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Vehicle Safety

2009 HIGHLIGHTS:

- Introduced the first automotive inflatable seat belts
- Supported legislation banning handheld texting while driving

Based on a variety of independent measures, Ford remains an industry leader in motor vehicle safety.

Vehicle safety is very important to us at Ford. In fact, it's one of four principles that inform and guide our every design and engineering effort.[1] We consider building safe vehicles to be part of the "price of admission" to the automotive industry, and we continually work to raise the bar on safety.

In 2009, our efforts were once again rewarded. Based on the independent measures listed below, Ford remains an industry leader in motor vehicle safety.

- Ford holds the most Top Safety Picks (awarded by the Insurance Institute for Highway Safety, or IIHS) of any vehicle manufacturer. Nineteen Ford vehicles earned this honor in 2009, including the Ford Taurus, Taurus X, Fusion, Focus, Edge, Flex, Escape and F-150; the Lincoln MKS, MKZ, MKT and MKX; the Mercury Sable, Milan and Mariner; and the Volvo S80, C30, C70 and XC90. To earn a Top Safety Pick, a vehicle must receive a rating of "good" in offset frontal impact, side impact and rear impact evaluations, and offer electronic stability control. For 2010, vehicles will also be expected to earn a "good" rating in roof strength tests.
- For the 2010 model year, 23 Ford vehicles received five-star ratings for both frontal impact and side impact from the National Highway Traffic Safety Administration (NHTSA) in its U.S. New Car Assessment Program (NCAP) ratings, compared with 24 for the 2009 model year.
- The 2010 Ford Taurus is one of the safest-rated large sedans sold in America, with five-star NCAP crash ratings for frontal and side impact and "good" IIHS ratings in offset frontal impact, side impact, roof strength and rear impact evaluations.
- The 2010 Ford F-150 is America's safest full-size pickup. It's the only full-size pickup to earn five-star crash test ratings in all categories from NHTSA.
- The 2010 model year Mustang Convertible earned five-star ratings in all categories of NHTSA NCAP.
- For the 2010 model year, the IIHS awarded 30 Ford vehicles with "good" ratings for frontal offset performance and 19 Ford vehicles with "good" ratings for side impact performance.
- In Ford's most recent EuroNCAP assessments, the Ford Kuga and Ford Fiesta achieved Ford's first three-star ratings for pedestrian protection. These cars also joined the Focus, Mondeo, S-MAX and Galaxy in having best-in-class, five-star adult protection and four-star child protection ratings.
- The Ford Mondeo was the second Ford car (after the Focus) to be awarded a five-star rating in

PERSPECTIVES ON SUSTAINABILITY

Jim Vondale

Director, Ford Automotive Safety Office

Read more

RELATED LINKS

Vehicle Web Sites:

- Ford Mustang
- Ford Taurus
- Ford Fusion
- Ford Focus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford F-150
- Lincoln MKS
- Lincoln MKZ
- Lincoln MKT
- Lincoln MKX
- Mercury Milan
- Mercury Mariner
- Volvo S80
- Volvo C30
- Volvo C70
- Volvo XC90

Ford.co.uk:

the Chinese NCAP.

- The Ford Falcon was the first Australian-built car to be awarded five stars in the Australasian New Car Assessment Program (ANCAP).

In addition, Volvo's City Safety system received awards in 2009 from the following automotive publications: *Autohoje* (Portugal); *FuturAuto* (Belgium); and *Auto Motor und Sport*, Paul Pietsch Award (Germany).

This section outlines our vehicle safety performance over the past year. It includes a discussion of current vehicle safety opportunities and challenges globally, and how we manage vehicle safety within the Company. It also focuses on technologies we've developed, programs we support and research we are undertaking to promote safer driving, how we manufacture ever-safer vehicles and how we promote a safer driving environment. The section then looks at the various collaborative efforts we are undertaking with other organizations related to vehicle safety. Finally, a case study looks in-depth at the issue of driver distraction.

For a discussion of Ford's positions on U.S. public policy issues relating to vehicle safety, please see the Governance section.

1. The other principles are quality, fuel efficiency and smart technologies.

Ford Kuga
Ford Fiesta
Ford Focus
Ford Mondeo
Ford S-MAX
Ford Galaxy

Ford.com.au:

Ford Falcon

External Web Sites:

National Highway Traffic Safety Administration
Insurance Institute for Highway Safety
European New Car Assessment Programme
Australasian New Car Assessment Program

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Challenges and Opportunities

As we at Ford implement our global "ONE Ford" strategy, we are mindful that countries with different levels of economic and infrastructure development face different traffic safety challenges.

In the United States and other developed countries, traffic safety has significantly improved in recent years. Although the U.S. population has continued to increase, the number of traffic fatalities in the United States in 2009 reached its lowest level in 55 years, according to the National Highway Traffic Safety Administration (NHTSA). In fact, the fatality rate per 100 million vehicle miles traveled has declined steadily since the late 1960s, and is now at the lowest level ever recorded.

Other developed countries have also seen improvements. The nonprofit Resources for the Future looked at traffic fatality data in 32 high-income countries between 1970 and 1999, and found that traffic fatalities declined in these countries by an average of 35 percent.

These improvements can be attributed to a combination of factors, including higher safety belt usage, advancements in vehicle safety technology, greater enforcement, better traffic infrastructure and increased cultural disapproval of driving under the influence.

Of course, traffic safety remains a significant challenge in these countries, with much room for improvement. In the United States in 2009, approximately 34,000 people died in motor vehicle crashes. Traffic crashes are the leading cause of death among U.S. teens. And, as discussed in depth in our case study, distracted driving is a serious and growing problem.

In developing countries, traffic safety is an acute public health problem. The World Bank reports that fatality rates in developing countries are 25 to 30 per 10,000 vehicles, compared to 1 to 2 per 10,000 vehicles in mature markets. Of the 1.2 million people who die each year worldwide in traffic accidents, more than 1 million live in countries with low- and middle-income economies. The World Health Organization (WHO) estimates that deaths due to road traffic accidents will increase to 2.4 million in 2030, primarily owing to increased motor vehicle ownership and use associated with economic growth in low- and middle-income countries.

Many of the traffic deaths in developing nations involve pedestrians and/or motorcycles. As mobility increases in developing markets, people initially use two-wheeled motor vehicles, and the incidence of traffic accidents rises. As people migrate to automobiles, traffic accidents and injury levels generally decrease. During this transition, holistic solutions are required, including infrastructure improvements, the modification of road user behavior and the enforcement of traffic laws. One critical task is to educate drivers about the most important primary safety feature – safety belts.

In both developed and emerging markets, continued improvements in vehicle safety are also very important, and we at Ford continue to take seriously our responsibility to build safe vehicles.

Everywhere in the world, it is increasingly important for road safety stakeholders to work together using an integrated approach to ensure the maximum benefits are delivered from any given safety initiative. To support this approach, we at Ford seek ways to partner with governments, nongovernmental organizations and other stakeholders to identify the best opportunities to promote safety based on real-world data. We have become more involved in encouraging new and innovative ways to modify road user behavior (for example, through new technologies, driver education efforts and working with government agencies such as the UK Driving Standards Agency) and encouraging infrastructure and enforcement improvements in the communities in which we operate.

