

Safety Is Not an Option

Lee Brown
Anjulie Ponce

The Brown Law Firm
750 N. St. Paul Street, Suite 1680
Dallas, Texas 75201
(214) 624-3400

lbrown@leebrownlaw.com
aponce@leebrownlaw.com

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The management of American car manufacturers like Ford, General Motors, and Chrysler are increasingly using safety devices like electronic stability control, side airbags, and rollover airbags as expensive options on their vehicles in the United States, while making them standard safety devices on other markets around the world. But safety devices like stability control and airbags differ from traditional revenue generating options for manufacturers like leather seats and CD players, as a consumer's life can literally depend on whether the safety features are equipped with the vehicles.

Safety should not be delegated from the manufacturer to the consumer, especially where manufacturers are utterly failing to provide consumers enough information to make an informed decision about whether the options are needed. Accordingly, unsuspecting consumers – not surprisingly – routinely reject the expensive options, thereby subjecting them, their families, and subsequent purchasers to the unknown and extreme risks of the defective vehicles.

I. VEHICLES WITH OPTIONAL SAFETY FEATURES ARE DEFECTIVELY DESIGNED

A product is defectively designed when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or another distributor, and the omission of the alternative design renders the product not reasonably safe.¹

A vehicle without standard safety features such as electronic stability control, side airbags, or rollover airbags is defective because it is unreasonably dangerous. The risks associated with vehicles that are not equipped with these safety devices are well chronicled, as detailed below, as are the benefits of the safety devices, which do not increase the risk of other injuries or impede the utility of the vehicles. A cursory review of the data collected and tests performed by the car manufacturers, National Highway Traffic Safety Administration (“NHTSA”), and Insurance Institute for Highway Safety (“IIHS”) of vehicles with and without the safety devices demonstrates (1) the severity of injuries and deaths caused by loss-of-control, side-impact, and rollover accidents, and (2) the benefits of these safety features and how they prevent or minimize these injuries and deaths. Having these safety options become standard in vehicles is clearly a safer alternative design, and thus manufacturers in other markets like Europe, have already implemented the safety devices as standard features. U.S. citizens deserve the same level of safety as Europeans, and they should be fairly compensated for the unnecessary harm caused by unreasonably dangerous products.

II. WHY IS SAFETY OPTIONAL IN THE UNITED STATES?

The three most prevalent areas where manufacturers have offered life saving devices as optional features are electronic stability control (“ESC”), side airbags, and rollover airbags. ESC

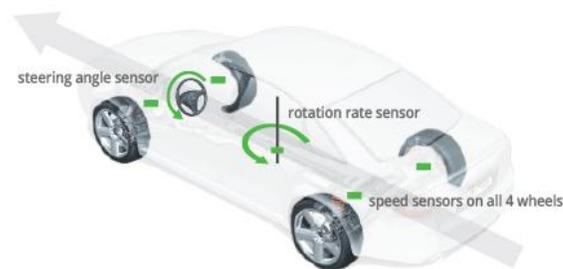
¹ RESTATEMENT (THIRD) OF TORTS: PROD. LIAB. § 2 (1998) (common law definition of design defect).

prevents or significantly reduces the risk of an accident occurring. Side and rollover airbags prevent or reduce the risk of injury from when the accident occurs. The use of these systems dramatically reduces the risk of injury and death to consumers without impairing the vehicle's utility in any way. And all the designs are and have been technologically and economically feasible, as manufacturers have developed and fine-tuned each system for their vehicles. Yet manufacturers have chosen to make these safety devices optional, not standard, features.

1. Electronic Stability Control

Loss of control accidents present a serious problem on American roadways, leading to a high number of injuries and deaths every year. Looking at data from 2000 to 2005, NHTSA estimated that about 1,000,000 minor to severe injuries annually were attributable to crashes that could have been affected by ESC, with around 458,000 of those injuries occurring in single-vehicle crashes.² Furthermore, 27,680 people were killed annually in crashes that could have been affected by ESC, with over half of the fatalities (15,191 deaths) occurring in single-vehicle crashes.³

ESC protects occupants by improving the control of a vehicle and thereby significantly reducing the risk of an accident from occurring, by using sensors to monitor whether a driver is about to lose control of his vehicle and braking systems.⁴ The sensors continuously monitor how well a vehicle is responding to a driver's steering wheel input.⁵ When a vehicle strays from its intended line of travel, ESC automatically brakes individual wheels to keep the vehicle under control.⁶



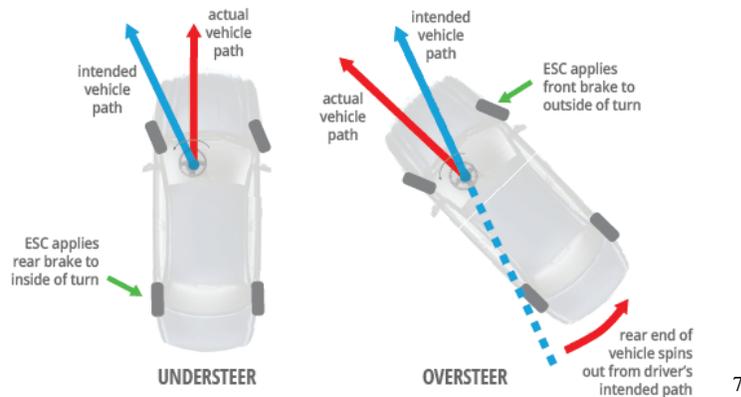
² 72 Fed. Reg. 17236, 17241 (Apr. 6, 2007).

