacturer’s Association (an industry trade association now called the Alliance of Automobile Manufacturers) presents findings of a report on the impact of the weight of light trucks in fatal crashes at the American Association of Automotive Medicine conference, showing that both weight and design are determining factors of aggressivity.<sup>15</sup>
- Jan. 1986 NHTSA examines incompatibility and aggressivity during its Volkswagen Rabbit testing and finds that increasing the design compatibility of a crash barrier reduces injuries and deaths better than reinforcing the side of the Rabbit.<sup>16</sup>
- 1996 - 2000 Numerous papers are published by researchers through the Society of Automotive Engineers and various scientific journals that analyze the contribution of specific aspects of vehicle performance to aggressivity. The consensus is that light truck design and mass pose profound risks to occupants in collisions, and that an aggressivity “metric” is achievable.<sup>17</sup>
- May 1996 A vehicle compatibility working group of regulators and researchers formed at the Fifteenth International Conference on the Enhanced Safety of Vehicles in Melbourne, Australia to explore methodologies to assess aggressivity.

- Feb. 1998 Prompted by the growth in trucks, vans and SUVs (collectively Light Truck Vehicles – LTVs) on the highway, NHTSA publishes an overview of the considerable body of research regarding vehicle compatibility and LTV issues.
- Jan. 12, 1998 NHTSA Administrator Dr. Ricardo Martinez infuriates Detroit automakers by mentioning publicly that they should address the problem of compatibility. One of Detroit’s CEOs responded to Martinez, “My God, don’t touch my cash cow.”<sup>18</sup>
- June 1998 Martinez announces at the International Technical Conference on the Enhanced Safety of Vehicles, a gathering every two years of the world’s top safety regulators and researchers, that NHTSA research and crash tests show that vehicle mismatch between cars and light trucks is causing as many as 2,000 extra deaths each year on American roads.<sup>19</sup> Ford Explorers are tested and found to inflict twice the risk of chest and head injury to the other driver as a car. In response, the auto industry, including Ford Motor Company, promises Dr. Martinez that it will make modifications to achieve safer designs, mainly by adjusting vehicle suspension, but refuses to provide any details of their plans. It is unclear whether any design changes were made to any vehicles.
- Apr. 1998 Insurance Institute for Highway Safety (IIHS) publishes a report on vehicle compatibility research, and its president urges that the “principal focus for incompatibility improvements needs to be on pickups and utility vehicles and the sides of passenger cars.”<sup>20</sup>
- Oct. 1999 IIHS finds that for every million registered vehicles weighing between 3,500 and 3,900 pounds, 45 deaths occur in vehicles struck by these cars while 76 deaths occur in vehicles struck by SUVs in the same weight class. While occupants of a car hit in the side by another car are seven times more likely to die than people inside the striking car, the fatality rate of car occupants is *twenty-six* times higher when the car is broadsided by an SUV or pickup truck.<sup>21</sup> IIHS concludes that changing vehicle geometry and design can improve compatibility.
- Apr. 2000 In a NHTSA report, researcher Hans Joksch examines federal crash data on collisions from 1991-97 and formulates an aggressivity ratio capable of measuring the aggressivity of different vehicle types in crashes.
- June 2001 NHTSA researchers Stephen Summers, Alope Prasad, William T. Hollowell, Alexandra C. Kuchar present a series of papers at the Seventeenth International Conference on Enhanced Safety of Vehicles, Paper No. 354, Amsterdam, Netherlands, concluding that the steady increase in light trucks is leading to a steady increase in fatalities in cars struck by light trucks, even as overall fatalities are in decline. Other

findings were that SUVs inflict twice the number the of fatalities as large cars and that pickup trucks *weighing the same as large cars* still inflict nearly twice the level of fatalities that the large cars do.

- March 2002      Aggressivity research done by Marc Ross, of the University of Michigan, and Tom Wenzel, of Lawrence Berkeley National Laboratory, for the Department of Energy, shows that vehicle design plays an enormous role in the amount of risk a vehicle imposes on other vehicles on the road and charts make/model differences using real-world crash data.<sup>22</sup>
- Apr. 2002      NHTSA research contractor Hans Joksch publishes a report, *Vehicle Design versus Aggressivity*, showing that aggressive design kills: more than 445 people died in 1996 alone in collisions with light trucks who would not have died if the other vehicle in the collision was a car *of the same weight*.<sup>23</sup>
- Fall 2002      NHTSA renews a bilateral agreement with Canada and signs a bilateral agreement with Japan to exchange data and research on vehicle compatibility;
- Feb. 26, 2003      Senate Commerce Committee holds a hearing on SUV safety where senators, the administrator of NHTSA, auto industry representatives and spokespeople from consumer safety groups speak about the incompatibility of SUVs and cars.
- June 2003      NHTSA releases its report, “Initiatives to Address Vehicle Compatibility,”<sup>24</sup> outlining the strategies NHTSA plans to pursue to improve vehicle compatibility. Contrary to the recommendations of the IIHS, the agency focuses upon improvements in side impact protection, and does not address any consideration of changes in the design of light trucks to reduce their aggressiveness in multiple-vehicle crashes.
- July 17, 2003      NHTSA releases its “2002 Annual Assessment of Motor Vehicle Crashes”<sup>25</sup> and notes that between 2001 and 2002, the number of car occupants who died in two-vehicle crashes with a light truck (SUV, van or pickup) increased 1.4 percent (from 4,405 to 4,465) while the number of occupant fatalities in the light trucks decreased 3 percent (from 1,160 to 1,125). NHTSA also found that in two-vehicle crashes between cars and light trucks the car occupants were 3.3 times more likely to be killed in a head-on collision and 20.8 times more likely to die in a side impact crash (with the LTV hitting the side of the car).
- Fall 2003      The Insurance Services Office recalculated its adjustment factors, used voluntarily by hundreds of auto insurers, to account for the growing mismatch on the road. Owners of vehicles that produce the greatest

liability claims will pay up to an additional 25 percent and owners of least aggressive vehicles will be discounted up to 25 percent.

- Dec. 2003 Alliance of Automobile Manufacturers announces a “voluntary program” to address SUV aggressivity issues. The program proposes to phase in side air bags that shield the head and torso by 2007, as well as phasing in lower light truck bumper heights and perhaps lower frame-rail heights for the tallest pickups and sport-utility vehicles. The plan, however, fails to address crucial light truck design problems, such as the steel bars and frame-on-rail construction, which make these vehicles so aggressive. It does not require that all vehicles become compliant with the plan, and no outside body will verify vehicle compliance. Moreover, the plan offers no procedural or judicial oversight, no mechanisms for accountability, no baseline for safety, and no opportunity for public participation or review.
- Feb. 2004 Nissan begins nine-city tour of its first full-size SUV, the Armada, passing on traditional billboard advertisement because, according to Jon Cooper, Nissan’s senior manager of youth and urban communications, “This truck is so aggressive, we didn’t want to show it in a traditional setting.”<sup>26</sup>
- Feb. 12, 2004 Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes provisions addressing aggressivity and incompatibility that would:
- A standard that would reduce vehicle incompatibility and aggressivity for vehicles under 10,000 lbs. that addresses bumper height, weight and additional design characteristics (Notice of Proposed Rulemaking (NPRM) 1-31-07, Final Rule not later than 18 months following NPRM); and
  - Development of a standard rating metric to evaluate compatibility and aggressivity and make it public(NPRM 1-31-07, Final Rule not later than 18 months following NPRM).

## **SIDE IMPACT PROTECTION**

**Decades of Inaction and Thousands of Unnecessary Deaths;  
Still No Standard for Side Impact Airbags and  
Other Major Safety Improvements**

*About 10,000 people die each year in both single- and multiple-vehicle collisions involving side impacts, even though many of these deaths could be prevented by improved side impact safety standards. Side impact crashes have increased in both severity and the number of deaths over the past decade due primarily to the explosive growth in the number of aggressively designed sport utility vehicles in the nation's fleet. Purchases of SUVs, pickup trucks, and large vans now comprise one-half of annual sales of new passenger vehicles.*

*Not only has the federal government dragged its feet to prevent terribly destructive truck designs, but the National Highway Traffic Safety Administration (NHTSA) has made little progress toward improving side impact occupant protection, despite proven technologies such as side air bags.*

---

### **Lower Interior Side Impact Protection (FMVSS No. 214):**

- |              |  |
|--------------|--|
| Jan. 1, 1973 | NHTSA's quasi static side impact test takes effect for passenger cars. The test relies on pressing a cylinder against passenger vehicle doors and results in moderate improvements in vehicles resisting intrusion, particularly from poles. |
| Dec. 6, 1979 | NHTSA issues an advanced notice of proposed rulemaking (ANPRM) on upgrading the side impact standard and broadening its scope to include all passenger carrying vehicles.  |
| 1980s        | NHTSA begins testing passenger vehicle side impact strength and occupant protection when vehicles strike poles in side impact crashes.   |
| Jan. 1988    | NHTSA proposes adding a more demanding dynamic test procedure that uses a moving barrier simulating another car to test car side impact safety performance.  |
| Aug. 1988    | NHTSA proposes updating lower interior side impact protection, including the use of dynamic tests and the need to address the problems of deep intrusion from narrow, fixed roadside objects, such as telephone poles.                       |
| Dec. 1989    | NHTSA proposes to extend the cylinder test requirements introduced in 1971-1980 to light trucks, buses, and multipurpose passenger vehicles (MPVs).  |

- Oct. 30, 1990 NHTSA adopts a dynamic side impact protection requirement, but only applies it to passenger cars. It also establishes requirements for a special side impact dummy and a moveable barrier similar to a medium-sized car to be used in dynamic side impact compliance testing. Most vehicles already comply with the meager occupant protection requirements for pelvis and thorax injury, and the other actions primarily comprise the use of special padding. The standard was phased in, with partial compliance necessary by 1994 and full compliance required by 1998.
- Nov. 1991 Congress requires NHTSA to conduct rulemaking for the purpose of extending dynamic side impact protection requirements beyond passenger cars to include light trucks, vans, and SUVs with gross vehicle weight ratings (GVWRs) of 8,500 lbs. or less.
- June 1992 NHTSA opens to public comment the proposal for extending the dynamic side impact standard to larger passenger vehicles.
- Sept. 1, 1993 The quasi static test, made applicable to passenger cars in 1973, is extended to other passenger vehicles.
- June 1994 NHTSA proposes to apply the dynamic side impact protection requirements to light trucks, vans, and SUVs weighing 8,500 lbs. GVWR or less.
- July 1995 NHTSA extends its dynamic side impact test requirements beyond cars to include light trucks, vans, and sport utility vehicles (LTVs). However, the agency restricts compliance only to such vehicles 6,000 pounds GVWR or less. NHTSA rejects safety community arguments that the moveable barrier used for testing is too low and too light to show the side impact dangers of light trucks, especially smaller makes and models being struck by other large, tall, heavy LTVs. Full compliance not required until 1999.
- July 1998 Safety organizations petition NHTSA to strengthen in specific ways the side impact standards for both lower interior and upper interior occupant protection, asking that the agency more closely coordinate the standards.
- Mar. 1999 NHTSA holds public meeting on benefits of side impact air bags.
- Oct. 1999 NHTSA grants a petition from Advocates for Highway and Auto Safety the Center for Auto Safety to improve the standard, but no rulemaking has occurred to date.
- Dec. 1999 NHTSA opens to public comment a technical report authored by the agency on the relationship between the two injury measures (pelvic acceleration and Thoracic Trauma Index) used to determine compliance with the standard.