RELATED LINKS

This Report:

Case Study: Driver Distraction

External Web Sites:

National Highway Traffic Safety Administration
Resources for the Future
The World Bank
World Health Organization
UK Driving Standards Agency

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How We Manage Vehicle Safety

Here at Ford, our objective is to design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over the broad spectrum of real-world conditions. Real-world safety data, driver behavior, research, regulatory requirements and voluntary agreements provide much of the input into our safety processes, including our Safety Design Guidelines (SDGs) and Public Domain Guidelines (PDGs), see graphic below. The SDGs are Ford's stringent internal engineering design targets that exceed regulatory requirements and define many additional requirements that are not regulated. The PDGs are Ford guidelines that focus specifically on helping to ensure that our vehicles earn top marks in relevant public domain assessments.

Both SDGs and PDGs are managed on a global basis and address the local needs of individual regions and markets. Awareness of road safety is rapidly increasing in many emerging markets. In 2009, Ford added Australasian-specific SDGs and PDGs to address this issue – raising the bar for vehicle performance in this market beyond regulatory requirements.

Government-run New Car Assessment Programs (NCAPs) are an increasingly important tool to improve consumer awareness in emerging markets such as China, but their relevance in developed markets is still also very strong. This is likely to remain the case, as both the National Highway Traffic Safety Administration (NHTSA) NCAP and EuroNCAP ratings systems are being significantly altered. As such, fewer vehicles (of all makes) will receive top ratings. Ford is working hard to meet this challenge. We have taken active roles working with NHTSA and EuroNCAP to help ensure that the respective rating schemes will be appropriate and will deliver additional real-world benefit.

Changes to the NCAP system were slated to apply to 2010 model year vehicles, but NHTSA delayed implementation and will now first apply the tougher requirements to 2011 model year vehicles. Ford is continuing to work with NHTSA to address several remaining concerns about the new NCAP test requirements before they are implemented. EuroNCAP's more-stringent requirements went into effect in 2009. However, EuroNCAP does not test all vehicles annually, so no Ford vehicles have yet been assessed under the new system.

Internally, Ford utilizes engineering analyses, extensive computer modeling and crash and sled testing to evaluate the performance of vehicles and individual components. These rigorous evaluations help to confirm that our vehicles meet or exceed regulatory requirements and our even more stringent internal guidelines. Our state-of-the-art crash-test facilities include the Safety Innovation Laboratory in Dearborn, Michigan, and the extensive crash-test facilities in Merkenich, Germany, and Dunton, England.

There has been increased attention recently regarding vehicle manufacturers' processes to investigate customer issues as they relate to potential vehicle safety defects, as well as the role of

RELATED LINKS

External Web Sites:

- National Highway Traffic Safety Administration
- European New Car Assessment Programme
- Global Technical Regulations

NHTSA. Ford has a proactive internal system that quickly identifies, evaluates and resolves issues as they relate to potential vehicle safety defects. In addition, when a competitor has a recall, we conduct a review to determine whether we share any of the same vendors, designs or parts. Ford has a very open and transparent process, and we work closely with the NHTSA when they contact Ford regarding customer concerns.

There has also been increased attention recently regarding vehicle electrical systems and the potential for electromagnetic interference (EMI) to affect vehicle performance. We design, engineer and rigorously test our vehicles for the wide range of environments in which they operate, including the potential effects of EMI. Our electronic safety system controls are designed to continuously monitor performance of key vehicle functions, detect issues if they arise and engage back-up functions in the unlikely event they occur.

Global Technical Regulations

The automotive industry is highly regulated, and two systems of vehicle regulation predominate globally: the United Nations Economic Commission for Europe Regulations and the U.S. Federal Motor Vehicle Safety Standards. To meet the relevant regulations of each market in which it sells, manufacturers must modify their vehicle designs and features. This is a particular challenge for Ford, given our increased focus on producing vehicles with the same platforms globally. It can increase vehicle complexity and cost, sometimes without documented, incremental real-world safety benefit.

With the aim of harmonizing world vehicle regulations, 31 countries are working together to develop Global Technical Regulations (GTRs). Ford Motor Company actively participates in the GTR development process.

Thus far, 10 GTRs have been developed. Progress has been slow due to the difficulty of reconciling varied national requirements and the historical differences of existing regulations. Despite these challenges, Ford continues to believe that harmonization has the potential to significantly reduce global complexity while maintaining high levels of vehicle safety, security and environmental performance, and we plan to support harmonization efforts.

Haddon Safety Matrix

Vehicle safety is the product of complex interactions among the driver, the vehicle and the driving environment. We use the Haddon Safety Matrix (developed by William Haddon, a former NHTSA administrator and IIHS president) to take a holistic view of the factors that affect vehicle safety.

The Haddon Matrix looks at injuries in terms of causal and contributing factors, including human behavior, vehicle safety and the driving environment. Each factor is then considered in the pre-crash, crash and post-crash phases. In the pre-crash phase, the focus is to help avoid the crash. In the crash and post-crash phases, the primary objective is to help reduce the risk of injury to occupants during and after a collision. Another goal is to minimize the amount of time that elapses between the crash and when help arrives.

	HUMAN BEHAVIOR	VEHICLE SAFETY	ENVIRONMENT
			
Pre-Crash (accident avoidance)	• Research • Education • Advocacy	• Crash avoidance technologies • Security	• Road design for accident avoidance • Traffic control
Crash (occupant protection)	• Technology and proper use	• Crashworthiness	• Road design for injury mitigation • Research
Post-Crash (injury mitigation)	• Telematics	• Post-crash notification	• Emergency medical services
Examples of Ford Actions	• SYNC® technology • MyFord™ driver connect technology • MyKey™ • Ford Driving Skills for	• Accident avoidance features • SYNC® with 911 Assist • Inflatable safety belts • Roll Stability Control®	• Global Road Safety Initiative • Accident research

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Encouraging Safer Driving

The U.S. Department of Transportation reports that human factors cause or contribute to more than 90 percent of serious crashes.

In the pre-crash stage, drivers can try to avoid crashes by practicing safe driving. In the crash and post-crash phases, drivers can help reduce the risk of injury by always properly using safety equipment such as safety belts. Ford Motor Company provides information, educational programs and advanced technologies to assist in promoting safe driving practices.

In the past year, distracted driving has received increased national attention as a contributing factor in motor vehicle crashes. We at Ford have been working for years to provide teen driver education and appropriate technologies to help prevent crashes due to distracted driving. Our sustainability report last year included a case study on distracted driving; the case has been updated for this year's report.