³ *Id.*

⁴ Ins. Inst. for Highway Safety, *Update on Two Effective Safety Features: Electronic Stability Control*, STATUS REPORT, June 13, 2006, at 3, available at <http://www.iihs.org/externaldata/srdata/docs/sr4105.pdf>. There are various names for ESC, depending on the manufacturer, including Electronic Stability Program, Stability Track, or Active Handling. *Id.* at 3.

⁵ *Id.*

⁶ *Id.*



The first patent on the operating principles of ESC was awarded in 1959. ITT-Teves offered brake based electronic yaw stability control systems as early as 1988. Mercedes demonstrated the system to journalists in 1994 on a working prototype vehicle. In 1995, ESC was first introduced on some Mercedes Benz S Class models. Over the next two years BMW, Cadillac, and Lexus followed suit. In 1997, Nissan and Honda introduced ESC on the Japanese market only, as an option on the Cima and Accord models, respectively. In 2003, ESC/RSC was standard on the Volvo XC90. By 2005, ESC was standard equipment on some mainstream U.S. market vehicles such as the Hyundai Sonata, Scion xB, and Buick Lucerne, but remained optional or non-existent for many other vehicles.

Car manufacturers have made a slow and reluctant transition to offering ESC on their vehicles. For example, while Ford introduced ESC on the European Ford Focus in 1999,⁸ it was not available on any of its American vehicles until the 2001 model year, offering ESC as an option on the Ford Focus and Ford Windstar.⁹ In 2005, Ford made ESC standard on the Explorer, Mercury Mountaineer, Lincoln Aviator, and Lincoln Navigator.¹⁰ But it still remained non-existent or only an option on its other vehicles. So while 55% of passenger vehicle models had ESC as standard or optional, less than 25% of Ford's model vehicles were equipped with ESC, whether standard or optional.¹¹ Not until 2009, did Ford even offer ESC on its popular selling F-150.¹²

In 2007, NHTSA passed FMVSS 126 for passenger vehicles, in response to the high number of loss-of-control and rollover accidents, mandating manufacturers to install ESC as

⁷ Q&A: *Electronic Stability Control*, INS. INST. FOR HIGHWAY SAFETY, <http://www.iihs.org/research/qanda/esc.aspx>.

⁸ Safety Research and Strategies, Inc., *A Brief History of Electronic Stability Controls and their Applications*, VEHICLE AND PRODUCT SAFETY, <http://www.safetyresearch.net/2004/07/01/54/> (last visited Sept. 20, 2012).

⁹ Ford Motor Company's Third Supplemental Responses to Plaintiffs' First Request for Production, Response to Request to Produce 9, *Moore v. Ford Motor Co.*, No. 2-07CV-309 TJW (E.D. Tex., Dec. 17, 2007) (on file with authors).

¹⁰ Jeff Plungis and Eric Mayne, *Cars: GM, Ford Target rollovers*, USA TODAY, Nov. 12, 2004, http://www.usatoday.com/money/autos/2004-11-12-suvs_x.htm (last visited Sept. 1, 2012).

¹¹ *Supra* source cited note 4.

¹² *Introducing the New F-150*, 2009 Ford F-150 brochure (2008) (on file with authors); *compare Vehicles with ESC - 2009*, SAFERCAR.GOV, <http://www.safercar.gov/Vehicle+Shoppers/Resources/Vehicles+with+ESC++2009>, with *Vehicles with ESC - 2008*, SAFERCAR.GOV, <http://www.safercar.gov/Vehicle+Shoppers/Resources/Vehicles+with+ESC+-2009>.

standard equipment in all vehicles under 10,000 GVWR rating for the 2012 Model Year.¹³ Thus, manufacturers that had been reluctant to standardize ESC on their own accord, have now been forced to meet the requirements of 126 since September 1, 2011.¹⁴ But manufacturers have not been required to recall their prior vehicles without standard ESC systems, leaving these defective vehicles on our American roads for unsuspecting consumers.

The proven benefits of electronic stability control are significant. NHTSA estimates that ESC will prevent over 67,466 to 90,807 crashes, prevent 156,000 to 238,000 minor to critical injuries, and save 5,300 to 9,600 lives annually, once all light vehicles are equipped with ESC.¹⁵ IIHS similarly reported that when comparing the fatal crash risk between the same vehicles models, with and without ESC, there was a 30% reduction in fatal crash risk for vehicles equipped with ESC systems.¹⁶ These substantial benefits of ESC would translate into economic savings of between \$376,000,000 and \$535,000,000.¹⁷

Not only are there these extensive benefits, but the cost to equip a vehicle with ESC system is considerably low. Most of the major components required for ESC, such as the anti-lock brake hydraulic unit, anti-lock brake (ABS) computer, and wheel sensors, are already present on current vehicles. The only additional components required for ESC are some supplementary sensors, typically a yaw rate sensor, a lateral acceleration sensor, a steering angle sensor, and additional software for the anti-lock brake controller. NHTSA estimates that that the average cost to implement ESC on vehicles, in accordance with FMVSS 126, is only \$58, as most vehicles are already equipped with ABS.¹⁸

Despite these demonstrable benefits, car manufacturers looked to their own interests in deciding not to standardize ESC on their vehicles prior to FMVSS 126. While NHTSA estimated that ESC has only an incremental cost of \$58,¹⁹ ESC was costing customers around \$300 to \$800 as a stand-alone option, or over \$2000, if ESC was packaged with other optional equipment that customers then had to buy.²⁰ Why this steep increase in price? Standard use of the safety devices does not generate additional sales revenue and profits, whereas expensive options do. For example, Ford offered ESC for \$795 on the 2004 Explorer.²¹ Using a take-rate of 20% (meaning 20% of purchasers took the option)²² and assuming that 400,000 Explorers sold in calendar year 2003,²³ Ford made \$58,960,000 in potential profit.²⁴ But this profit fails to

¹³ 49 C.F.R. § 571.126 (2011); FMVSS, Electronic Stability Control Systems, 72 Fed. Reg. 17236, 17236 (Apr. 6, 2007).