- May 2000 NHTSA partially grants a petition from American Automobile Manufacturers Association (AAMA), Association of International Automobile Manufacturers (AIAM), and the IIHS asking the agency to use European side impact test criteria and crash dummies.
- Feb. 12, 2004 Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes provisions addressing side impact protection that would:
- Require the evaluation of additional barriers and measurements of head and neck injuries, consider the need for new dummies for full range of occupants, and review IIHS side impact test criteria (NPRM 6-30-04, not later than 18 months following NPRM).

**Upper Interior Side Impact Head Protection (FMVSS No. 201):**

- 1970s GM begins to improve head impact performance in its vehicles with such technologies as air gap head impact padding (overlapping semicircles of thin aluminum) in critical roof areas.
- 1980s By the 1980s, GM discontinues including such protections as air gap padding in most of its vehicles.
- 1981-1982 NHTSA and automakers begin cooperative research effort into upper interior head protection. The agency conducts its own research after the settlement of a lawsuit regarding conflicts with joint industry-agency research for government standards.
- 1988 NHTSA gives long-delayed regulatory notice of its interest in upgrading the interior impact protection safety standard to require head protection.
- Dec. 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) requires application of passenger car safety standards to light trucks, vans, buses, and MPVs 6,000 lbs. GVWR or less. ISTEA also requires issuance of a standard to prevent head injury, specifically mentioning the front header and roof.
- Feb 1993 NHTSA proposes requiring both front and side impact upper interior head protection, but excludes roofs above their pillars, rails and headers.
- Nov 1993 NHTSA conducts public meeting on the issues in the February 1993 proposed safety standard.
- Aug 1995 Responding to a 1991 ISTEA requirement that NHTSA initiate and complete a rulemaking to address “improved head impact protection from interior components of passenger cars (i.e., roof rails, pillars and front

headers),” the agency establishes minimum head protection requirements for both frontal and side impact with upper interior vehicle components. The changes apply to both passenger cars and light trucks 10,000 lbs. GVWR or less. The updated standard requires some manufacturers to soften head impacts with these interior features by adding foam padding and other countermeasures, but does not address roof strength.

- Mar. 1996 NHTSA issues an ANPRM to evaluate public responses to issues involving the use of dynamic upper interior head impact systems.
- Aug. 1997 NHTSA proposes amendment to FMVSS No. 201 for both frontal and side impact upper interior head protection, adding two test procedures to accommodate development of dynamic upper interior head impact protection systems, such as side-head air bags. However, the criteria must be used only if manufacturers choose to use dynamic rather than static systems for head protection. The proposed standard is weak and undemanding, requiring few safety improvements by vehicle manufacturers.
- Dec. 1997 NHTSA proposes a new upper interior head impact test dummy composed of parts of two existing test dummies, the Hybrid III (torso) and the Side Impact Dummy (head).
- Aug. 1998 NHTSA issues requirements for passenger cars, trucks, buses, and MPVs 10,000 lbs. GVWR or less to provide optional dynamic protection when an occupant’s head strikes the vehicle upper interior components such as roof pillars, roof side rails and headers, and the roof itself. However, the rule permits but does not require the use of dynamic protection, such as air bags.
- Aug. 1998 NHTSA also adopts specifications for a new composite test dummy to be used for compliance tests. The dummy is a composite of the existing Hybrid III dummy torso with a new Free Motion Headform taken from the Side Impact Dummy.
- May. 1999 In a letter to the Alliance of Automobile Manufacturers dated May 9, NHTSA Administrator Dr. Ricardo Martinez expresses interest in the development of industry-generated, voluntary testing procedures to ensure side and head protection air bag safety, and “avoid the need for Federal standards in this area.”
- Aug. 1999 The Alliance of Automobile Manufacturers, in response to Administrator Martinez’s letter, establishes a “Technical Working Group” (TWG) to develop side air bag occupant crash protection test procedures. TWG is comprised of representatives from the Alliance, Association of International Automobile Manufacturers, Automotive Occupant Restraints

Council (a trade group of restraint manufacturers), NHTSA, Transport Canada, the insurance industry and academia. Significantly, the goal of TWG is not to achieve the actual installation of side air bags in vehicles, but only to develop a test. Contrary to Dr. Martinez's request, consumer representatives are excluded.

- Apr. 2000 NHTSA proposes to amend technical features of Standard No. 201 with respect to the minimum distance between compliance test target points. However, no final rule has been issued to date.
- Aug. 2000 The TWG releases its recommended procedures for evaluating occupant injury risk from deploying side air bags. The test procedures are the result of closed deliberations and, because they are voluntary, offer no procedural oversight by third parties, no outside verification of test compliance, no mechanism for accountability should an air bag system turn out to be a clear safety danger, and no assurance they will be used by all companies.
- 2002 More than 20 years after NHTSA's research began — and more than 30 years after GM began installing head impact protection in its vehicles — the upgrade of the upper interior protection safety standard is completely phased-in.
- Meanwhile, FM, in cost-cutting measures, makes side-air bags — as well as anti-lock brakes — optional equipment in a number of models where they had been standard.
- Aug. 2003 The IIHS finds that only 24 percent of 2003 vehicle models offer head-protection side air bags as standard equipment. Moreover, these vehicles tend to be more expensive foreign vehicles.
- Nov. 2003 A national household survey by the Insurance Research Council finds that 85 percent of respondents were aware that automakers had begun to equip some vehicles with side impact air bags, and six in ten respondents stated that the availability of side air bags would be an important consideration in the selection of their next vehicle.
- Dec. 2003 The Alliance of Automobile Manufacturers announces a voluntary plan to test side air bags for most new vehicles by 2009. The plan, however, does not make any specific commitment to redesigning vehicles to improve side impact safety. Moreover, there is no requirement that all vehicles comply with the plan, and no outside body will verify vehicle compliance. The voluntary “standard” is developed in closed, secret deliberations, involves no procedural or judicial oversight, and provides no mechanisms for accountability.

Feb. 12, 2004

Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes provisions addressing side impact protection that would:

- Require the evaluation of additional barriers and measurements of head and neck injuries, consider the need for new dummies for full range of occupants, and review Insurance Institute for Highway and Safety side impact test criteria (NPRM 6-30-04, not later than 18 months following NPRM).

# 15-PASSENGER VAN SAFETY HAZARDS

## Thirty Years of Faulty Design and Agency Inaction

*The dangerous design of 15-passenger vans has been responsible for the deaths of too many Americans, yet the vans continue to carry families, church and school groups on outings.*

---

- 1971 The full-size Dodge Ram Wagon passenger van, one of the oldest 15-passenger vans, hits the showroom.
- 1972 During the development of the Ford E-series 15-passenger van, Ford recognizes the feasibility of using dual rear wheels to enhance load capacity, better traction and handling characteristics, but decides against this design for cost reasons.
- 1979 Ford introduces its E-series 15-passenger van, with the same wheelbase of their traditional van and an added 18-inch overhang in the rear to seat additional passengers.
- 1992 The National Highway Traffic Safety Administration (NHTSA) publishes “A Statistical Analysis of Vehicle Rollover Propensity and Vehicle Stability”<sup>27</sup> and shows that loading additional passengers into a vehicle has a negative effect on both the static stability factor and the tilt table performance of a variety of vehicles. Fifteen-passenger vans were not included in this original study.
- Nov. 4 1993 Value Rent-A-Car sends a letter to Ford, following a rash of rollovers involving Value’s Ford Aerostar 15-passenger vans, asking Ford to send them additional safety information relating to the vehicle. Ford responds by asking that Value “not put things like this in writing,” and did nothing. Value places its own warning sticker on the vans.
- 1993 NHTSA sends its first set of letters to the National Automobile Dealers Association, state directors of pupil transportation and independent education groups outlining the Federal requirements for school bus safety and NHTSA’s policy that pre-school and school aged children not be transported in 15-passenger vans due to safety concerns. Similar letters are sent in 1997 and 2001.
- Jan. 2000 The National Association of State Directors of Pupil Transportation issues a report and statement suggesting that educational institutions should transport students in school busses, which are held to strict safety standards, not in 15-passenger or other high-occupancy vans, that are not held to these standards.