Numerous studies show that hands-free multimedia devices offer safety benefits compared to hand-held devices. The benefits are seen in driving performance as well as object and event detection. Ford's popular and award-winning SYNC® technology, powered by Microsoft®, provides a way for drivers to use cell phones and MP3 players more safely, because they can do so through voice commands alone while keeping their eyes on the road and their hands on the wheel. Ford SYNC was launched in late 2007 and is now available on nearly every vehicle from Ford, Lincoln and Mercury.

In 2010, Ford will introduce new MyFord™ driver connect technology – an all-new user interface that will deliver a smarter, safer and simpler way to connect drivers with in-car technologies and their digital lives. MyFord, along with MyLincoln™ and MyMercury™, was developed after a thorough review of current interior design – and its limitations – considering the abundance of new and emerging technologies. After studying vehicle communications trends and the ways drivers were using technology inside their vehicles, it was evident that the current way of interacting with car and truck technology was rapidly becoming obsolete.

MyFord™ map-based navigation offers an Eco-Route option, which instantly calculates the most fuel-efficient route for the driver.

The MyFord user interface replaces many of the traditional vehicle buttons, knobs and gauges, and is designed to allow maximum focus on driving, while providing unparalleled access to information, entertainment and connectivity features. The system includes two easily reached and intuitive five-way controllers on the steering wheel, a next-generation, state-of-the-art voice recognition system with nearly 10,000 available commands, and clear, large, color LCD displays. These features ensure that drivers maximize the time their eyes are on the road and their hands are on the steering wheel. And although the user interface is all new, it should not feel unfamiliar, as it is based on the fundamentals of Ford's award-winning navigation system, as well as the SYNC user interface.

MyFord launches on the 2011 Ford Edge and goes global with availability on the 2012 Focus. MyLincoln will be standard equipment on new Lincolns beginning with the 2011 MKX.

Beginning last year on select 2010 models, SYNC became available with Traffic, Directions and Information, a subscription service that allows drivers to access traffic reports, turn-by-turn directions and business news and information, all via voice command. SYNC will be launched on Ford's European product range beginning in 2011. (See the case study in this section for more on how SYNC helps to reduce driver distraction.)

RELATED LINKS

This Report:

Case Study: Driver Distraction

Vehicle Web Sites:

Ford Taurus
Ford Focus
Ford Edge
Ford Flex
Ford Escape
Ford Expedition
Ford F-150
Mercury Mariner
Lincoln MKS
Lincoln MKT
Lincoln MKX
Lincoln Navigator

Ford Web Sites:

SYNC®
MyFord™
MyKey™
Ford Driving Skills for Life

External Web Sites:

U.S. Department of Transportation
Operation Teen Safe Driving

Ford's MyKey™ system is an innovative new technology designed to help parents encourage their teenagers to drive more safely. MyKey allows owners to program a key that can limit the vehicle's top speed to 80 mph and the audio volume to 44 percent of total volume. MyKey encourages safety-belt usage by enabling Ford's Beltminder™ to chime every minute indefinitely until the safety belt is buckled, rather than ceasing after five minutes, and also by muting the audio system until the belt is buckled. In addition, MyKey provides an earlier low-fuel warning (at 75 miles to empty rather than 50); sounds speed-alert chimes at 45, 55 or 65 mph; and will not allow manual override of other safety systems. For the 2010 model year, MyKey is available on the Ford F-150, Taurus, Flex, Focus, Escape and Expedition; the Mercury Mariner; and the Lincoln Navigator, MKS and MKT.

MyKey™ programmable keys enable restricted driving speeds and audio volume.

Ford Driving Skills for Life (FDSFL), Ford's driver education program, demonstrates our continued commitment to educating teens about safer driving. In 2008, Ford launched FDSFL in the Asia Pacific and Africa (APA) region, and in 2009 continued with the successful rollout of the program to additional APA markets. FDSFL is now in Indonesia, the Philippines, Thailand, Vietnam, China, Taiwan and India. During 2009 in these markets, Ford provided training for roughly 11,000 licensed drivers and several thousand Ford India employees.

The U.S. FDSFL program (www.drivingskillsforlife.com) was carried out in nine different states in 2009. The program provides outstanding learning tools, including an award-winning curriculum with hands-on training and web-based learning, a teacher and parent educational kit, a teaching DVD designed for interactive learning, and printed materials to help young drivers improve their ability behind the wheel. Both the FDSFL Web site and "Ride and Drives" for teen drivers include modules on the importance of avoiding distracted driving. In addition, the program includes information about eco-driving, car care tips and information for mature drivers.

COMMENTS AT A FORD DRIVING SKILLS FOR LIFE "RIDE AND DRIVE" EVENT

"They hit it out of the park with the kids today in the top-notch way this was put together. Kids come in scared and walk away feeling much more confident in their driving skills." – Dr. Jennifer Reeves, Area Superintendent, Orange County (Florida) Public Schools

"We would love to see more programs like this, sponsored by a manufacturer of automobiles... Kids and adults can learn a lot from this program." – Jim Ports, former deputy administrator, NHTSA

"A lot of people can pass the permit test without being a good driver. This really teaches you how to be a good driver." – teenaged participant

Beginning in 2007, Ford partnered with the Illinois Department of Transportation, secretary of state, and state police to launch a statewide effort – modeled on Ford Driving Skills for Life – designed to reduce teen crashes and fatalities. Called Operation Teen Safe Driving, this campaign was the first of its kind and got high school students directly involved by challenging them to develop and implement a teen safe driving community awareness campaign using FDSFL resources. This seven-month statewide effort involved 778 schools in 102 Illinois counties, and had the support of the governor, the secretary of state and the Chicago board of education.

The results have been remarkable: The state has seen a 49 percent reduction in teen fatalities over the last three years.

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Building Ever-Safer Vehicles

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Accident Avoidance Technologies

Read about Ford's accident avoidance technologies, including Forward Collision Warning with Auto Brake and other features that use forward-looking radar and vision sensors.

Read more

Occupant Protection Technologies

Learn about our occupant protection technologies, including our Safety Canopy® and the world's first automotive inflatable seat belts.

Read more

Post-Crash/Injury Mitigation Technologies

Discover Ford's latest post-crash technologies, including SYNC® with 911 Assist and our SOS-Post Crash Alert System.

Read more

Research

Read about our research efforts, including two projects in Europe that are testing the performance of active safety systems.

Read more

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Accident Avoidance Technologies

A variety of technologies, in addition to a vehicle's handling and braking capabilities, can help drivers avoid accidents. These technologies are generally not necessary for attentive drivers in most road conditions, but may provide added benefits for drivers who become distracted or experience challenging road conditions.

For example, Ford's Rearview Camera with Guidelines can enhance rear visibility, as well as assist with actions that require reverse maneuverability such as parallel parking and hitching trailers. The system uses an exterior camera embedded in the rear of the vehicle that sends images to a video display in the rearview mirror or the navigation system screen. These images can help improve visibility directly behind the vehicle when the vehicle is in reverse. The camera image is overlaid with lines that mark the width of the vehicle, which makes it easier to gauge distance and navigate in reverse. The system increases visibility in low light by using a low-light-capable camera and high-intensity reverse taillights. Rearview Camera with Guidelines is offered on most of Ford's vehicles – including the new 2010 Ford Taurus.