¹⁴ 72 Fed. Reg. 17236, 17240.

¹⁵ *Id.* at 17241, 17297.

¹⁶ CHARLES M. FARMER, INS. INST. FOR HIGHWAY SAFETY, EFFECTS OF ELECTRONIC STABILITY CONTROL ON FATAL CRASH RISK 6 (2010).

¹⁷ 72 Fed. Reg. 17236, 17297.

¹⁸ 72 Fed. Reg. 17236, 17241.

¹⁹ *Id.*

²⁰ *Supra* source cited note 4.

²¹ Cars.com, *2004 Ford Explorer: Standard Equipment and Options*, <http://www.cars.com/ford/explorer/2004/standard-equipment/>.

²² This is an optimistic take-rate, based on historical figures from car manufacturers that cannot be cited.

²³ One review of the 2004 Explorer stated that sales in 2003 for the Explorer “slid to under 400,000 for the first time in years.” Ann Job, MSN Autos, *Reviews: 2004 Ford Explorer*,

accurately account for the societal costs associated with the accidents caused by the unreasonably dangerous products.

2. Side Airbags

Side airbags are another safety device that vehicle manufacturers have chosen to make optional to maximize profits. The side structure of vehicles have relatively little space to absorb energy and shield occupants, unlike the front and rear structure of vehicles that have substantial crumple zones.²⁵ Side airbags provide a cushion to soften occupant contact with the interior side structures of the vehicle and/or external objects intruding into the vehicle during side impact collisions.²⁶



Ford Focus 4-door, 2008-11 models²⁷

Each year, about 3.18 million U.S. drivers are involved in police-reported crashes in which vehicles are struck in the side.²⁸ Side impact crashes of passenger vehicles cause 35,800 severe head injuries²⁹ and 9,400 deaths per year, which is about 30% of all passenger vehicle occupant deaths.³⁰

Patents for airbags go back to the 1950s.³¹ Ford Motor Company first became interested in side airbags as early as 1957.³² Allen Breed is credited for inventing the world's first electro

http://autos.msn.com/research/vip/review.aspx?year=2004&make=Ford&model=Explorer&cp-documentid=435190#VIP_TAB.

²⁴ This figure was arrived at by calculating how much profit Ford would make per vehicle, subtracting the incremental cost of ESC from the price the option was sold for (\$795-\$58) and multiplying that amount by 20 percent of the total Explorers sold (400,000 x .20), which equaled **\$58,960,000**.

²⁵ *Side Crash Test Program*, INS. INST. FOR HIGHWAY SAFETY, http://www.iihs.org/ratings/side_test_info.html.

²⁶ News Release, Ins. Inst. for Highway Safety, *In Real-World Crashes, Side Airbags with Head Protection are Saving Lives* (Aug. 26, 2003), available at http://www.iihs.org/news/2003/iihs_news_082603.pdf.

²⁷ *Ford Focus 4-door, 2008-11 models*, INS. INST. OF HIGHWAY SAFETY, available at <http://www.iihs.org/ratings/rating.aspx?id=1049&seriesId=328> (last visited Sept. 24, 2012).

²⁸ ELISA R. BRAVER & SERGEY Y. KYRYCHENKO, INS. INST. FOR HIGHWAY SAFETY, EFFICACY OF SIDE AIRBAGS IN REDUCING DRIVER DEATHS IN DRIVER-SIDE COLLISIONS I (2003); see also Elisa R. Braver & Sergey Y. Kyrychenko, *Efficacy of Side Airbags in Reducing Driver Deaths in Driver-Side Collision*, 159:6 AM. J. OF EPIDEMIOLOGY 556, 556 (2004).

²⁹ News Release, Ins. Inst. for Highway Safety, *Impressive Crash Test Performance for Vehicles with Side Airbags that also Protect Peoples' Heads* (April 6, 2003), available at http://www.iihs.org/news/1999/iihs_news_040699.pdf.

³⁰ *Supra* sources cited note 28.

³¹ Mary Bellis, *The History of Airbags*, ABOUT.COM, http://inventors.about.com/od/astartinventions/a/air_bags.htm (last visited Sept. 24, 2012).

mechanical automotive airbag system in 1968, which was the only crash sensing technology available at the birth of the airbag industry.³³ But most car manufacturers stopped the development of side airbags and focused solely on frontal airbags since frontal impacts were regulated by NHTSA. Car manufacturers refocused on side airbags in the 1980s when NHTSA began to address side impact regulations.