- Apr. 2001 NHTSA releases a Research Note<sup>28</sup> on the rollover propensity of 15-passenger vans finding that, for example, a fully loaded 15-passenger van has 6 times the rollover risk, in a single vehicle accident, of the same van with only 5 passengers. NHTSA also issues a Consumer Advisory warning consumers about the risks of 15-passenger vans.
- Apr. 2002 NHTSA issues a second Consumer Advisory warning of 15-passenger van hazards.
- Apr. 2002 GuideOne, a leading insurer of churches and their vehicles, stops selling new policies to owners of 15-passenger vans. Numerous smaller insurers follow suit.
- June 2002 DaimlerChrysler discontinues production of 15-passenger vans.
- Nov. 1 2002 The National Transportation Safety Board issues a safety report on 15-passenger vans which includes recommendations to address the safety hazards of the vans, directed to General Motors, Ford and NHTSA.
- Nov. 21, 2002 Public Citizen releases “Stopping Rollovers: The Dual-Wheel Solution for 15-Passenger Vans,” detailing the danger of 15-passenger vans, suggesting a dual-wheel solution to the vans’ stability problems and calling on NHTSA and manufacturers to make the vans safer.
- Nov. 2002 NHTSA, partnering with the Health Resources and Services Administration and the American Academy of Pediatrics, announces a training program for child care providers to educate them on the benefits of transporting children in school busses versus 15-passenger vans.
- March 2003 Sen. Olympia Snowe (R-Maine) introduces S.717, the Passenger Van Safety Act of 2003, to address 15-passenger van safety. Rep. Mark Udall (D-Colo.) introduces a similar bill, H.R. 1641, in the House of Representatives.
- July 15, 2003 An National Transportation Safety Board investigation into two different 15-passenger van crashes concludes that “contributing to the severity of the injuries was the lack of appropriate Federal Motor Vehicle Safety Standards applicable to 15-passenger vans in the areas of restraints and occupant protection,” and makes recommendations to improve 15-passenger van classification, driver training, occupant protection, and tire condition, inspection and maintenance.
- Sept. 25, 2003 California Assembly Member Carol Liu’s 15-Passenger Van Safety bill, AB 626 becomes law, restricting the use of these vans in the state;

- Sept. 2003
- NHTSA issues an Action Plan for 15-passenger Van Safety that calls for:
- additional research;
  - evaluation of a rollover-hazard label for the vans;
  - passage of a rule requiring lap and shoulder belts in all seating positions for all vehicles, including 15-passenger vans, up to 10,000 lbs. GVWR;
  - inclusion of 15-passenger vans in the upgrade of the as-yet un-issued and long delayed side impact protection rule; and
  - inclusion of 15-passenger vans in the upgrade of the as-yet un-issued and long-delayed roof crush rule.
- Feb. 12, 2004
- Senate passes S.1072, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA 2003), which includes provisions addressing 15-passenger vans that would:
- Include all 15-passenger vans in NHTSA's dynamic rollover testing program (Final Rule by 9-31-05);
  - Require 15-passenger vans to comply with all existing and prospective FMVSS Safety Standards for occupant protection and vehicle crash avoidance that are relevant to them (Final Rule by 9-31-05);
  - Include 15-passenger vans in NHTSA's New Car Assessment testing and rating program (Final Rule by 9-31-05); and
  - Require an evaluation of technologies, like electronic stability control systems, that could assist 15-passenger van operators in controlling the vehicles.
- Today
- 15-Passenger vans continue to be exempt from numerous federal safety standards including the following:
- FMVSS 201: Occupant Protection in Interior Impact (15-passenger vans exempted from upper interior head protection). This standard specifies requirements to afford impact protection for occupants.<sup>29</sup>
  - FMVSS 202: Head Restraints (15-passenger vans exempted from placing head restraints in rear seating positions). This standard specifies requirements for head restraints to reduce the frequency and severity of neck injury in rear-end and other collisions.<sup>30</sup>
  - FMVSS 206: Door Locks and Door Retention Components. This standard specifies requirements for side door locks and side door retention components including latches, hinges and other supporting means, to minimize the likelihood of occupants being thrown from the vehicle as a result of impact.<sup>31</sup>
  - FMVSS 214: Side Impact Protection (15-passenger vans exempted from dynamic test). This standard specifies performance requirements for protection of occupants in side impact crashes. Its purpose is to reduce the risk to vehicle occupants in side impact crashes by specifying vehicle crashworthiness requirements in terms of

accelerations measured on anthropomorphic dummies in test crashes, by specifying strength requirements for side doors, and by other means.<sup>32</sup>

- FMVSS 216: Roof Crush Resistance. This standard establishes strength requirements for the passenger compartment roof. Its purpose is to reduce the crushing of the roof into the passenger compartment in rollover accidents.<sup>33</sup>
- 49 CFR 575.105: Rollover Warning Label. This section requires manufacturers of utility vehicles to alert the drivers of those vehicles that they have a higher possibility of rollover than other vehicle types and to advise them of steps that can be taken to reduce the possibility of rollover and/or to reduce the likelihood of injury in a rollover.<sup>34</sup>

# **POWER-OPERATED WINDOWS AND POWER SWITCHES:**

Over a Decade of Needless Child Injuries and Deaths

---

- Apr. 1991 NHTSA issues rule adopting Federal Motor Vehicle Safety Standard No. 118 to minimize the likelihood of death or injury from accidental operation of power windows, partitions and roof panels.
- 1991-1996 Evidence increases that power windows are nevertheless entrapping and injury small children, in particular, resulting either in deaths or serious injuries.
- Sept. 1995 NHTSA receives a petition to open rulemaking to adopt power window automatic reversal safety features and to amend the existing standard to prevent inadvertent power window closings.
- Aug. 1996 NHTSA proposes amending Standard No. 118 to permit, but not to require, infrared detection systems to stop power windows, partitions and roof panels from closing when there is an intervening object. NHTSA also asks if “express-up” power function should be allowed for power windows. Safety groups argue that prevention of power window and other panel entrapments should be required, not just permitted, and express doubts about the safety of “express-up” power window operation. No further rulemaking is conducted by NHTSA to date.
- Nov. 1996 NHTSA proposes a rule for controlling the ease with which a child can inadvertently trigger a power window switch. However, safety organizations point out in docket comments that the design restriction is not sufficient to stop children from activating switches with their elbows and therefore is inadequate. No further rulemaking is conducted by NHTSA.
- Jan. 2003 The Zoie Foundation petitions NHTSA to change the power switches on passenger vehicles to prevent children from being crushed by power windows. No reply has been received from the agency to date.
- Sept. 2003 Several major safety organizations petition NHTSA to change the standard to prevent dangerous power window closings by changing the power switch operation and also to require automatic reversal systems to prevent deaths and injuries. To date, no action has been taken on the merits of the petition.

# TIRE SAFETY STANDARDS

## Tire Safety Performance Requirements Still Not Comprehensive

In the 1966 law, the National Traffic and Motor Vehicle Safety Act, the U.S. Secretary of Transportation was required to prescribe a uniform quality grading system for motor vehicle tires that applied only to passenger car tires. This rating program, the Uniform Tire Quality Grading Standards (UTQGS), is for consumer information purposes only and does not establish any safety performance requirements for tire manufacturers to meet. Subsequently, tire safety performance standards were issued but were inadequate in many areas, yet were left essentially unchanged by the agency for decades.

In 2000, Congress passed the Transportation Recall Enhancement, Accountability, and Documentation Act (TREAD) that directed NHTSA to adopt a new regulation improving the safety performance of passenger vehicle tires in several critical areas. Congress found that the existing tire standards were not sufficiently stringent to prevent tire failure, especially when tires are underinflated. However, the agency final rule adopted in response to the TREAD Act did not establish standards in all the areas necessary to have comprehensive federal regulations governing in-service tire safety performance, although they did apply to light trucks up to 10,000 lbs. gross vehicle weight.

---

Nov. 1970	NHTSA adopts basic tire standards. Criteria for bead unseating and other requirements are based on bias-ply tires.
July 1978	NHTSA adopts a revised and improved UTQGS.
June 1994	NHTSA issues notice with request for comments on potential substitution of a rolling resistance rating in lieu of the current temperature rating, and the adoption of a super-traction rating of "AA." Safety organizations oppose these tentative proposals.
July 1995	NHTSA publishes notice of proposed rulemaking to adopt a "super-traction" rating of "AA" and to replace the current temperature resistance grading system with a rolling resistance/fuel economy grade. Safety organizations strongly oppose both proposals, pointing out that the agency was not requiring a uniform improvement in the actual grading criteria for traction and that a rolling resistance standard could produce tires prone to skidding in wet weather and having poor high temperature resistance. The agency does not respond to safety community objections and arguments that the agency is changing the UTQGS without actually improving the safety performance of tires.

- July 1995 NHTSA holds a public meeting on the regulatory proposal. Safety representatives make a presentation strongly opposing the UTQGS changes.
- Sept. 1996 NHTSA issues a final rule adopting a super-traction grade of “AA,” despite safety organization arguments that the regulatory change does not actually require tire manufacturers to change the current traction quality of their products.
- 1998-1999 Rubber and tire manufacturers approach NHTSA with proposal for a globally harmonized tire standard to simplify testing and compliance for certifying tires sold in the U.S.
- Nov. 1999 NHTSA expresses concerns at a public meeting of the European Economic Community Working Group on brakes and running gears that the proposed criteria for the “Global Tire Standard 2000” (GRS 2000) are too weak and inadequate. NHTSA also acknowledges at the meeting that all the agency’s tire standards are outdated and in need of basic changes. Although radial tires have displaced bias ply tires, the existing standards were written for the bias ply tires.
- 1995-2000 Tread separations and resulting crashes increase among Bridgestone/Firestone tires mounted on Ford Explorers, causing hundreds of deaths and injuries in rollover crashes that are unknown to the public and not evaluated by NHTSA.
- Aug. 2000 Following a NHTSA investigation — sparked by two stories by KHOU TV in Houston, TX — and the disclosure that Ford recalled some tires in Saudi Arabia, Ford and Firestone conduct a “voluntary” recall of 6.5 million tires used on Explorers for tread separation.
- Nov. 2000 Congress enacts the Tire Recall Enhancement, Accountability, and Documentation (TREAD) Act that requires NHTSA to upgrade tire performance standards and tire consumer information programs, among other issues.
- Nov. 2002 NHTSA establishes a standard for light vehicle tires, FMVSS No. 139, *New Pneumatic Tires for Light Vehicles*, to improve the information readily available to consumers about their vehicles’ tires, particularly tire labeling, effective Sept. 2003.
- Mar. 2002 NHTSA publishes a notice of proposed rulemaking to upgrade several existing standards and also to establish new standards in critical tire safety areas not previously addressed in the agency’s tire safety requirements.