In the 2010 Ford Taurus, the rearview camera projects through the centerstack-mounted screen.

Ford is continuing its development of accident avoidance features that use forward-looking radar and vision sensors. These features help to warn drivers of potentially dangerous situations, such as unintended lane departures, pedestrians in the roadway or following a vehicle too closely. These technologies are being developed by a joint team in Dearborn, Michigan; Merkenich, Germany; and Gothenburg, Sweden. Some are now available on selected Ford and Volvo vehicles.

Adaptive Cruise Control (ACC), for example, helps drivers maintain a safe distance from the vehicle in front of them. It is one of the innovations now available on the 2010 Ford Taurus, Lincoln MKS and MKT, as well as the Volvo XC60, S80, XC70 and V70 and the Ford Mondeo, S-MAX and Galaxy. While primarily a comfort and convenience feature, Adaptive Cruise Control also contributes to more controlled driving when traffic flow is uneven. The ACC module is mounted at the front of the vehicle and uses radar to measure the gap and closing speed to the vehicle ahead. The system automatically adjusts the speed of the car to help maintain a pre-set distance from the vehicle in front. Ford Motor Company was the first manufacturer to launch radar-based ACC several years ago.

On Volvo vehicles, Forward Collision Warning with Auto Brake is part of a "Driver Support" package and uses radar, camera and "heads-up" display[1] technology to help avoid or reduce the effects of rear-end collisions. The area in front of the vehicle is monitored by a radar and camera sensor. If the equipped vehicle detects another vehicle ahead of it, and the driver does not react, a visual and audible warning signal is activated. The system is designed to provide additional time for the driver to react and avoid or reduce the hazard. If the risk of collision increases despite the warning, Auto Brake is activated. This system supports driver-initiated braking by pre-charging the brakes and preparing for panic brake application, and then brakes automatically if a collision remains imminent. A similar system with Brake Support is available on

RELATED LINKS

Vehicle Web Sites:

- Ford Taurus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford Escape Hybrid
- Ford Explorer
- Ford Sport Trac
- Ford Expedition
- Ford F-150
- Ford Super Duty
- Ford E-Series
- Lincoln MKS
- Lincoln MKT
- Lincoln MKX
- Lincoln Navigator
- Mercury Mariner
- Mercury Mountaineer
- Volvo S60
- Volvo S80
- Volvo V70
- Volvo XC60
- Volvo XC70

Ford.co.uk:

- Ford Mondeo
- Ford S-MAX
- Ford Galaxy

the 2010 Ford Taurus and Lincoln MKS, and will be available on the 2011 Ford Edge and Lincoln MKX. A Forward Collision Warning system is also available in Europe on the Ford Mondeo, S-MAX and Galaxy.

The next generation of these preventative safety technologies was unveiled in 2009 at the Detroit Auto Show on the Volvo S60 Concept vehicle. The S60 Concept featured Collision Warning with Full Auto Brake and pedestrian detection. This advanced radar- and camera-based technology is designed to react when a pedestrian is detected in front of a car, and will activate the car's full braking power if the driver does not respond to the danger. The radar has a widened field of vision, which allows it to detect the moving pattern of a pedestrian. The automatic full braking power – a first in the industry – is an emergency measure that is designed to activate when a collision with a pedestrian or vehicle is imminent. The S60 Concept also featured an upgraded Driver Support package, which includes Blind Spot Information System, Driver Alert Control, Lane Departure Warning, Distance Alert, Adaptive Cruise Control (at all speeds) and Forward Collision Warning with Full Auto Brake. These next-generation technologies are now available on the all-new 2010 Volvo S60.

Driver Alert Control and Lane Departure Warning are now also available on the Volvo XC60, S80, V70 and XC70. These systems are designed to reduce the risk of a driver drifting out of the lane. (Driver inattentiveness is a traffic safety concern worldwide.) The Driver Alert Control and Lane Departure Warning features use a forward-looking camera to continuously monitor the road and keep track of where the car is in relation to the lane markings. The system is designed to sense if the driver loses concentration or the vehicle's wheels move outside the lane markings without an obvious reason, such as use of a turn signal. In that case the system provides a warning chime to alert the driver and a visual alert in the shape of a coffee cup. This patented system has been tested both on roads and in simulators and is unique among vehicle manufacturers.

Volvo has also introduced a unique and award-winning system called City Safety, which will help drivers avoid the sort of low-speed collisions that are common in slow-moving urban traffic. If a driver is about to collide with the vehicle in front and does not react in time, the City Safety system is designed to activate the brakes to slow the vehicle.

City Safety is active at up to 30 km/h and works via an optical laser system integrated behind the top of the front windscreen. It can monitor vehicles up to 10 meters from the front of the car. If the vehicle in front suddenly brakes and City Safety senses that a collision is imminent, it pre-charges the brakes to help the driver avoid an accident by braking or letting the driver steer away from a potential collision. The City Safety feature allows driver-initiated interactions (steering or braking) to override the City Safety system. Volvo introduced City Safety as standard equipment on the Volvo XC60 in late 2008, and for 2010 it is also standard on the all-new S60.

Another important Ford safety innovation is the next generation of adaptive headlamps. Our Adaptive Front Lighting System (AFLS) allows drivers to see better at night around curves in the road. The system allows drivers to take corners and curves more safely, and to consume less energy while doing so. The AFLS is available on all Lincolns (except the Navigator) and a number of vehicles across the Ford fleet, in both North America and Europe.

Finally, Ford's industry-leading innovation known as AdvanceTrac® with Roll Stability Control® (RSC) continues to give drivers more driving confidence. RSC actively measures and helps control both yaw and roll movements. It uses two gyroscopic sensors to detect when a driver corners too fast or swerves sharply to avoid an obstacle. It then applies pressure to select brake(s) to help the driver maintain control and thus reduce the risk of a rollover event.

Roll Stability Control was first introduced on the 2003 Volvo XC90 and is now standard equipment on the Ford Flex, Explorer, SportTrac, Expedition, Edge, Escape and F-150, as well as E-Series Wagons equipped with the 5.4L engine and the 2011 SuperDuty with single rear-wheel configurations. It is also standard equipment on the Mercury Mountaineer and Mariner; the Lincoln Navigator, MKX and MKT; and the Volvo XC60. Ford has developed a next-generation regenerative braking system for the 2009 and 2010 Escape Hybrid and Mariner Hybrid that is compatible with RSC. For the 2011 model year, 84 percent of all Ford vehicles will offer either RSC or our standard electronic stability control system.

Percent of North American Nameplates with Standard Offering of Electronic Stability Control or Roll Stability Control

	Percent
2011 Model Year	84%
2010 Model Year	77%
2009 Model Year	62%
2008 Model Year	40%

2007 Model Year	27%

1. "Heads-up display" is the projection of an image onto the windshield, so that the information may be viewed without looking down to an instrument cluster.