The progression of this technology has resulted in the development of three main types of side airbags:

- **Torso Side Airbags** - Torso side airbags are mounted in the side of the seat or in the door and are designed to protect an adult's torso in a serious side-impact crash.³⁴
- **Head Side Airbags** - Head side airbags are mounted in the seat or roof rail above the side window and are designed to protect the occupant's head in a side impact crash.³⁵ Head side airbags can be further broken down into two categories:
 - **Curtain Side Airbags** typically protect both front and rear occupants in a side-impact crash and may also provide protection from ejection in rollover, and
 - **Inflatable Tubular Structure Side Airbags** are for head protection and reduce the rate of ejection.³⁶
- **Head/Torso Combination Side Airbags** - Combination side airbags are usually mounted in the side of the seat.³⁷ Head/torso side airbags are designed to help protect both the head and torso of an adult.³⁸

The evolution of side airbag technology is the result of the contributions of many automakers. In 1995, Volvo introduced side/torso bags.³⁹ In 1996, Ford's 10,000th Crash Test demonstrated the benefits of the head/thorax side airbag system.⁴⁰ The Insurance Institute for Highway Safety (IIHS), in collaboration with Ford, conducted two crash tests of Lincoln Town Cars, a 1999 model in which the new side airbag with head protection is standard equipment and a 1998 model without side airbags.⁴¹ In each test the car was propelled sideways at 18 miles per hour into a rigid pole.⁴² In the 1998 model that did not include the side airbags the crash dummy's head hit the pole with more than enough force to cause death in an actual collision.⁴³ The head injury criterion was 5390, or more than five times the reference value (1000) used to

³² R. M. Kemmerer, Ford Motor Co., R. Chute & D.P. Hass, Eaton Yale & Towne, Inc., Automatic Inflatable Occupant Restraint Systems 2 (Society of Automotive Engineers, 1968).

³³ *Supra* citation cited note 31.

³⁴ *Types of SABs*, SAFERCAR.GOV, <http://www.safercar.gov/Vehicle+Shoppers/Air+Bags/Types+of+SABs> (last visited Sept. 24, 2012).

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Supra* sources cited note 28.

⁴⁰ FORD MOTOR CO., 10,000TH CRASH TEST, video (1995) (on file with authors).

⁴¹ *Supra* source cited note 29.

⁴² *Id.*

⁴³ *Id.*

indicate the likelihood of a serious head injury.⁴⁴ In the same test of the 1999 model which included side airbags the injury criterion was 376, well below the injury reference value and 93% lower than what occurred in the very same test without the airbag.⁴⁵

The inflatable tubular structure was the world's first airbag for head protection and was introduced in 1997 on BMW cars.⁴⁶ The head/thorax side-impact airbag was introduced in 1998 and developed in cooperation with Ford and Renault.⁴⁷ The inflatable curtain was developed in cooperation with Mercedes and Volvo, who began to introduce it into their cars in 1998.⁴⁸

The benefits of side airbags are statistically proven. Driver fatality risk in near-side crashes was reduced by 45% in passenger cars equipped with head/torso protection side airbags and by 11% in cars with airbags that protect only the torso.⁴⁹ An IIHS analysis shows that side airbags with head protection reduce a car driver's risk of death in driver-side crashes by 37% and an SUV driver's risk by 52%.⁵⁰ Side airbags designed to protect only the torso reduce fatality risk by 26% for car drivers and 30% for SUV drivers.⁵¹ NHTSA estimates that if all U.S. vehicles were equipped with head protection side airbags, between 700 and 1,000 lives would be saved each year in side impact crashes.⁵² Furthermore, side airbags do not increase the risk of injuries or death.⁵³

NHTSA estimated the average incremental cost per vehicle, in 2004 dollars, to equip a vehicle with side airbags to be \$126 for combination head/thorax side airbags; \$243 for window curtain and thorax side airbags with two sensors; and \$280 for the window curtains and thorax side airbags with four sensors.⁵⁴

Despite the surprisingly low cost per vehicle to provide this enhanced safety feature, North American car manufacturers, unlike their European counterparts, have chosen to incorporate this technology as an optional safety enhancement and profit from its sale.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ AutoSearch USA, *Side Impact Airbag Technology Explained*, FINDTHEPERFECTCAR.COM <http://www.findthepperfectcar.com/index.php?id=31> (last visited Sept. 24, 2012).

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Supra* source cited note 26.

⁵⁰ News Release, Ins. Inst. for Highway Safety, *Side Airbags Substantially Reduce Death in Cars & SUVs; Those that Protect People's Heads are Especially Effective* (Oct. 5, 2006), available at <http://www.iihs.org/news/rss/pr100506.html>.

⁵¹ *Id.*

⁵² *Side-Impact Airbags*, SAFERCAR.GOV, <http://safercar.gov/Vehicle+Shoppers/Air+Bags/Side-Impact+Air+Bags> (last visited Sept. 24, 2012).

⁵³ August "Chip" Chidester, *Side Impact Inflatable Restraint Systems*, NHTSA power point presentation (2001) (on file with authors).

⁵⁴ NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., AMENDING SIDE IMPACT DYNAMIC TEST ADDING OBLIQUE POLE TEST E-4 (2007).

2004 MODEL PASSENGER VEHICLES WITH SIDE AIRBAGS

ACURA

| | | | |
|--------------------|---------------|----------------------------|--------------|
| 3.2 TL / MDX / TSX | Front Rear | Torso & curtain Curtain | Std. Std. |
| 3.5 RL | Front | Torso | Std. |
| RSX | Front | Torso | Std. |

AUDI

| | | | |
|--------------------------|-----------------------|-------------------------------------|----------------------|
| A4 / S4 except Cabriolet | Front Rear Rear | Torso & curtain Curtain Torso | Std. Std. Opt. |
| A4 Cabriolet | Front | Torso/head | Std. |
| A6 / Allroad | Front Rear Rear | Torso & curtain Curtain Torso | Std. Std. Opt. |
| A8 | Front & rear | Torso & curtain | Std. |
| TT | Front | Torso/head | Std. |