June 2003

NHTSA issues final rule to improve tire safety, concentrating particularly on tire endurance and speed performance to reduce failure and extends the standard to tires used by light trucks and vans. However, the agency leaves major areas of the proposed standard unfinished including reducing failure from tire impacts with road hazards, improving tire resistance to unbeading, and controlling tire failure because of gradual deterioration during tire service life. The agency also has not addressed the issue of tire wet weather anti-skidding performance, an issue specifically directed by Congress in separate legislation.

# SEAT BELT REMINDER TECHNOLOGY

## Thirty-Year-Old 8-Second Minder is Insufficient

- 
- 1968 Federal occupant protection standard requiring front outboard lap and shoulder belts takes effect, lap belts at other seating positions.
- 1972 Because of low seat belt use rates (12-15 percent) passenger vehicles are required to have reminder systems using a combined flashing warning light and audible buzzing sound of at least 60-seconds in duration to remind front seat occupants to buckle their seat belts.
- Aug. 1973 All new vehicles are required to be equipped with either passive restraints (air bags) or a seat belt-ignition interlock, to prevent engine from starting unless driver and passenger seat belts are buckled. The audible buzzer-visual light system would engage if the seat belt was unbuckled after the engine was started. Belt use in model year (MY) 1973 vehicles was reported at 28 percent.
- 1974 Other than 10,000 air bag equipped vehicles sold by General Motors, all new MY 1974 vehicles are equipped with seat belt-ignition interlocks.
- Oct. 1974 Despite fact that seat belt-ignition interlocks increase seat belt use rate to as high as 60 percent, Congress enacts legislation to prohibit use of seat belt-ignition interlock and to limit any audible reminder (buzzer) for seat belt use to not longer than 8 seconds in duration after engine ignition. *See* 49 USC § 30124.
- Oct. 1975 NHTSA issues rule rescinding seat belt-ignition interlock option and adopts a 4-8 second audible reminder.
- 1990s European vehicle manufacturers develop seat belt use reminder systems using chimes and other audible sounds, which become more insistent based on increasing vehicle speed or distance driven.
- 2000 Ford Motor Company begins voluntarily installing belt minder system in certain makes and models.
- 2001 Congress requests NHTSA to study seat belt reminder technologies in the conference report accompanying the DOT Appropriations Act for FY 2002.
- 2002 NHTSA Chief Counsel issues interpretive ruling that voluntary seat belt use reminder systems must be readily distinguishable in either sound or

timing from the required 4-8 second audible buzzer required by federal law.

2003

National Academy of Sciences conducts study of new seat belt reminder technologies for NHTSA, recommending, among other actions, that all new light-duty vehicles be equipped with an enhanced belt reminder system that includes an audible warning and a visual indicator for front seat occupants and that the current 4-8 second limitation on audible warnings be amended to increase the time limit. *See Buckling Up: Technologies to Increase Seat Belt Use*, Transportation Research Board Special Report No. 278 (prepublication copy available online at <http://trb.org/publications/sr/sr278.pdf>).

Feb. 12, 2004

Senate passes S.1072, the Highway Trust Fund Bill, that includes safety provisions concerning seat belt minders that would:

- Require NHTSA to pass a rule addressing alternate means to encourage increased belt usage in vehicles under 10,000 GVWR that considers alternative means to encourage increased usage including intermittent or continuous audible or visual reminders and features to prevent operation of convenience or entertainment features.

## Endnotes: Chapter Two

---

<sup>1</sup> Planning Document for Rollover Prevention and Injury Mitigation. Docket 91-68. No. 1. Office of Vehicle Safety Standards, Sept., 13 pp. NHTSA. 1993

<sup>2</sup> *Shopping for Safety: Providing consumer automotive safety information*, Transportation Research Board, National Research Council, National Academy Press, 1996.

<sup>3</sup> NCSA, *Characteristics of Rollover Crashes*, DOT HS 809 438, (Apr. 2002), at 14 and 20; *See also* "Registration Data for 1975-2001

<sup>4</sup> National Highway Traffic Safety Administration; *Initiatives to Address the Mitigation of Vehicle Rollover.*, 2003. 50 IAMV NHTSA

<sup>5</sup> National Center for Statistics and Analysis, National Highway Traffic Safety Administration. *2002 Annual assessment of motor vehicle crashes. Motor vehicle traffic crash fatality and injury estimates for 2002*. Washington, DC: NCSA, 2003

<sup>6</sup> Herbst, B., Forrest, S., Meyer, S., Hock, D., "Alternative Roof Crush Resistance Testing with Production and Reinforced Roof Structures", SAE 2002-01-2076

<sup>7</sup> NCSA, *Characteristics of Rollover Crashes*, DOT HS 809 438, (Apr. 2002), at 14 and 20; *See also* "Registration Data for 1975-2001

<sup>8</sup> Runge, Jeffrey. Speech to the 3<sup>rd</sup> Motor Vehicle Safety Symposium, United Nations University, Tokyo, Japan, September 17, 2002. < <http://www.nhtsa.dot.gov/nhtsa/announce/speeches/020917Runge/UNU%20speech.doc>>

<sup>9</sup> NHTSA Advanced Glazing Research Team; "Ejection Mitigation Using Advanced Glazing: A Status Report;" November 1995; NHTSA Docket 95-41 GR.

<sup>10</sup> NHTSA Advanced Glazing Research Team; "Ejection Mitigation Using Advanced Glazing, Status Report II, August 1999;" August 1999; NHTSA Docket 95-41 GR

<sup>11</sup> Zagaroli, Lisa; "Agency quietly rejects stronger glass standard," *The Detroit News* March 3, 2003.

<sup>12</sup> Kossar, Jerome M., "Big and Little Car Compatibility," Report on the Fifth International Technical Conference on Experimental Safety Vehicles, London, June 1974

<sup>13</sup> Five Year Plan for Motor Vehicle Safety and Fuel Economy and Invitation for Applications for Financial Assistance, National Highway Traffic Safety Administration, Docket No. 78-07, Notice 1, March 1978.

<sup>14</sup> Wolfe, Aurthur C., and Oliver M. Carsten, "Study of Car/Truck Crashes in the United States," Highway Safety Research Institute, University of Michigan, 1982.

<sup>15</sup> Terhune, Kenneth W., and Thomas A. Ranney, "Components of Vehicle Aggressiveness," 28<sup>th</sup> Annual Proceedings of the American Association for Automotive Medicine, 1984.

<sup>16</sup> Monk, Michael W., and Donald T. Willke, "Striking Vehicle Aggressiveness Factors for Side Impact," National Highway Traffic Safety Administration, 1986.

<sup>17</sup> *See, e.g.*, Hollowell Gabler, "NHTSA's Vehicle Aggressivity and Compatibility Research Program," 16<sup>th</sup> International ESV Conference, Paper No. 98-S#-O-01 (1996); Hollowell Gabler "The Aggressivity of Light Trucks and Vans in Traffic Crashes," SAE Paper No. 980908 (1998); K. Digges, A. Eigen and J. Harrison, "Application of Load Cell Barrier Data to Assess Vehicle Crash Performance and Compatibility," SAE paper no. 1999-01-0720, 1999; K. Digges and A. Eigen, "Analysis of Load Cell Barrier Data to Assess Vehicle Compatibility," SAE paper no. 2000-01-0051 (March 2000); Gabler, Hampton C. and Hollowell, William T., "The Crash Compatibility of Cars and Light Trucks," Journal of Crash Protections and Injury Control, Volume 2, Issue 1, pp. 19-31, March 2000; K. H. Digges and A.M.Eigen, "Load Cell Barrier Measurements of Geometric Compatibility," Vehicle Safety 2000, I Mech E, London, June 2000; K. Digges and A. Eigen "Measurements of Stiffness and Geometric Compatibility in front-to-side crashes," ESV Conference, Amsterdam, Holland, Paper Number 349, 2001.

<sup>18</sup> Bradsher, Keith, "High and Mighty: The Dangerous Rise of the SUV," Public Affairs, New York 2002 at 1989.

<sup>19</sup> *See* Bradsher, Keith. "Light Trucks Will Get Designs That Are Safer, Official Says," *New York Times*, June 2, 1998, (quoting then-NHTSA Administrator Dr. Ricardo Martinez).

<sup>20</sup> IIHS Status Report: Crash Compatibility, How Vehicle Type, Weight Affect Outcomes, Feb. 14, 1998, at 10-11.

<sup>21</sup> Insurance Institute for Highway Safety *Status Report*, Vol. 34, No.9, Oct 30, 1999 p. 3.

<sup>22</sup> Marc Ross and Tom Wenzel, "An Analysis of Traffic Deaths by Vehicle Type and Model," U.S. Department of Energy LBNL-49675, Washington, DC Mar. 2002.

<sup>23</sup> *See* Joks, Hans C., "Vehicle Design versus Aggressivity," Apr. 2002 at 41. Further calculations by Hans Joks state that: "In 1996, 890 car occupants died in collisions with SUVs. If the risk in collisions with cars of the same weight had been half as high, as estimated at that time, 445 deaths would not have occurred if SUVs had been replaced by cars of the same weight." Email from Hans Joks on February 24, 2003 (on file at Public Citizen).

---

<sup>24</sup> "Initiatives to Address Vehicle Compatibility," June 2003, 68 FR 36534, and Docket NHTSA-2003-14622.

<sup>25</sup> National Center for Statistics and Analysis, National Highway Traffic Safety Administration. 2002 Annual assessment of motor vehicle crashes. Motor vehicle traffic crash fatality and injury estimates for 2002. Washington, DC: NCSA, 2003

<sup>26</sup> Haliday, Jean "Marketing: Nissan 'cube' touts Armada," *Automotive News*, March 1, 2004.

<sup>27</sup> T.M. Klein, *A Statistical Analysis of Vehicle Rollover Propensity and Vehicle Stability*, SAE Tech. Pap. 920584 (Warrendale, PA: Society of Automotive Engineers, 1992) 135-150.

<sup>28</sup> W. Riley Garrott, Barbara Rhea, Rajesh Subramanian, and Gary J. Heydinger, *The Rollover Propensity of Fifteen-Passenger Vans*, Research Note (Washington, DC: NHTSA, Apr. 2001).

<sup>29</sup> *See* 49 CFR § 571.201.

<sup>30</sup> *See* 49 CFR § 571.202.