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Occupant Protection Technologies

Many factors influence a vehicle's crashworthiness, including the design of the vehicle's structure to absorb impact energy and the use of passive safety equipment such as air bags. To help protect drivers and passengers in the event of a crash, a variety of Ford technologies have been designed to enhance the performance of safety belts and air bags and provide additional occupant protection in side crashes and rollovers.

Safety belts remain the most important vehicle safety technology available. In 2010, Ford is bringing to market the world's first automotive inflatable seat belts, combining the attributes of traditional seat belt and airbag technologies to help reduce head, neck and chest injuries for rear-seat passengers. Ford will introduce inflatable rear seat belts on the next-generation Ford Explorer, to be introduced in 2010 in North America. Over time, Ford plans to offer the technology in vehicles globally.

Ford introduces the auto industry's first-ever production inflatable seat belts, which are designed to provide additional protection for rear-seat occupants.

The inflatable belts are designed to deploy over a vehicle occupant's torso and shoulder in 40 milliseconds in the event of a crash. Each belt's tubular airbag inflates with cold compressed gas. The inflatable belt's increased diameter can more effectively restrain the occupant in the appropriate seating position in the event of a frontal or side crash, and the belt distributes crash force energy across five times more of the occupant's torso than a traditional belt, helping to further reduce the risk of injury.

In everyday use, the inflatable belts operate like conventional seat belts and are safe and compatible with infant and child safety car and booster seats. In Ford's research, more than 90 percent of those who tested the inflatable seat belts found them to be similar to or more comfortable than a conventional belt because they feel padded and softer. That comfort factor could help improve the 61 percent rear-belt usage rate in the U.S., which compares to 82 percent usage by front-seat passengers, according to NHTSA. Ford will monitor real-world effectiveness and customer acceptance of this new technology as it begins the phase-in into the Ford fleet.

Ford was the first in the industry to offer rollover-activated side-curtain air bags, known as the Safety Canopy®, beginning with the Ford Explorer and Mercury Mountaineer in 2002. Today, the Safety Canopy with rollover sensors – which helps reduce the risk of injury to vehicle occupants during side-impact collisions and rollover accidents – is available on most Ford vehicles, including the Ford Taurus, Flex, Edge, Escape, Explorer, SportTrac, Expedition and F-Series; the Mercury Mariner and Mountaineer; and the Lincoln MKS, MKX, MKT and Navigator. By the 2010 model year, all Ford, Lincoln and Mercury retail SUVs and crossovers, as well as vans and trucks under 8,500 lbs., are planned to have the Safety Canopy as standard equipment.

The 2010 Ford Taurus, Ford Flex, Lincoln MKS and Lincoln MKT have been engineered with crush zones designed to direct excess energy around the passenger compartment into a high-strength frame. This advanced engineering design – known as SPACE™ Architecture – utilizes crash form management techniques to help channel impact forces around and away from the passenger cabin.

In Europe, the Ford Mondeo, S-MAX and Galaxy are equipped with an Inflatable Knee Bolster, designed to help reduce the driver's forward motion in the event of a severe frontal crash and reduce the risk of injury to lower limbs. This technology is also available on the 2010 Fusion Hybrid and Milan Hybrid and on the 2011 Ford Fiesta in the United States.

RELATED LINKS

Vehicle Web Sites:

- Ford Fiesta
- Ford Fusion Hybrid
- Ford Taurus
- Ford Edge
- Ford Flex
- Ford Escape
- Ford Explorer
- Ford Sport Trac
- Ford Expedition
- Ford F-150
- Lincoln MKS
- Lincoln MKT
- Lincoln MKX
- Lincoln Navigator
- Mercury Milan
- Mercury Mariner
- Mercury Mountaineer

Ford.co.uk:

- Ford Mondeo
- Ford S-MAX
- Ford Galaxy

External Web Sites:

- National Highway Traffic Safety Administration

Finally, as smaller and more fuel-efficient vehicles become more popular, the safety of smaller cars is sometimes raised as a concern. Ford's study of accident trends found that fatality rates for small cars of the 1990s were lower than for large cars of the 1970s, due to improvements in vehicle safety, changing driver behavior such as increased seat-belt usage and generally safer road infrastructure.

Ford's focus is to continue making small cars even safer while building larger vehicles that are more crash compatible with smaller vehicles. We've already lowered the front bumper structures on most of our crossovers, SUVs and pickups to help them better match up with small vehicle crash structures. Ford now uses more high-strength steel as part of our continuing effort to enhance the safety and fuel efficiency of our vehicles. In fact, we have recently introduced ultra-high-strength steel as well. Increased usage of high-strength steels helps us design vehicle structures with enhanced crash energy management, while balancing overall vehicle weight – even as we add more standard safety equipment.

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Post-Crash/Injury Mitigation Technologies

One method of assisting emergency responders to reach the scene of a vehicle crash quickly is through in-vehicle emergency call systems, also called post-crash notification. These systems enable a driver to summon assistance in an urgent situation either automatically (if, for example, an airbag deploys) or at the touch of a button.

In the United States, Ford SYNC® is an award-winning, in-car connectivity system that was introduced on certain 2007 model year vehicles. Beginning with the 2009 model year, SYNC-equipped vehicles come with an all-new occupant communications capability called 911 Assist. In the event of a severe crash, the ability to directly contact the local 911 emergency operator could be critical, for both the vehicle occupants and first responders. While any cell phone alone could be used in an emergency situation, SYNC can assist in placing a call to a local 911 emergency operator – when a phone is properly paired, turned on and connected to SYNC and where the system and cell phone remain powered and undamaged – should a crash with an airbag deployment or fuel shutoff switch activation occur. The key advantage of SYNC 911 Assist is speed, as calls are placed directly to local 911 operators and do not have to be routed through a call center (as in competitors' versions), which can delay the time it takes to get help on the way. SYNC 911 gives the occupants a choice as to whether or not to make the emergency call, and places the call if the occupant does not respond after a short time.

This voice-activated feature is available to customers with 2008 and beyond model year SYNC-equipped vehicles through a dealer-installed software update. We are investigating a system similar to SYNC's 911 Assist for introduction in Ford's European product range beginning in 2011.

In late 2004, Ford, via its membership in the European Automobile Manufacturers' Association, signed a memorandum of understanding (MOU) regarding the development of a pan-European, in-vehicle emergency call system dubbed "eCall." The purpose of the MOU is to promote the development and implementation of eCall systems throughout Europe, in order to improve the number of vehicles reached by emergency responders within a short period of time.

The On Call system – a GSM- and GPS-based emergency and assistance system [1] – is currently available on Volvo vehicles. It is sold and operational in a number of European countries, including Russia. With the On Call system and any future deployment of a 911 Assist-type feature in Europe, Ford has made and will continue to make significant progress toward increasing the availability of eCall technology on vehicles in Europe.