BMW

| | | | |
|----------------------------|-----------------------|---|----------------------|
| 3 Series / M3 except conv. | Front Rear | Torso & inflatable tube Torso | Std. Opt. |
| 3 Series / M3 conv. | Front Rear | Torso Torso | Std. Opt. |
| 5 Series | Front Rear Rear | Torso & inflatable tube Inflatable tube Torso | Std. Std. Opt. |
| 6 Series except conv. | Front | Torso & inflatable tube | Std. |
| 6 Series conv. | Front | Torso | Std. |
| Z4 Roadster | Front | Torso | Std. |
| 7 Series | Front Rear Rear | Torso & inflatable tube Inflatable tube Torso | Std. Std. Opt. |
| X3 | Front Rear Rear | Torso & inflatable tube Inflatable tube Torso | Std. Std. Opt. |
| X5 | Front Rear | Torso & inflatable tube Torso & inflatable tube | Std. Opt. |
| Mini Cooper | Front Rear | Torso & inflatable tube Inflatable tube | Std. Std. |

BUICK

| | | | |
|-------------------|---------------------------|---------------------|--------------|
| Century / Regal | Driver only | Torso/head | Opt. |
| LeSabre / Rainier | Front | Torso | Opt. |
| Park Avenue | Front | Torso | Std. |
| Rendezvous | Driver Front passenger | Torso/head Torso | Opt. Opt. |

CADILLAC

| | | | |
|------------------------|---------------------------|----------------------------|--------------|
| CTS | Front Rear | Torso & curtain Curtain | Std. Std. |
| DeVille | Front Rear | Torso Torso | Std. Opt. |
| Escalade & ESV & EXT | Front | Torso | Std. |
| Seville / XLR Roadster | Driver Front passenger | Torso/head Torso | Std. Std. |
| SRX | Front Rear | Torso & curtain Curtain | Std. Std. |

CHEVROLET

| | | | |
|----------------------|---------------------------|---------------------|--------------|
| Avalanche / Cavalier | Front | Torso | Opt. |
| Suburban / Tahoe | Front | Torso | Opt. |
| Colorado / Malibu | Front & rear | Curtain | Opt. |
| Impala / Monte Carlo | Driver only | Torso/head | Opt. |
| SSR | Front | Torso | Std. |
| TrailBlazer & EXT | Front | Torso | Opt. |
| Venture | Driver Front passenger | Torso/head Torso | Opt. Opt. |

CHRYSLER

| | | | |
|------------------------------|--------------|------------|------|
| 300M / Concorde / PT Cruiser | Front | Torso/head | Opt. |
| Crossfire | Front | Torso | Std. |
| Pacifica | Front & rear | Curtain | Opt. |
| Sebring 4dr | Front & rear | Curtain | Opt. |
| Sebring 2dr except conv. | Front | Torso/head | Opt. |
| Town & Country | Front | Torso/head | Opt. |

DODGE

| | | | |
|-------------------------|--------------|------------|------|
| Caravan / Grand Caravan | Front | Torso/head | Opt. |
| Stratus 2dr | Front | Torso/head | Opt. |
| Stratus 4dr | Front & rear | Curtain | Opt. |
| Durango / Ram pickup | Front & rear | Curtain | Opt. |
| Intrepid / Neon / SRT-4 | Front | Torso/head | Opt. |

FORD

| | | | |
|-----------------------|---------------|----------------------------|--------------|
| Crown Victoria | Front | Torso/head | Opt. |
| Escape | Front | Torso/head | Opt. |
| Explorer & Sport Trac | Front & rear | Curtain | Opt. |
| Expedition | Front & rear | Curtain | Opt. |
| Focus / Taurus | Front | Torso/head | Opt. |
| Freestar | Front Rear | Torso & curtain Curtain | Opt. Opt. |
| Thunderbird | Front | Torso/head | Std. |

GMC

| | | | |
|------------------|--------------|---------|------|
| Canyon | Front & rear | Curtain | Opt. |
| Envoy & XL & XUV | Front | Torso | Opt. |
| Yukon & XL | Front | Torso | Opt. |

HONDA

| | | | |
|------------------------|---------------|----------------------------|--------------|
| Accord | Front Rear | Torso & curtain Curtain | Opt. Opt. |
| Civic / CR-V / Element | Front | Torso | Opt. |
| Civic Hybrid / Pilot | Front | Torso | Std. |
| Odyssey | Front | Torso | Std. |

HYUNDAI

| | | | |
|-----------------------------------|-------|------------|------|
| Accent / Elantra / Sonata / XG350 | Front | Torso/head | Std. |
| Santa Fe / Tiburon | Front | Torso/head | Std. |

INFINITI

| | | | |
|-----------------------------|---------------|----------------------------|--------------|
| FX-series / G35 / M45 / Q45 | Front Rear | Torso & curtain Curtain | Std. Std. |
| I35 | Front | Torso/head | Std. |

ISUZU

| | | | |
|----------|-------|-------|------|
| Ascender | Front | Torso | Std. |
|----------|-------|-------|------|

JAGUAR

| | | | |
|-----------------------------|---------------|----------------------------|--------------|
| S-Type / XJ-Series / X-Type | Front Rear | Torso & curtain Curtain | Std. Std. |
| XK-Series | Front | Torso/head | Std. |

JEEP

| | | | |
|--------------------------|--------------|---------|------|
| Grand Cherokee / Liberty | Front & rear | Curtain | Opt. |
|--------------------------|--------------|---------|------|