<sup>31</sup> *See* 49 CFR § 571.206.

<sup>32</sup> *See* 49 CFR § 571.214.

<sup>33</sup> *See* 49 CFR § 571.216.

<sup>34</sup> *See* 49 CFR § 575.105.



---

## Chapter Three: Safety Equipment and Suppliers

---

<p><b>AUTOMOTIVE SAFETY TECHNOLOGIES</b> <b>AVAILABLE FROM AUTOMOTIVE SUPPLIERS</b></p>
---

*Despite the failure of manufacturers to install sufficient occupant protections to reduce highway deaths and injuries — particularly those in rollover crashes — and in spite of the absence of federal standards to mandate such protections, there is a wide selection of safety technologies already available from automotive suppliers that would reduce rollover deaths and injuries.*

*The following is a short list of some of the major automotive suppliers and examples of safety-related technology they provide, particularly technology oriented towards mitigating the risk of vehicle rollover or minimizing the harm caused should the vehicle roll.\**

---

### **Continental Teves**

- Electronic air suspension system
- Cruise control that adapts as surrounding traffic changes
- Reversible seat belt pretensioner
- Electronic brake systems
- Electronic stability program (ESP)
- Electro hydraulic brake (EHB)
- Electro mechanical brake (EMB)
- Deflation detection system (DDS)
- Tire pressure monitoring system (TPMS)
- Electronic air suspension system (EAS)

### **Autoliv**

- Restraint system integrated into seat (“Belt-In-Seat”)
- “Belt Grabber,” which prevents a payout of the belt as loading increases
- Height-adjustable upper anchorage point for shoulder belt, to improve safety belt geometry

---

\* The use of automotive supplier company names should not be interpreted as any kind of endorsement of any supplier company or its products. Furthermore, the lists of products are not complete and are not meant to reflect the comparative range of products available from various suppliers. The lists are only provided to allow consumers to understand the general range of automotive safety technologies available.

---

- Load limiter
- Safety belt pretensioner
- Inertial release-resistant safety belt buckle
- Seat belt beam, facilitating a complete 3-point retractor belt in the mid-rear seat, especially in hatchbacks and station wagons, which also provides passengers with improved side-impact protection
- “Smart Belt,” which adapts its restraining force to the severity of the crash and to the restraining force of the air bag
- Head-thorax air bag and thorax air bag
- Side impact air bag
- A head side impact air bag, Inflatable Tubular Structure (ITS)

### **TRW Automotive**

- Safety belt pretensioner
- Restraint system integrated into seat
- Inflatable safety belts
- Single-Point Automotive Restraint Control system (SPARCS), which makes restraints sensitive and adaptive to front, rear and side impacts
- Vehicle Stability Enhancement System (VSES)
- Child restraints integrated into seat
- Thorax, head, and combined head/thorax side impact air bag systems

### **Delphi Corporation**

- Side impact air bag
- Head/torso side impact air bag
- Buckle pretensioner
- Height-adjustable upper anchorage point for shoulder belt, to improve safety belt geometry
- Load limiter
- Emergency locking retractor
- Dual beam radar back-up aid (“Forewarn”)
- Adaptive cruise control with driver alert (“Forewarn”)
- Side and front impact sensors
- Occupant position detection system

### **Takata**

- Restraint system integrated into seat
- Retractor pretensioners
- Buckle pretensioners
- Energy management retractors
- Seat belt tension reducers

- Low friction guide loops
- Rollover detector
- Restraint control modules, which makes restraints sensitive and adaptive to front, rear and side impacts
- Belt tension sensor
- Inflatable safety belts
- Intelligent energy management retractors
- Dual stage energy management retractors

### **Key Safety Systems**

- Pretensioners
- Load limiters
- Seat belt tension sensor
- Crash sensor
- Side impact air bags
- Seat track position sensor
- Inflatable safety belts

### **Robert Bosch**

- Rollover sensor
- Restraint system sensor
- Side and front impact sensors
- Front air bag sensors
- Occupant position detection system
- Crash severity sensor, making occupant safety technologies like air bags more adaptive to the mode and severity of the crash
- Electronic Stability Program (ESP)
- Power-assisted braking
- Traction Control System (TCS)
- Modular Anti-lock Braking System (ABS)

## 2004 MODEL YEAR SAFETY EQUIPMENT Side Impact Air Bags, Laminated Side-Window Safety Glass, Backover Prevention Technology, and Rollover Safety Belt Pretensioners

Forty-seven percent of 2004 model-year vehicles offered head-protection side air bags, but only 27 percent offered the protection as standard equipment.<sup>1</sup> Of model year 2003 cars tested by the National Highway Traffic Safety Administration (NHTSA) in the New Car Assessment Program (NCAP), Electronic Stability Control (ESC) was standard on 22 percent of cars and optional on 17 percent. At least two dozen 2004 vehicle models offer a rearview camera or sensor; only one fourth of these vehicles, however, offer this technology as standard equipment. In addition, at least one 2004 model offers standard rollover safety belt pretensioners.

### 2004 MODEL YEAR SAFETY EQUIPMENT: Side Airbags and Laminated Side-Window Safety Glass<sup>2</sup>

There are several types of air bags used by manufacturers. Two prevalent models are curtain air bags, which deploy to cover side windows, and tube airbags, which deploy to cover the side beam in an automobile. Both tube and curtain models are meant primarily to lessen head injuries in crashes. Other side air bag models are meant to primarily protect the torso, though some such models also extend upwards to offer head protection, as well. The type of air bag available in each automobile model is noted in this table.

Model	Side Air Bag			Laminated Side-Window Safety Glass
	Location	Type of Side Air Bag	Standard/Optional	Standard/Optional
<b>Acura</b>				
3.2 TL/MDX/TSX	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
3.5 RL	Front	Torso	Standard	
RSX	Front	Torso	Standard	
<b>Audi</b>				
A4/S4 (except Cabriolet)	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
	Rear	Torso	Optional	
A4 Cabriolet	Front	Torso/head	Standard	
A6/Allroad	Front	Torso and curtain	Standard	Optional
	Rear	Curtain	Standard	
	Rear	Torso	Optional	
A8	Front/rear	Torso and	Standard	Optional

		curtain		
TT	Front	Torso/head	Standard	
<b>BMW</b>				
3 Series/M3 (except conv.)	Front	Torso and inflatable tube	Standard	
	Rear	Torso	Optional	
3 Series/M3 conv.	Front	Torso	Standard	
	Rear	Torso	Optional	
5 Series	Front	Torso and inflatable tube	Standard	Optional
	Rear	Inflatable tube	Standard	
	Rear	Torso	Optional	
6 Series (except conv.)	Front	Torso and inflatable tube	Standard	Optional
6Series conv.	Front	Torso	Standard	
Z4 Roadster	Front	Torso	Standard	
7 Series	Front	Torso and inflatable tube	Standard	Optional
	Rear	Inflatable tube	Standard	
	Rear	Torso	Optional	
X3	Front	Torso and inflatable tube	Standard	Optional
	Rear	Inflatable tube	Standard	
	Rear	Torso	Optional	
X5	Front	Torso and inflatable tube	Standard	Optional
	Rear	Torso and inflatable tube	Optional	
Mini Cooper	Front	Torso and inflatable tube	Standard	
	Rear	Inflatable tube	Standard	
<b>Buick</b>				
Century/Regal	Driver only	Torso/head	Optional	
LeSabre	Front	Torso	Optional	
Rainier	Front	Torso	Optional	Optional
Park Avenue	Front	Torso	Standard	
Rendezvous	Driver	Torso/head	Optional	
<b>Cadillac</b>				
CTS	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
DeVille	Front	Torso	Standard	
	Rear	Torso	Optional	
Escalade/ESV/EXT	Front	Torso	Standard	
Seville/XLR Roadster	Driver	Torso/head	Standard	
	Front passenger	Torso	Standard	
SRX	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
<b>Chevrolet</b>				
Avalanche/Cavalier	Front	Torso	Optional	
Suburban/Tahoe	Front	Torso	Optional	

Colorado/Malibu	Front/rear	Curtain	Optional	
Impala/Monte Carlo	Driver only	Torso/head	Optional	
SSR	Front	Torso	Standard	
Trailblazer/EXT	Front	Torso	Optional	
Venture	Driver	Torso/head	Optional	
	Front passenger	Torso	Optional	
<b>Chrysler</b>				
300M /Concorde/PT Cruiser	Front	Torso/head	Optional	
Crossfire	Front	Torso	Standard	
Pacifica	Front/rear	Curtain	Optional	Optional
Sebring 4-door	Front/rear	Curtain	Optional	
Sebring 2-door (except conv.)	Front	Torso/head	Optional	
Town & Country	Front	Torso/head	Optional	
<b>Dodge</b>				
Caravan/Grand Caravan	Front	Torso/head	Optional	
Stratus 2-door	Front	Torso/head	Optional	
Stratus 4-door	Front/rear	Curtain	Optional	
Durango	Front/rear	Curtain	Optional	Optional
Ram pickup	Front/rear	Curtain	Optional	
Intrepid/Neon/SRT-4	Front	Torso/head	Optional	
<b>Ford</b>				
Crown Victoria	Front	Torso/head	Optional	
Escape	Front	Torso/head	Optional	
Explorer/Sport Trac	Front/rear	Curtain	Optional	
Expedition	Front/rear	Curtain	Optional	
Focus/Taurus	Front	Torso/head	Optional	
Freestar	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Thunderbird	Front	Torso/head	Standard	
<b>GMC</b>				
Canyon	Front/rear	Curtain	Optional	
Envoy/XL/XUV	Front	Torso	Optional	
Yukon/XL	Front	Torso	Optional	
<b>Honda</b>				
Accord	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Civic/CR-V/Element	Front	Torso	Optional	
Civic Hybrid/Pilot	Front	Torso	Standard	
Odyssey	Front	Torso	Standard	
<b>Hyundai</b>				
Accent/Elantra/Sonata/XG350	Front	Torso/head	Standard	
Santa Fe/Tiburon	Front	Torso/head	Standard	
<b>Infiniti</b>				
FX-series/G35/M45/Q45	Front	Torso and curtain	Standard	
	Rear	Curtain	Optional	
I35	Front	Torso/head	Standard	
<b>Isuzu</b>				
Ascender	Front	Torso	Standard	
<b>Jaguar</b>				