The SOS-Post Crash Alert System, which is standard equipment on most Ford, Lincoln and Mercury vehicles, is another important advance in post-crash safety technology. The SOS-Post Crash Alert System automatically activates the horn and emergency flashers in the event of an airbag deployment or safety belt pre-tensioner activation. The second-generation system – which is being launched on the 2011 Ford F-150 SuperDuty, Ford Edge and Lincoln MKX – also automatically unlocks vehicle doors in the event of an airbag deployment or safety belt pre-tensioner activation. The system is designed to alert passers-by and emergency services to the vehicle's location.

1. GSM = Global System for Mobile communications; GPS = Global Positioning System

RELATED LINKS

Ford Web Sites:

SYNC®

Vehicle Web Sites:

Ford Edge

Ford Super Duty

Lincoln MKX

External Web Sites:

European Automobile Manufacturers' Association

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Research

Ford is undertaking a number of research efforts to assess and verify the effectiveness of new active safety technologies, such as those using forward-looking radar and vision sensors.

In January 2010, a consortium of 29 partners – led by the Ford European Research Center in Aachen, Germany – joined forces in the Accident Avoidance by Active Intervention of Intelligent Vehicles (interactIVe) European research project. The consortium seeks to support the development and implementation of active safety systems, and consists of seven automotive manufacturers, six suppliers, 14 research institutes and three other stakeholders. The European Commission will cover more than half of the €30 million budget.

During the planned 42-month duration of interactIVe, the partners will test the performance of implemented safety systems through active intervention, including autonomous braking and steering in critical situations, with the aim of avoiding collisions or at least mitigating impact severity in accidents.

In 2008, Ford launched a major European research project (called EuroFOT) to deliver a large-scale field operational test of the real-world impact of active safety systems. Under the EU's Seventh Framework Program (FP7) for research and technological development, this project joins together 28 partners – including vehicle manufacturers, suppliers, universities and research centers – and will run until August 2011. More than 1,500 cars and trucks will be equipped with eight new active safety technologies, along with advanced data-collection capabilities. This will allow a thorough evaluation of the new technologies for safety, efficiency and driver comfort, in real-world scenarios and with ordinary drivers. The project has a total budget of €22 million and is led by the Ford research center in Aachen, Germany. It includes 100 Ford and 100 Volvo vehicles.

One particularly creative research technique Ford has been using involves driving cars with Forward Collision Warning with Brake Support into large "balloons" nearly the size and shape of real cars. The purpose of these tests is to assess the accuracy of the radar and the timing of the warning signals and braking pre-charge. The balloons play the role of a "target" vehicle, allowing Ford engineers to assess the radar and braking features without endangering test drivers or damaging real cars. The balloons offer enough "give" to allow impact without injury. Ford uses about a dozen balloon cars in different sizes, each made from tarp-like material and weighing more than 40 pounds.

Ford is testing an array of active safety technologies by driving prototypes into large, car-shaped balloons.

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Promoting Safer Roadways

The driving environment includes physical infrastructure (roads, signs, traffic lights, etc.) and the condition and maintenance of that infrastructure. Increasingly, information technologies play a role in the driving environment – for example, by controlling the timing of traffic lights. All of these factors have a significant influence on traffic safety.

Safety challenges related to the driving environment vary between countries and between developed and developing economies. Around the world, we work with government agencies and private-sector partners to promote road safety.

In 2009, Volvo and the Swedish Road Administration began a strategic partnership to understand how their respective visions (Volvo's Vision 2020 and Sweden's Vision Zero) could work together. Through information exchange and data sharing, the two entities will seek to develop a common view of safer infrastructure and vehicles in the future.

In late 2004, working in partnership with General Motors, Honda, Michelin, Renault, Shell and Toyota, Ford helped to found the Global Road Safety Initiative (GRSI). The purpose of the GRSI has been to transfer best practices, with the objective of reducing accidents and building capacity in developing countries to manage road safety. Projects have included educational outreach to increase safety-belt and helmet usage rates, and training aimed at improving roadway design.

Ford and other participating companies pledged a total of $10 million to the GRSI over five years to fund important road safety projects in China, Brazil and countries in the Association of Southeast Asian Nations. The projects were implemented through the Global Road Safety Partnership, an existing organization founded by the World Bank and national governmental aid organizations. Ford served on the Partnership's Executive Committee and has been actively involved in project execution. The projects relied on delivery through local organizations, so those organizations could build capacity and continue their work long after the projects were completed.

Also in China, Ford is cooperating with the China Automotive Technology & Research Center (CATARC) and the Chinese Ministry of Public Security to launch a new project that aims to provide accurate and scientific data for research into road safety in China.

RELATED LINKS

External Web Sites:

- Volvo's Vision 2020
- Global Road Safety Initiative
- Global Road Safety Partnership
- China Automotive and Technology Research Center

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Collaborative Efforts

Ford Motor Company is involved with a number of partners to enhance the safety of the driving experience and develop future technologies.

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- Alcolock Blue Ribbon Panel
- New Crash-Test Dummies

RELATED LINKS

External Web Sites:

- National Highway Traffic Safety Administration
- John Force Racing
- National Hot Rod Association
- Society of Automotive Engineers
- U.S. Council for Automotive Research
- Global Human Body Models Consortium

CAMP

In 1995, Ford and General Motors launched the Crash Avoidance Metrics Partnership (CAMP) to conduct pre-competitive active safety research with other OEMs, suppliers and the U.S. government. Within CAMP, the Vehicle Safety Communications Two (VSC-2) Consortium, which included Ford, GM, Toyota, Daimler and Honda, worked with the U.S. Department of Transportation on projects to develop safety applications that utilize vehicle communications. Their efforts focused on developing a communication system whereby vehicles can "talk" to each other and to the roadway. This would be analogous to a wireless internet system or a cellular telephone for cars. CAMP VSC-2 successfully completed projects that demonstrated the basic feasibility of this technology and evaluated several applications.

CAMP has now formed a VSC-3 Consortium with Ford, GM, Honda, Hyundai-Kia, Mercedes, Nissan, Toyota and VW-Audi to continue work on vehicle safety communications such as cooperative intersection collision avoidance systems and vehicle-to-vehicle communications for safety applications. This consortium is being funded by NHTSA to complete all of the pre-competitive work necessary for a deployment decision for vehicle safety communications in 2013.

CAMP is also conducting two additional projects with NHTSA. The Crash Imminent Braking Project (involving Ford, GM, Mercedes, Continental and Delphi) is developing minimum performance requirements and objective test procedures for systems that automatically apply the brakes to avoid crashes or mitigate the severity of a crash. The Advanced Restraint Systems Project (involving Ford, GM and Mercedes) is developing restraint systems that utilize pre-crash and occupant sensing information.

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First Responder Training

Ford has been involved in several cooperative efforts with first responder groups in order to improve performance in the critical area of emergency response. The increasing use of stronger steels (e.g., boron steel, tubular hydroform steel, and high-strength steel) in motor vehicles, as well as issues surrounding hybrid vehicles (i.e., the challenge of disengaging the high-voltage battery), have raised some concerns by first responders regarding gaining access to vehicle occupants who have been involved in an accident. Engineers from Ford's Customer Service Division, Design Analysis and Crash Safety Departments have held several informative events with emergency first responder groups, ranging from equipment manufacturers like DeWalt and Hilti to local law enforcement and firefighters. First responder groups from several cities were represented in these sessions, where the industry's latest techniques for occupant extraction were reviewed and

explained for various crash scenarios. The events were well received by the first responder community, and should help their important efforts in the future.