KIA

| | | | |
|---------|--------------|-----------------|------|
| Optima | Front | Torso/head | Std. |
| Sorento | Front & rear | Curtain | Std. |
| Amanti | Front & rear | Torso & curtain | Std. |

LIST CONTINUES ON NEXT PAGE

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LAND ROVER

| | | | |
|-------------|-------|-------------------------|------|
| Range Rover | Front | Torso & inflatable tube | Std. |
| | Rear | Inflatable tube | Std. |

LEXUS

| | | | |
|--------------------------|-------|-----------------|------|
| ES 300 / GX 470 / LS 430 | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| LX 470 / RX 330 | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| GS series / IS 300 | Front | Torso & curtain | Std. |
| SC 430 | Front | Torso | Std. |

LINCOLN

| | | | |
|---------------------|--------------|-----------------|------|
| Aviator / Navigator | Front & rear | Curtain | Std. |
| LS | Front | Torso/head | Std. |
| | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Town Car | Front | Torso/head | Std. |

MAZDA

| | | | |
|---------------|-------|-----------------|------|
| 6 | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| MPV / Tribute | Front | Torso/head | Opt. |
| RX-8 | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |

MERCEDES-BENZ

| | | | |
|------------------------------|--------------|-----------------|------|
| C / CL class / CLK class 2dr | Front & rear | Torso & curtain | Std. |
| CLK class conv. | Front | Torso/head | Std. |
| | Rear | Torso | Std. |
| E class / S class | Front & rear | Torso & curtain | Std. |
| M class | Front & rear | Torso & curtain | Std. |
| SL class | Front | Torso/head | Std. |
| SLK class | Front | Torso | Std. |

MERCURY

| | | | |
|---------------|--------------|-----------------|------|
| Grand Marquis | Front | Torso/head | Std. |
| Monterey | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Mountaineer | Front & rear | Curtain | Opt. |
| Sable | Front | Torso/head | Opt. |

MINI

| | | | |
|--------|-------|-------------------------|------|
| Cooper | Front | Torso & inflatable tube | Std. |
| | Rear | Inflatable tube | Std. |

MITSUBISHI

| | | | |
|---------------------------|-------|-------|------|
| Eclipse / Galant / Lancer | Front | Torso | Opt. |
| Endeavor / Outlander | Front | Torso | Opt. |
| Montero | Front | Torso | Std. |

NISSAN

| | | | |
|-----------------------------|--------------|-----------------|------|
| 350Z except conv. | Front | Torso & curtain | Opt. |
| 350Z conv. | Front | Torso | Opt. |
| Altima / Pathfinder / Titan | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Pathfinder Armada / Quest | Front | Curtain | Std. |
| | Front | Torso | Opt. |
| | Rear | Curtain | Std. |
| Maxima / Murano | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| Sentra | Front | Torso/head | Opt. |
| Xterra | Front & rear | Curtain | Opt. |

OLDSMOBILE

| | | | |
|------------|-----------------|------------|------|
| Bravada | Front | Torso | Opt. |
| Silhouette | Driver | Torso/head | Std. |
| | Front passenger | Torso | Std. |

PONTIAC

| | | | |
|----------------|-----------------|------------|------|
| Aztek | Driver | Torso/head | Opt. |
| | Front passenger | Torso | Opt. |
| Bonneville | Front | Torso | Std. |
| Grand Prix | Front & rear | Curtain | Opt. |
| Montana | Driver | Torso/head | Std. |
| | Front passenger | Torso | Std. |
| Sunfire / Vibe | Front | Torso | Opt. |

PORSCHE

| | | | |
|---------------|-------|-----------------|------|
| 911 / Boxster | Front | Torso | Std. |
| Cayenne | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |

SAAB

| | | | |
|------------------|-------|-----------------|------|
| 9-3 except conv. | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| 9-3 conv. / 9-5 | Front | Torso/head | Std. |

SATURN

| | | | |
|-----------|--------------|---------|------|
| ION / VUE | Front & rear | Curtain | Opt. |
| L series | Front & rear | Curtain | Std. |

SCION

| | | | |
|----|-------|-----------------|------|
| xA | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |

SUBARU

| | | | |
|------------------|-------|------------|------|
| Forester | Front | Torso/head | Std. |
| Impreza | Front | Torso/head | Opt. |
| Legacy / Outback | Front | Torso | Opt. |

TOYOTA

| | | | |
|----------------------------------|-------|-----------------|------|
| 4Runner / Camry | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Camry Solara except conv. | Front | Torso | Std. |
| | Front | Curtain | Opt. |
| | Rear | Curtain | Opt. |
| Camry Solara conv. / Avalon | Front | Torso | Std. |
| Celica / Corolla / Echo / Matrix | Front | Torso | Opt. |
| Highlander / Land Cruiser | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Prius / RAV4 / Sienna | Front | Torso & curtain | Opt. |
| | Rear | Curtain | Opt. |
| Sequoia | Front | Torso & curtain | Opt. |

VOLKSWAGEN

| | | | |
|---------------------------------|--------------|-----------------|------|
| Golf / Jetta / Passat / Touareg | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| New Beetle / New Beetle conv. | Front | Torso/head | Std. |
| Phaeton | Front & rear | Torso & curtain | Std. |

VOLVO

| | | | |
|------------------|-------|-----------------|------|
| C70 | Front | Torso/head | Std. |
| S40 / S60 / S80 | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |
| V40 / V70 / XC90 | Front | Torso & curtain | Std. |
| | Rear | Curtain | Std. |

⁵⁵ Ins. Inst. for Highway Safety, 2003 passenger vehicle models with side airbags, STATUS REPORT, June 28, 2003, at 9, 11, available at <http://www.iihs.org/externaldata/srdata/docs/sr3807.pdf>.