S-Type/XJ-Series/X-Type	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
XK-Series	Front	Torso/head	Standard	
<b>Jeep</b>				
Grand Cherokee/Liberty	Front/rear	Curtain	Optional	
<b>Kia</b>				
Optima	Front	Torso/head	Standard	
Sorento	Front/rear	Curtain	Standard	
Amanti	Front/rear	Torso and curtain	Standard	
<b>Land Rover</b>				
Range Rover	Front	Torso and inflatable tube	Standard	
	Rear	Inflatable tube	Standard	
<b>Lexus</b>				
LS 430	Front	Torso and curtain	Standard	Optional
ES300/GX470	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
LX470/RX330	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
GS Series/IS300	Front	Torso and curtain	Standard	
SC430	Front	Torso	Standard	Optional
<b>Lincoln</b>				
Aviator/Navigator	Front/rear	Curtain	Standard	Standard front
LS	Front	Torso/head	Standard	
	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Town Car	Front	Torso/head	Standard	
<b>Mazda</b>				
MAZDA6	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
MPV/Tribute	Front	Torso/head	Optional	
RX-8	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
<b>Mercedes-Benz</b>				
C/CL Class/CLK Class 2-door	Front/rear	Torso and curtain	Standard	
CLK class conv.	Front	Torso/head	Standard	
	Rear	Torso	Standard	
E Class	Front/rear	Torso and curtain	Standard	Optional
S Class	Front/rear	Torso and curtain	Standard	Standard
M Class	Front/rear	Torso and curtain	Standard	

SL Class	Front	Torso/head	Standard	
SLK Class	Front	Torso	Standard	
<b>Mercury</b>				
Grand Marquis	Front	Torso/head	Standard	
Monterey	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Mountaineer	Front/rear	Curtain	Optional	
Sable	Front	Torso/head	Optional	
<b>Mini</b>				
Cooper	Front	Torso and inflatable tube	Standard	
	Rear	Inflatable tube	Standard	
<b>Mitsubishi</b>				
Eclipse/Galant/Lancer	Front	Torso	Optional	
Endeavor/Outlander	Front	Torso	Optional	
Montero	Front	Torso	Standard	
<b>Nissan</b>				
350Z (except conv.)	Front	Torso and curtain	Optional	
350Z conv.	Front	Torso	Optional	
Altima/Pathfinder/Titan	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Pathfinder Armada/Quest	Front	Curtain	Standard	
	Front	Torso	Optional	
	Rear	Curtain	Standard	
Maxima/Murano	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
Sentra	Front	Torso/head	Optional	
Xterra	Front/rear	Curtain	Optional	
<b>Oldsmobile</b>				
Bravada	Front	Torso	Optional	
Silhouette	Driver	Torso/head	Standard	
	Front passenger	Torso	Standard	
<b>Pontiac</b>				
Aztek	Driver	Torso/head	Optional	
	Front passenger	Torso	Optional	
Bonneville	Front	Torso	Standard	
Grand Prix	Front/rear	Curtain	Optional	
Montana	Driver	Torso/head	Standard	
	Front passenger	Torso	Standard	
Sunfire/Vibe	Front	Torso	Optional	
<b>Porsche</b>				
911	Front	Torso	Standard	Optional
Boxster	Front	Torso	Standard	
Cayenne	Front	Torso and curtain	Standard	Optional
	Rear	Curtain	Standard	

<b>Saab</b>				
9-3 (except conv.)	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
9-3 conv./9-5	Front	Torso/head	Standard	
<b>Saturn</b>				
Ion/Vue	Front/rear	Curtain	Optional	
L Series	Front/rear	Curtain	Standard	
<b>Scion</b>				
xA	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
<b>Subaru</b>				
Forester	Front	Torso/head	Standard	
Impreza	Front	Torso/head	Optional	
Legacy/Outback	Front	Torso	Optional	
<b>Toyota</b>				
4Runner/Camry	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Camry Solara (except conv.)	Front	Torso	Standard	
	Front	Curtain	Optional	
	Rear	Curtain	Optional	
Camry Solara conv./Avalon	Front	Torso	Standard	
Celica/Corrola/Echo/Matrix	Front	Torso	Optional	
Highlander/Land Cruiser	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Prius/RAV4/Sienna	Front	Torso and curtain	Optional	
	Rear	Curtain	Optional	
Sequoia	Front	Torso and curtain	Optional	
<b>Volkswagen</b>				
Golf/Jetta/Passat/Touareg	Front	Torso and curtain	Standard	
	Rear	Curtain	Standard	
New Beetle/New Beetle conv.	Front	Torso/head	Standard	
Phaeton	Front/rear	Torso and curtain	Standard	Optional
<b>Volvo</b>				
C70	Front	Torso/head	Standard	
S40/S60	Front	Torso and curtain	Standard	Optional
	Rear	Curtain	Standard	
S80	Front	Torso and curtain	Standard	Standard
	Rear	Curtain	Standard	
V40/V70/XC90	Front	Torso and curtain	Standard	Standard
	Rear	Curtain	Standard	

## 2004 Model Year Safety Equipment: Parking Sensors and Cameras<sup>3</sup>

Year, Make, Model, Style/Trim	Equipment	Standard/ Optional
2004 Acura MDX Touring AWD 4dr SUV w/Nav (3.5L 6cyl 5A)	rear parking sensors	Standard
2004 Acura MDX Touring AWD 4dr SUV w/Nav (3.5L 6cyl 5A)	rear view camera	Standard
2004 Acura MDX Touring AWD 4dr SUV w/Nav and Entertainment System (3.5L 6cyl 5A)	rear parking sensors	Standard
2004 Acura MDX Touring AWD 4dr SUV w/Nav and Entertainment System (3.5L 6cyl 5A)	rear view camera	Standard
2004 Audi A6 2.7T quattro AWD 4dr Sedan (2.7L 6cyl Turbo 5A)	rear parking sensors	Optional
2004 Audi A6 2.7T quattro AWD 4dr Sedan (2.7L 6cyl Turbo 6M)	rear parking sensors	Optional
2004 Audi A6 3.0 Avant quattro AWD 4dr Wagon (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Audi A6 3.0 Fwd 4dr Sedan (3.0L 6cyl CVT)	rear parking sensors	Optional
2004 Audi A6 3.0 quattro AWD 4dr Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Audi A6 4.2 quattro AWD 4dr Sedan (4.2L 8cyl 5A)	rear parking sensors	Optional
2004 Audi A8 L quattro AWD 4dr Sedan (4.2L 8cyl 6A)	front and rear parking sensors	Optional
2004 Audi allroad quattro AWD 4dr Wagon (2.7L 6cyl Turbo 5A)	rear parking sensors	Optional
2004 Audi allroad quattro AWD 4dr Wagon (2.7L 6cyl Turbo 6M)	rear parking sensors	Optional
2004 Audi allroad quattro AWD 4dr Wagon (4.2L 8cyl 5A)	rear parking sensors	Optional
2004 BMW 3 Series 325Ci Rwd 2dr Convertible (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 325Ci Rwd 2dr Coupe (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 325i Rwd 4dr Sedan (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 325i Rwd 4dr Sport Wagon (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 325xi AWD 4dr Sedan (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 325xi AWD 4dr Sport Wagon (2.5L 6cyl 5M)	rear parking sensors	Optional
2004 BMW 3 Series 330Ci Rwd 2dr Convertible (3.0L 6cyl 6M)	rear parking sensors	Optional
2004 BMW 3 Series 330Ci Rwd 2dr Coupe (3.0L 6cyl 6M)	rear parking sensors	Optional
2004 BMW 3 Series 330i Rwd 4dr Sedan (3.0L 6cyl 6M)	rear parking sensors	Optional
2004 BMW 3 Series 330xi AWD 4dr Sedan (3.0L 6cyl 6M)	rear parking sensors	Optional
2004 BMW 5 Series 525i 4dr Sedan (2.5L 6cyl 6M)	front and rear parking sensors	Optional
2004 BMW 5 Series 530i 4dr Sedan (3.0L 6cyl 6M)	front and rear parking sensors	Optional
2004 BMW 5 Series 545i 4dr Sedan (4.4L 8cyl 6A)	front and rear parking sensors	Optional
2004 BMW 5 Series 545i 4dr Sedan (4.4L 8cyl 6M)	front and rear parking sensors	Optional
2004 BMW 7 Series 745i 4dr Sedan (4.4L 8cyl 6A)	front and rear parking sensors	Optional
2004 BMW 7 Series 745Li 4dr Sedan (4.4L 8cyl 6A)	front and rear parking sensors	Optional
2004 BMW 7 Series 760Li 4dr Sedan (6.0L 12cyl 6A)	front and rear parking sensors	Standard
2004 BMW M3 2dr Convertible (3.2L 6cyl 6M)	rear parking sensors	Optional
2004 BMW M3 2dr Convertible (3.2L 6cyl 6M)	rear parking sensors	Optional
2004 BMW M3 2dr Coupe (3.2L 6cyl 6M)	rear parking sensors	Optional
2004 BMW M3 2dr Coupe (3.2L 6cyl 6M)	rear parking sensors	Optional
2004 BMW X3 2.5i AWD 4dr SUV (2.5L 6cyl 6M)	front and rear parking sensors	Optional
2004 BMW X3 3.0i AWD 4dr SUV (3.0L 6cyl 6M)	front and rear parking sensors	Optional