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Ford Racing and the NHRA

Ford (through Ford Racing) has been working cooperatively with John Force Racing and the National Hot Rod Association to make significant safety improvements in the cars they use during testing and racing. Substantial safety improvements have already been implemented, including additional head padding (that is also thicker and more shock absorbent), stiffer chassis, and the Ford Blue Box data acquisition system (developed by Ford Racing and Delphi) to help with analysis of vehicle safety systems. This work will continue, with additional improvements expected in the years to come.

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University Partnerships

Ford is increasingly collaborating with university partners on crucial advanced safety technology projects. Ford has major research alliances with the Massachusetts Institute of Technology (MIT), the University of Michigan and Northwestern University and has utilized Ford's global University Research Program (URP) to collaborate with leading researchers at more than 100 universities worldwide. Safety is a central thrust in our collaborative university programs. The following are some examples:

- Projects within the Ford–MIT alliance are yielding progress in areas of vehicle autonomy and active safety, including computer vision, lane keeping, vehicle controls, obstacle detection and avoidance, and accurately assessing the driver's interaction with the vehicle. One project aims to assess the role of active safety technologies, features and functions in reducing driving-related stresses and enhancing driver wellness.
- At Auburn University, Ford has an ongoing project to conduct "sensor fusion" – that is, to coordinate between Global Positioning System sensors and the motion sensors in a vehicle's stability control systems, to predict when a driver is about to lose control. The ultimate goal is to use satellites to feed data to a vehicle's electronic stability control system, allowing it to adjust and prevent a loss-of-control accident.
- At the University of Michigan, safety work includes a portfolio of projects on 360° sensing and developing more robust and capable active vehicle control and enhanced collision avoidance systems, utilizing both onboard sensors and offboard information sources.
- At Virginia Tech, Ford has an ongoing URP project assessing the properties of maternal tissues from pregnant women. This project will enable the improvement of computer models to help gain a better understanding of the injury risk to pregnant women and their unborn babies.
- A project at the State University of New York's Downstate Medical Center should yield an improved understanding of human tolerance to pelvis injury.
- Collaborative work is ongoing with Purdue University investigating enhanced vehicle dynamics and stability control.
- As part of its accident research projects in Germany, the UK and Australia, Ford works closely with internationally acknowledged safety experts from the Universities of Hannover, Loughborough, Dresden, Birmingham and Monash.

Collaborative university work catalyzes innovation at Ford by providing access to the leading researchers at the cutting edge of vehicle dynamics and stability control, accident avoidance and driver assist safety technology, to name just a few. Ford will continue to integrate these collaborative innovations, driving continuous improvement in real-world safety and sustainability for all Ford Motor Company products.

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Alcolock Blue Ribbon Panel

Reducing the incidence of impaired driving would go a long way toward improving road traffic safety. In the EU, 25–30 percent of all car accidents involve alcohol. In the United States, approximately 40 percent of all traffic fatalities are alcohol-related (as reported by NHTSA).

The Automotive Coalition for Traffic Safety formed a Blue Ribbon Panel (BRP) in 2007 for the development of advanced alcohol detection technology, often called "alcolocks." The panel consists of vehicle manufacturers, including Ford, alcohol detection technology suppliers, Mothers Against

Drunk Driving, the Insurance Institute for Highway Safety, government representatives and other experts.

The BRP and its research are being funded jointly by NHTSA and the Alliance of Automobile Manufacturers. The purpose of the research is to "...engage major automakers in cooperative research that advances the state of alcohol detection technology... to promote the standardization of the technology, its widespread deployment, and acceptance by the general public."

Ford continued to participate in the work of the Blue Ribbon Panel through the Alliance during 2009.

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New Crash-Test Dummies

Crash-test dummies are essential research tools that aid in the development of passive safety technologies, and Ford Motor Company continues to develop, often in partnership with other parties, more advanced test dummies.

From 2005 through 2008, Ford partnered with the Children's Hospital of Philadelphia (CHOP), the University of Virginia, Virginia Tech and the Takata Corporation in a multi-year project to develop a new abdominal insert and sensor for a crash-test dummy representing a six-year-old child.

CHOP studies have shown that, in vehicle crashes, significant abdominal injury in four- to eight-year-old children is second in frequency of occurrence only to head and facial injuries. Abdominal injuries often occur when children too young (i.e., the four- to eight-year-old range) utilize adult restraint systems without a booster seat. The abdominal insert and sensor will allow restraint engineers industry-wide to test the potential for abdominal injuries in children and ultimately improve the development of in-vehicle restraint systems for young children.

In February 2008, the Society of Automotive Engineers established a task force to perform "round robin" testing of the new dummy component, and the group held its first meeting in June. More than 20 organizations from around the globe have signed up to participate. Tests will be performed by dummy manufacturers, other OEMs and NHTSA's Vehicle Research and Test Center. Testing was scheduled to begin in March 2010.

In another effort, Ford, GM and Chrysler have been working together under the auspices of the Occupant Safety Research Partnership (OSRP), a group within the U.S. Council for Automotive Research, to research, develop, test and evaluate advanced crash-test dummies and other pre-competitive safety systems. A number of years ago, the OSRP initiated development of WorldSID, a male side-impact dummy that is recognized as the most advanced crash-test dummy ever created. From 2006 through 2008, the OSRP worked with NHTSA to help them evaluate WorldSID for potential use in the federal government's new side-impact crash-test standard. NHTSA concluded that the "biofidelity" of WorldSID is better than that of the dummy in the current side-impact regulation. WorldSID is the first side-impact dummy with the potential to be commonly used in side-impact regulations around the world. To that end, in November 2009, the U.S. government proposed the creation of an informal working group, under the UN's Global Road Safety Partnership, to fully develop WorldSID dummies for use in government regulations globally.

Ford is also involved in the Global Human Body Models Consortium (GHBMC), which holds promise for the future of safety research. Established in 2006 by nine automotive manufacturers (including Ford) and two automotive suppliers, the GHBMC is working to develop next-generation, computer-generated virtual reality models of the human body. These advanced models will help researchers to better predict the effect of trauma resulting from automobile crashes on the human body and enable a variety of virtual crash tests, with the ultimate goal of improving automotive safety globally. The research and development is currently being led by multidisciplinary teams at universities in five countries – the United States, Canada, France, India and Korea – with the first set of human digital models expected to be completed in 2011. Ford brings much expertise to this effort, having developed its own human body model representing an average-sized male occupant and publishing this work in peer-reviewed journals over the last 15 years. Ford continues to refine its human body model for use in internal research.

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Data

The data relating to vehicle safety is included in the Society section of this report.