A profit analysis illustrates just how much money Ford made on the sale of the head/thorax side impact airbag as an “optional” safety feature in the Ford Focus. These figures were obtained from the actual testimony of a Ford corporate representative.⁵⁶ The per vehicle retail price of side curtain airbags for the 2004 Ford Focus was \$350, while the cost for Ford to install the airbags was \$200 per vehicle, giving Ford \$150 in profit per vehicle that it sold with the option.⁵⁷

Ford estimated that it sold approximately 1,000,000 C170 model Focus vehicles,⁵⁸ with a consumer take-rate of 10%, meaning that if this feature were offered as an option, only 10% of the consumers would purchase it.⁵⁹ At this rate, 100,000 Focus vehicles were sold with the optional safety device.⁶⁰ Thus, Ford made \$15,000,000 in profit from the side airbag option alone.⁶¹

The Ford Motor Company 2004 Annual Report boasts net income just shy of \$3.5 billion, with an improved revenue of \$745 per unit in its North American operations.⁶² The sale of safety devices as options clearly contributes to this bottom line profit. But again Ford’s sales ledger fails to accurately reflect the societal cost associated with the injuries and deaths from the unsafe vehicles. Safety should not be an option.

3. Rollover Airbags

In addition to failing to standardize ESC, to prevent rollover accidents, car manufacturers have failed to standardize rollover airbags to prevent the risk of injuries and death from rollovers. Each year in the U.S., an average 268,500 vehicles are involved in rollovers.⁶³ The number of occupants in these vehicles is around 385,348.⁶⁴ Of these rollover exposed occupants, around 238,102 are injured or killed.⁶⁵ About 177,127 of the occupants suffer minor to moderate injuries, 51,027 suffer incapacitating injuries, and 9,947 are killed.⁶⁶ The comprehensive cost of the injuries and fatalities in rollovers is about \$40 billion per year.⁶⁷

⁵⁶ *Durham v. Cnty. of Maui*, 692 F. Supp. 2d 1256, 1260 (D. Haw. 2010). See also Plaintiffs’ Memorandum in Opposition to Defendant Ford Motor Company’s Motion for Partial Summary Judgment on Plaintiffs’ Claim for Punitive Damages Filed on December 2, 2009 at 16, *Durham v. Cnty. of Maui*, No. CV08-00342 (D. Haw. Feb. 1, 2009) [hereinafter Plaintiffs’ Memo, *Durham*].

⁵⁷ *Supra* sources cited note 56.

⁵⁸ Plaintiffs’ Memo, *Durham* at 16.

⁵⁹ *Supra* sources cited note 56.

⁶⁰ 1,000,000 vehicles x 10% = 100,000 Focus vehicles sold with optional side airbags.

⁶¹ 100,000 vehicles sold with the optional side airbags x \$150 profit per vehicle = **\$15,000,000 total profit.**

⁶² FORD MOTOR CO., 2004 ANNUAL REPORT 4, 25 (2005), available at <http://corporate.ford.com/doc/2004annualReport.pdf>.

⁶³ NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., AN ANALYSIS OF MOTOR VEHICLE CRASHES AND INJURY OUTCOMES 7, Table 1 (2007) (figure computed by taking an average of the totals given from 1994 to 2004).

⁶⁴ *Id.* at 8, Table 2 (figure computed by taking an average of the totals given from 1994 to 2004).

⁶⁵ *Id.* (figure computed by taking an average of the totals given from 1994 to 2004).

⁶⁶ *Id.* (figures computed by taking an average of the totals given from 1994 to 2004).

⁶⁷ KENNERLY H. DIGGES, FHWA/NHTSA NATIONAL CRASH ANALYSIS CENTER, SUMMARY REPORT OF ROLLOVER CRASHES 1(2002), available at <http://www.ncac.gwu.edu/research/Rollover%20Summary%20Report%20-%20Digges%202002.pdf>.



Drive one.

09 F-150

SAFEST F-150



- A. NEW HYDROFORMED FRONT STRUCTURES** are made from one-piece tubes. Integrated with the roof pillar, they are designed to help direct impact forces up and over the passenger cabin. Their unique shape allows them to perform effectively in various crash situations.
 - B. NEW HIGH-STRENGTH STEEL ROOF BOWS** are large and wide to help stiffen the cab structure.
 - C. ULTRA-HIGH-STRENGTH STEEL ROOF RAILS** start at the base of the A-pillar and are hydroformed to run up and over doors in a single piece. Hydroforming changes the steel properties to increase its strength by 20%.
 - D. NEW, HIGH-STRENGTH STEEL REAR ROOF STRUCTURE** is kiln-baked for increased strength.
 - E. NEW HEAD RESTRAINTS** improve head and neck protection in certain types of collisions.
 - F. NEW SEATS** are designed to help properly position passengers for improved safety belt and airbag effectiveness.
 - G. NEW PASSENGER SAFETY CAGE** (shown in red) is re-engineered and manufactured with ultra-high-strength and high-strength steels. The resulting structure is 75% stronger, yet only 7% heavier than its predecessor.
 - H. STAMPED-STEEL FRONT HORNS** are engineered to help manage crash forces.
- NEW BORON STEEL REINFORCED B-PILLARS** (SuperCrew only, not shown) use a spine formed from steel that is hot stamped to achieve a yield strength that is 3 times stronger to enhance side-impact protection.