2004 BMW X5 3.0i AWD 4dr SUV (3.0L 6cyl 6M)	front and rear parking sensors	Optional
2004 BMW X5 4.4i AWD 4dr SUV (4.4L 8cyl 6A)	front and rear parking sensors	Optional
2004 Buick Park Avenue 4dr Sedan (3.8L 6cyl 4A)	rear parking sensors	Optional
2004 Buick Park Avenue 4dr Sedan (3.8L 6cyl 4A)	rear parking sensors	Optional
2004 Buick Park Avenue Ultra 4dr Sedan (3.8L 6cyl S/C 4A)	rear parking sensors	Optional
2004 Buick Rendezvous CX AWD 4dr SUV (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Buick Rendezvous CX Fwd 4dr SUV (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Buick Rendezvous CXL AWD 4dr SUV (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Buick Rendezvous CXL Fwd 4dr SUV (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Buick Rendezvous Ultra AWD 4dr SUV (3.6L 6cyl 4A)	rear parking sensors	Standard
2004 Cadillac DeVille 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Cadillac DeVille DHS 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Cadillac DeVille DTS 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Cadillac Escalade AWD 4dr SUV (6.0L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac Escalade ESV AWD 4dr SUV (6.0L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac Escalade ESV Platinum Edition AWD 4dr SUV (6.0L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac Escalade EXT 4dr Crew Cab AWD (6.0L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac Escalade Rwd 4dr SUV (5.3L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac Seville SLS 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Cadillac SRX AWD 4dr SUV (3.6L 6cyl 5A)	rear parking sensors	Standard
2004 Cadillac SRX AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Cadillac SRX Rwd 4dr SUV (3.6L 6cyl 5A)	rear parking sensors	Standard
2004 Cadillac SRX Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Cadillac XLR 2dr Roadster (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Chevrolet Venture LS Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Chevrolet Venture LT Entertainer AWD 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Chevrolet Venture LT Entertainer Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Ford Escape Limited 4WD 4dr SUV (3.0L 6cyl 4A)	rear parking sensors	Optional
2004 Ford Escape Limited Fwd 4dr SUV (3.0L 6cyl 4A)	rear parking sensors	Optional
2004 Ford Excursion Eddie Bauer 4WD 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Standard
2004 Ford Excursion Eddie Bauer 4WD 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion Eddie Bauer Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion Eddie Bauer Rwd 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Standard
2004 Ford Excursion Eddie Bauer Rwd 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion Limited 4WD 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Standard
2004 Ford Excursion Limited 4WD 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion Limited Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion Limited Rwd 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Standard
2004 Ford Excursion Limited Rwd 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Standard
2004 Ford Excursion XLT 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Excursion XLT 4WD 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Optional
2004 Ford Excursion XLT 4WD 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Optional
2004 Ford Excursion XLT Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Excursion XLT Rwd 4dr SUV (6.0L 8cyl Turbodiesel 5A)	rear parking sensors	Optional
2004 Ford Excursion XLT Rwd 4dr SUV (6.8L 10cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition Eddie Bauer 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard

2004 Ford Expedition Eddie Bauer Rwd 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Ford Expedition Eddie Bauer Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Ford Expedition XLT 4WD 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Rwd 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Sport 4WD 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Sport 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Sport Rwd 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Expedition XLT Sport Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer 4WD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer 4WD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Eddie Bauer Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited 4WD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited 4WD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer Limited Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT 4WD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT 4WD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport 4WD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport 4WD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Ford Explorer XLT Sport Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab FX4 4WD Flareside 6.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab FX4 4WD Styleside 6.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT 4WD Flareside 6.5 ft. SB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT 4WD Styleside 6.5 ft. SB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT 4WD Styleside 8 ft. LB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT Rwd Flareside 6.5 ft. SB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT Rwd Styleside 6.5 ft. SB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 2dr Regular Cab XLT Rwd Styleside 8 ft. LB (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 4dr SuperCab FX4 4WD Flareside 6.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 4dr SuperCab FX4 4WD Styleside 5.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 4dr SuperCab FX4 4WD Styleside 6.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 4dr SuperCab Lariat 4WD Styleside 5.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional
2004 Ford F-150 4dr SuperCab Lariat 4WD Styleside 6.5 ft. SB (5.4L 8cyl 4A)	rear parking sensors	Optional



6M)		
2004 Ford F-350 Super Duty 4dr Crew Cab Lariat Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab Lariat Rwd LB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab Lariat Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab Lariat Rwd SB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL 4WD LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL 4WD LB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL 4WD SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL 4WD SB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL Rwd LB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XL Rwd SB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT 4WD LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT 4WD LB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT 4WD SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT 4WD SB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT Rwd LB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr Crew Cab XLT Rwd SB DRW (6.8L 10cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat 4WD LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat 4WD LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat 4WD SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat Rwd LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab Lariat Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL 4WD LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL 4WD LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL 4WD SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL Rwd LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XL Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT 4WD LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT 4WD LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT 4WD SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT Rwd LB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT Rwd LB DRW (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford F-350 Super Duty 4dr SuperCab XLT Rwd SB (5.4L 8cyl 6M)	rear parking sensors	Optional
2004 Ford Freestar Limited 4dr Minivan (4.2L 6cyl 4A)	rear parking sensors	Optional
2004 Ford Freestar SEL 4dr Minivan (4.2L 6cyl 4A)	rear parking sensors	Optional
2004 Infiniti FX35 AWD 4dr SUV (3.5L 6cyl 5A)	rear view camera	Optional
2004 Infiniti FX35 Rwd 4dr SUV (3.5L 6cyl 5A)	rear view camera	Optional
2004 Infiniti FX45 AWD 4dr SUV (4.5L 8cyl 5A)	rear view camera	Optional

2004 Jaguar S-Type R 4dr Sedan (4.2L 8cyl S/C 6A)	rear parking sensors	Standard
2004 Jaguar S-Type V6 4dr Sedan (3.0L 6cyl 6A)	rear parking sensors	Standard
2004 Jaguar S-Type V8 4dr Sedan (4.2L 8cyl 6A)	rear parking sensors	Standard
2004 Jaguar XJR 4dr Sedan (4.2L 8cyl S/C 6A)	front and rear parking sensors	Optional
2004 Jaguar XJR 4dr Sedan (4.2L 8cyl S/C 6A)	rear parking sensors	Standard
2004 Jaguar XJ-Series Vanden Plas 4dr Sedan (4.2L 8cyl 6A)	front and rear parking sensors	Optional
2004 Jaguar XJ-Series Vanden Plas 4dr Sedan (4.2L 8cyl 6A)	rear parking sensors	Standard
2004 Jaguar XJ-Series XJ8 4dr Sedan (4.2L 8cyl 6A)	rear parking sensors	Standard
2004 Jaguar XJ-Series XJ8 4dr Sedan (4.2L 8cyl 6A)	front and rear parking sensors	Optional
2004 Jaguar XKR 2dr Convertible (4.2L 8cyl S/C 6A)	rear parking sensors	Standard
2004 Jaguar XKR 2dr Coupe (4.2L 8cyl S/C 6A)	rear parking sensors	Standard
2004 Jaguar XK-Series XK8 2dr Convertible (4.2L 8cyl 6A)	rear parking sensors	Standard
2004 Jaguar XK-Series XK8 2dr Coupe (4.2L 8cyl 6A)	rear parking sensors	Standard
2004 Jaguar X-Type 3.0 4dr AWD Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Jaguar X-Type 3.0 4dr AWD Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Land Rover Discovery HSE 4WD 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Land Rover Discovery S 4WD 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Land Rover Discovery SE 4WD 4dr SUV (4.6L 8cyl 4A)	rear parking sensors	Optional
2004 Land Rover Freelander HSE 4dr AWD SUV (2.5L 6cyl 5A)	rear parking sensors	Optional
2004 Land Rover Freelander SE3 2dr AWD SUV (2.5L 6cyl 5A)	rear parking sensors	Optional
2004 Land Rover Range Rover HSE 4WD 4dr SUV (4.4L 8cyl 5A)	front and rear parking sensors	Standard
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	rear view camera	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	rear view camera	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	front and rear parking sensors	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	front and rear parking sensors	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	rear view camera	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	front and rear parking sensors	Optional
2004 Lexus LS 430 4dr Sedan (4.3L 8cyl 6A)	front and rear parking sensors	Optional
2004 Lexus LX 470 4WD 4dr SUV (4.7L 8cyl 5A)	rear view camera	Standard
2004 Lexus RX 330 4dr AWD SUV (3.3L 6cyl 5A)	rear view camera	Optional
2004 Lexus RX 330 4dr AWD SUV (3.3L 6cyl 5A)	rear view camera	Optional
2004 Lexus RX 330 4dr Fwd SUV (3.3L 6cyl 5A)	rear view camera	Optional
2004 Lexus RX 330 4dr Fwd SUV (3.3L 6cyl 5A)	rear view camera	Optional
2004 Lincoln Aviator Luxury AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Lincoln Aviator Luxury Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Lincoln Aviator Ultimate AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Lincoln Aviator Ultimate Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Lincoln LS Appearance Option Package 4dr Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Lincoln LS Luxury 4dr Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Lincoln LS Premium 4dr Sedan (3.0L 6cyl 5A)	rear parking sensors	Optional
2004 Lincoln LS Sport 4dr Sedan (3.9L 8cyl 5A)	rear parking sensors	Optional
2004 Lincoln LS Ultimate 4dr Sedan (3.9L 8cyl 5A)	rear parking sensors	Optional
2004 Lincoln Navigator Luxury 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard

2004 Lincoln Navigator Luxury Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Lincoln Navigator Ultimate 4WD 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Lincoln Navigator Ultimate Rwd 4dr SUV (5.4L 8cyl 4A)	rear parking sensors	Standard
2004 Lincoln Town Car Signature 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Lincoln Town Car Ultimate 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Lincoln Town Car Ultimate L 4dr Sedan (4.6L 8cyl 4A)	rear parking sensors	Standard
2004 Maserati Coupe Cambiocorsa 2dr Coupe (4.2L 8cyl 6A)	rear parking sensors	Optional
2004 Maserati Coupe GT 2dr Coupe (4.2L 8cyl 6M)	rear parking sensors	Optional
2004 Maserati Spyder Cambiocorsa 2dr Convertible (4.2L 8cyl 6A)	rear parking sensors	Optional
2004 Maserati Spyder GT 2dr Convertible (4.2L 8cyl 6M)	rear parking sensors	Optional
2004 Maybach 57 4dr Sedan (5.5L 12cyl Turbo 5A)	front and rear parking sensors	Standard
2004 Maybach 62 4dr Sedan (5.5L 12cyl Turbo 5A)	front and rear parking sensors	Standard
2004 Mercedes-Benz CL55 AMG 2dr Coupe (5.5L 8cyl S/C 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CL-Class CL500 2dr Coupe (5.0L 8cyl 7A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CL-Class CL600 2dr Coupe (5.5L 12cyl Turbo 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK55 AMG 2dr Cabriolet (5.4L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK55 AMG 2dr Coupe (5.4L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK-Class CLK320 2dr Cabriolet (3.2L 6cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK-Class CLK320 2dr Coupe (3.2L 6cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK-Class CLK500 2dr Cabriolet (5.0L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz CLK-Class CLK500 2dr Coupe (5.0L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz E55 AMG 4dr Sedan (5.5L 8cyl S/C 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz E-Class E320 4MATIC AWD 4dr Sedan (3.2L 6cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz E-Class E320 Rwd 4dr Sedan (3.2L 6cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz E-Class E500 4MATIC AWD 4dr Sedan (5.0L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz E-Class E500 Rwd 4dr Sedan (5.0L 8cyl 7A)	front and rear parking sensors	Optional
2004 Mercedes-Benz G-Class G500 4WD SUV (5.0L 8cyl 5A)	rear parking sensors	Standard
2004 Mercedes-Benz M-Class ML350 AWD 4dr SUV (3.7L 6cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz M-Class ML500 AWD 4dr SUV (5.0L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz S55 AMG 4dr Sedan (5.5L 8cyl S/C 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz S-Class S430 4dr Sedan (4.3L 8cyl 7A)	front and rear parking sensors	Optional
2004 Mercedes-Benz S-Class S430 4MATIC AWD 4dr Sedan (4.3L 8cyl 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz S-Class S500 4dr Sedan (5.0L 8cyl 7A)	front and rear parking sensors	Optional
2004 Mercedes-Benz S-Class S500 4MATIC AWD 4dr Sedan (5.0L 8cyl 5A)	front and rear parking sensors	Optional

2004 Mercedes-Benz S-Class S600 4dr Sedan (5.5L 12cyl Turbo 5A)	front and rear parking sensors	Standard
2004 Mercedes-Benz SL55 AMG 2dr Convertible (5.5L 8cyl S/C 5A)	front and rear parking sensors	Optional
2004 Mercedes-Benz SL-Class SL500 2dr Convertible (5.0L 8cyl 7A)	front and rear parking sensors	Optional
2004 Mercedes-Benz SL-Class SL600 2dr Convertible (5.5L 12cyl Turbo 5A)	front and rear parking sensors	Optional
2004 Mercury Monterey Convenience 4dr Minivan (4.2L 6cyl 4A)	front and rear parking sensors	Standard
2004 Mercury Monterey Luxury 4dr Minivan (4.2L 6cyl 4A)	front and rear parking sensors	Standard
2004 Mercury Monterey Premier 4dr Minivan (4.2L 6cyl 4A)	front and rear parking sensors	Standard
2004 Mercury Mountaineer Convenience AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Convenience AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Convenience Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Convenience Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Luxury AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Luxury AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Luxury Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Luxury Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Optional
2004 Mercury Mountaineer Premier AWD 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Standard
2004 Mercury Mountaineer Premier AWD 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 Mercury Mountaineer Premier Rwd 4dr SUV (4.0L 6cyl 5A)	rear parking sensors	Standard
2004 Mercury Mountaineer Premier Rwd 4dr SUV (4.6L 8cyl 5A)	rear parking sensors	Standard
2004 MINI Cooper 2dr Hatchback (1.6L 4cyl 5M)	rear parking sensors	Optional
2004 MINI Cooper S 2dr Hatchback (1.6L 4cyl S/C 6M)	rear parking sensors	Optional
2004 Nissan Pathfinder Armada LE 4WD 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Pathfinder Armada LE Rwd 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Pathfinder Armada SE 4WD 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Pathfinder Armada SE Off-Road 4WD 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Pathfinder Armada SE Off-Road Rwd 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Pathfinder Armada SE Rwd 4dr SUV (5.6L 8cyl 5A)	rear parking sensors	Standard
2004 Nissan Quest 3.5 S 4dr Minivan (3.5L 6cyl 4A)	rear parking sensors	Optional
2004 Nissan Quest 3.5 SE 4dr Minivan (3.5L 6cyl 5A)	rear parking sensors	Standard
2004 Nissan Quest 3.5 SL 4dr Minivan (3.5L 6cyl 4A)	rear parking sensors	Optional
2004 Nissan Titan 4dr Crew Cab LE 4WD SB (5.6L 8cyl 5A)	rear parking sensors	Optional
2004 Nissan Titan 4dr Crew Cab LE Rwd SB (5.6L 8cyl 5A)	rear parking sensors	Optional
2004 Nissan Titan 4dr King Cab LE 4WD SB (5.6L 8cyl 5A)	rear parking sensors	Optional
2004 Nissan Titan 4dr King Cab LE Rwd SB (5.6L 8cyl 5A)	rear parking sensors	Optional
2004 Oldsmobile Silhouette GLS AWD 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Oldsmobile Silhouette GLS Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Oldsmobile Silhouette Premiere AWD 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Oldsmobile Silhouette Premiere Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Standard
2004 Pontiac Montana AWD 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Pontiac Montana Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Pontiac Montana MontanaVision Fwd 4dr Ext Minivan (3.4L 6cyl 4A)	rear parking sensors	Optional
2004 Porsche 911 Carrera 4 AWD 2dr Cabriolet (3.6L 6cyl 6M)	rear parking sensors	Optional
2004 Porsche 911 Carrera 4S AWD 2dr Cabriolet (3.6L 6cyl 6M)	rear parking sensors	Optional

2004 Porsche 911 Carrera 4S AWD 2dr Coupe (3.6L 6cyl 6M)	rear parking sensors	Optional
2004 Porsche 911 Carrera Rwd 2dr Cabriolet (3.6L 6cyl 6M)	rear parking sensors	Optional
2004 Porsche 911 Carrera Rwd 2dr Coupe (3.6L 6cyl 6M)	rear parking sensors	Optional
2004 Porsche 911 Targa Rwd 2dr Coupe (3.6L 6cyl 6M)	rear parking sensors	Optional
2004 Porsche 911 Turbo AWD 2dr Cabriolet (3.6L 6cyl Turbo 6M)	rear parking sensors	Optional
2004 Porsche 911 Turbo AWD 2dr Coupe (3.6L 6cyl Turbo 6M)	rear parking sensors	Optional
2004 Porsche Cayenne S Tiptronic 4WD 4dr SUV (4.5L 8cyl 6A)	front and rear parking sensors	Optional
2004 Porsche Cayenne S Tiptronic 4WD 4dr SUV (4.5L 8cyl 6A)	front and rear parking sensors	Optional
2004 Porsche Cayenne Turbo Tiptronic 4WD 4dr SUV (4.5L 8cyl Turbo 6A)	front and rear parking sensors	Standard
2004 Rolls-Royce Phantom 4dr Sedan (6.8L 12cyl 6A)	front and rear parking sensors	Standard
2004 Saab 9-3 Aero 2dr Convertible (2.0L 4cyl Turbo 6M)	rear parking sensors	Optional
2004 Saab 9-3 Aero 4dr Sedan (2.0L 4cyl Turbo 6M)	rear parking sensors	Optional
2004 Saab 9-3 Arc 2dr Convertible (2.0L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Saab 9-3 Arc 4dr Sedan (2.0L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Saab 9-5 Aero 4dr Sedan (2.3L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Saab 9-5 Aero 4dr Sport Wagon (2.3L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Saab 9-5 Arc 2.3T 4dr Sedan (2.3L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Saab 9-5 Arc 2.3T 4dr Sport Wagon (2.3L 4cyl Turbo 5M)	rear parking sensors	Optional
2004 Toyota Sienna XLE Limited 7 Passenger AWD 4dr Minivan (3.3L 6cyl 5A)	rear view camera	Standard
2004 Toyota Sienna XLE Limited 7 Passenger AWD 4dr Minivan (3.3L 6cyl 5A)	front and rear parking sensors	Standard
2004 Toyota Sienna XLE Limited 7 Passenger Fwd 4dr Minivan (3.3L 6cyl 5A)	front and rear parking sensors	Standard
2004 Toyota Sienna XLE Limited 7 Passenger Fwd 4dr Minivan (3.3L 6cyl 5A)	rear view camera	Standard
2004 Volkswagen Phaeton V8 4dr Sedan (4.2L 8cyl 6A)	front and rear parking sensors	Optional
2004 Volkswagen Touareg V6 AWD 4dr SUV (3.2L 6cyl 6A)	front and rear parking sensors	Optional
2004 Volkswagen Touareg V8 AWD 4dr SUV (4.2L 8cyl 6A)	front and rear parking sensors	Optional
2004 Volvo S80 2.5T AWD 4dr Sedan (2.5L 5cyl Turbo 5A)	rear parking sensors	Optional
2004 Volvo S80 2.9 Fwd 4dr Sedan (2.9L 6cyl 4A)	rear parking sensors	Optional
2004 Volvo S80 T6 Fwd 4dr Sedan (2.9L 6cyl Turbo 4A)	rear parking sensors	Optional
2004 Volvo S80 T6 Premier Fwd 4dr Sedan (2.9L 6cyl Turbo 4A)	rear parking sensors	Optional
2004 Volvo XC90 2.5T AWD 4dr SUV (2.5L 5cyl Turbo 5A)	rear parking sensors	Optional
2004 Volvo XC90 2.5T Fwd 4dr SUV (2.5L 5cyl Turbo 5A)	rear parking sensors	Optional
2004 Volvo XC90 T6 AWD 4dr SUV (2.9L 6cyl Turbo 4A)	rear parking sensors	Optional
2005 Ford Escape Limited AWD 4dr SUV (3.0L 6cyl 4A)	rear parking sensors	Optional
2005 Ford Escape Limited Fwd 4dr SUV (3.0L 6cyl 4A)	rear parking sensors	Optional

<sup>1</sup> O'Donnell, Jayne. "Study: Side Air Bags Should Shield Head." USA Today, August 26, 2003

<sup>2</sup> Air bag statistics from "2004 Model Vehicles with Side Air Bags," [www.usatoday.com/money/autos/2003-08-26-side-air-bags-chart.htm](http://www.usatoday.com/money/autos/2003-08-26-side-air-bags-chart.htm).

<sup>3</sup> Virtually any vehicle can have rear sensors or a video camera system added as an after-market product.