No other pickup delivers this level of safety engineering and technology.

THE NEW F-150 SETS A HIGHER SAFETY STANDARD by introducing more accident avoidance technology and passenger protection systems than any pickup before it. Standard AdvanceTrac® with RSC® (Roll Stability Control™), Safety Canopy® System with roll-fold side-curtain airbags, and high-strength safety cage structure work together in this remarkably safe truck. We're confident this is the safest F-150 yet.



THE NEW STANDARD SAFETY CANOPY SYSTEM fully offers protection in certain side-impact collisions or rollover events. Its advanced side-curtain airbags with roll-fold technology can slide the side-curtain between the window glass and an occupant's head if they are leaning toward the glass. Newly designed front-seat side "H" bags (in yellow) help dissipate crash forces to help enhance protection of the chest in certain side-impact events.

The introduction of compact angular rate sensors and accelerometers led to the development of technically and economically feasible rollover sensors in the late 1990s and early 2000s. Ford, Visteon, and TRW launched the first rollover curtain airbag system in 2002, with Ford introducing it in the 2002.5 Ford Explorer/Mountaineer.⁶⁹ Ford was also the first to leave it on the shelves, making it optional in the United States, despite knowing the substantial benefits of rollover airbags. This is the case despite the fact that Ford then proceeded to sell the very same 2002.5 Ford Explorer/Mountaineer overseas *with standard rollover airbags*.⁷⁰ Ford built these vehicles in Detroit, equipped every one of them with rollover airbags, and shipped them over to Europe and Japan, all the while using the option in the United States to jack up their profits.

By 2005, Ford was still only offering optional rollover airbags in the United States, with the option limited to select models.⁷¹ Similarly, Chrysler and General Motors only offered rollover airbags on a limited number of their vehicles. Chrysler offered rollover airbags as

⁶⁸ *Supra* source cited note 12.

⁶⁹ See Ford Motor Co., *Ford Introduces Industry's First Inflatable Seat Belts to Enhance Rear Seat Safety*, MEDIA.FORD.COM, http://media.ford.com/article_display.cfm?article_id=31360 (last visited Sept. 23, 2012).

⁷⁰ Verified Statement on Ford's Safety Canopy System as Standard Equipment in Worldwide Markets, *Jones v. Ford Motor Co.*, No. 07-12617-C (68th Dist. Ct., Dallas, County, Tex., Mar. 10, 2009) (on file with authors).

⁷¹ *Money: 2006 models with rollover-triggered side curtains*, USA TODAY, December 29, 2005, available at <http://www.usatoday.com/money/autos/2005-12-29-curtains.htm>.

standard on its Jeep Commander and optional on its Jeep Grand Cherokee and Dodge Durango, while General Motors offered rollover airbags as standard on its Cadillac SRX and optional on its Chevrolet TrailBlazer, TrailBlazer EXT, GMV Envoy, Envoy XL, Buick Rainier, Isuzu Ascender, Hummer H3, and Saturn Vue.⁷² As a result, a large number of Ford, Chrysler, and General Motor vehicles continued to not be equipped with rollover airbags.

In 2011, NHTSA passed FMVSS 226, an ejection mitigation standard, in response to the severity of rollover accidents and the resulting injuries and deaths.⁷³ Under FMVSS 226, the ejection mitigation standard reduces partial and complete ejections of vehicle occupants through side windows in crashes, particular rollover crashes, by requiring the safety system to prevent a test impactor from moving more than a specified distance beyond the plane of a window.⁷⁴ NHTSA estimates that when fully implemented, the requirement will prevent 476 serious injuries and 373 deaths every year.⁷⁵ Phasing-in of the requirements will begin on September 1, 2013.⁷⁶ All vehicles must meet the new standard by September 1, 2017.⁷⁷

Rollover protection is a small incremental cost over side impact airbags, with the additional necessary items being the sensors (additional ones required), the curtain (porous vs. nonporous), and the inflator (cold vs. hot). Almost everything else required, such as curtain mounts and circuitry, is already present in side impact curtain systems and rollover curtains. NHTSA estimates that compliance with the new FMVSS 226 will only cost approximately \$31 per vehicle.⁷⁸

Yet manufacturers have failed to make rollover airbags standard on all vehicles, again choosing profits over the safety of Americans. On the 2002 Explorer, the first vehicle to be equipped with a rollover safety canopy, Ford charged consumers \$495 for the side curtain airbag option or \$560 to upgrade to the safety canopy.⁷⁹ This is an unacceptable price for safety.

III. Conclusion

Safety should not be optional. Optional safety devices unreasonably subject consumers to unacceptable risks, injuries, and even death. Consumers should take a stand and hold manufacturers responsible for defective designs.

⁷² *Id.*

⁷³ 49 C.F.R. § 571.226 (2011).

⁷⁴ *Id.*

⁷⁵ FMVSS, Ejection Mitigation, 76 Fed. Reg. 3212, 3293 (Jan. 19, 2011) (codified as 49 C.F.R. § 571.226).

⁷⁶ 49 C.F.R. § 571.226 (2011).

⁷⁷ *Id.* Altered vehicles and vehicles produced in multiple stages will be provided more time to meet the requirements. *Id.*

⁷⁸ *Id.* This number is based on vehicles that are equipped with FMVSS 214 compliant curtain systems. *Id.* at 266.

⁷⁹ 2002 Explorer Pricing for Options 21J, 21E, *Jones v. Ford Motor Co.*, No. 07-12617-C (68th Dist. Ct., Dallas, County, Tex., Mar. 10, 2009) (on file with authors).