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Case Study: Driver Distraction

Over the past two decades, cellular phones have gone from clunky novelties to ubiquitous must-haves. Wireless subscriptions in the United States have grown from about 28 million in 1995 to about 270 million by 2009 – a whopping 960 percent increase. The public has become accustomed to using cell phones everywhere – at home, on the street, in restaurants, at the office, while shopping and – of most interest to Ford's safety researchers – while driving.

The ubiquity of cell phones – coupled with the proliferation of portable music players in vehicles – has heightened concerns about driver distraction. We at Ford agree that this is an important safety issue and we have taken steps to address it. We also believe that continued research is needed to better understand the complex interactions involved in this issue and we are participating in that research.

Ford Focus with SYNC®, Ford's fully integrated, voice-activated in-car communications and entertainment system

In 2009 and again in 2010, the National Safety Council (NSC) called for a total ban on the use of cell phones, both handheld and hands-free, while driving. The NSC stated that cell phone use while driving is "...a very high-risk behavior with significant impact on crashes...." And indeed, some studies have concluded that there's no difference in driver behavior whether using handheld or hands-free phones. In many of those laboratory studies, participants in simulated driving situations were observed while being asked to engage in in-depth conversations on challenging or emotional subjects, such as the latest political scandal or a near-death experience. Such intense and lengthy discussions can indeed be distracting.

Naturalistic driving studies – in which study participants' driving performance, "eye glance behavior," driving environment and in-vehicle activities are observed and recorded over weeks or months in real-world situations – have revealed different results. For example, naturalistic studies completed by the University of Michigan Transportation Research Institute reveal that, when immersed in real traffic conditions, drivers using cell phones by and large exhibit prudent driving behavior.

In addition, the landmark 100-Car Naturalistic Driving Study conducted by the Virginia Tech Transportation Institute (VTTI) found that almost 80 percent of all crashes and 65 percent of all near-crashes involved the driver looking away from the forward roadway just prior to the onset of the incident. In 2008, the study's authors summarized their findings in this way: "...it is a rare case that a crash occurs while the driver's eyes are on the forward roadway, regardless of any other 'cognitive demand' that they might be engaged in."

In 2009, the VTTI published a new naturalistic driving study based on commercial vehicle operator experience. This study suggested that there is a 23-fold increase in risk when commercial operators send text messages while driving and that some behaviors like checking gauges and talking on the cell phone can have protective benefits. After this study was published, legislative

RELATED LINKS

Ford Web Sites:

- SYNC®
- Ford Driving Skills for Life

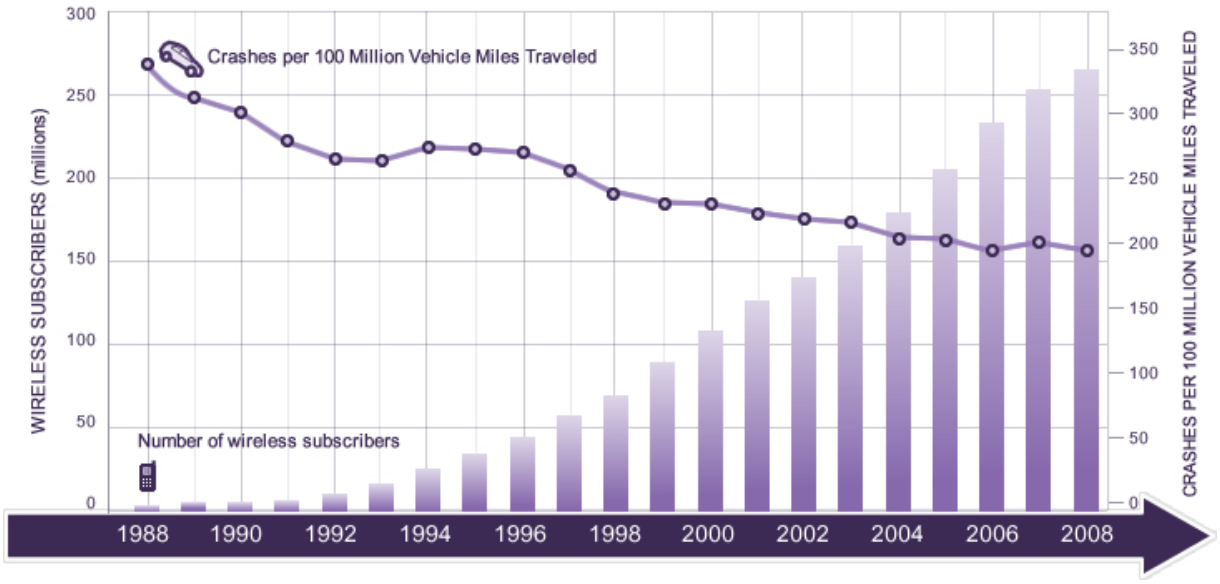
External Web Sites:

- National Safety Council
- University of Michigan Transportation Research Institute
- Virginia Tech Transportation Institute
- U.S. Department of Transportation
- Alliance of Automobile Manufacturers
- Insurance Institute for Highway Safety

and executive action to ban texting while driving increased dramatically, and the Secretary of Transportation convened a two-day Distracted Driving Summit to open a dialogue between the various stakeholders. Ford took part by sending representatives to attend the Summit as well as leading the development of the Alliance of Automobile Manufacturers' presentation for the Advanced Technologies Panel.

Beyond the VTTI and University of Michigan studies, there exists a considerable body of published research that indicates the superiority of hands-free voice interfaces as compared to handheld or visual–manual interfaces for the same tasks of command or data entry. These studies show advantages in driver performance, eye glance behavior toward the roadway, and object and event detection when the driver can keep eyes on the road and hands on the wheel. It is also interesting to note that, despite the significant increase in cell phone use in recent years, crash rates have fallen over the same time period (specifically, in both the categories of "fatal crashes" and "police-reported crashes"). (See graph below.) Also, the Insurance Institute for Highway Safety (IIHS) has published studies indicating that handheld phone bans in New York, Washington, DC and Finland led to an initial decline in the banned behavior followed by a return to pre-ban levels of handheld phone use within roughly one year.

Police Reported Crash Rates and Wireless Subscription Growth 1988-2008



More recently, the IIHS evaluated insurance data to see if there were demonstrable benefits to handheld bans. The IIHS had previously claimed that driving while using a cell phone causes a four-fold increase in risk, thus it was expected that insurance data would show a drop in claims after the enactment of handheld bans. However, the data showed no observable drop in claims as expected, and the IIHS is now re-evaluating its position on distracted driving and cell phone use risks.

For several years now, Ford has been focused on the issue of driver distraction and has taken steps to enhance driving safety for those who use cell phones and other telematics devices while driving. Through its work with the Alliance of Automobile Manufacturers, for example, Ford helped lead the development of an industry-wide Driver Distraction Voluntary Agreement, and Ford designs its telematics systems to meet that agreement. In addition, Ford was the first automotive manufacturer to support the Schumer Bill, the first bill in Congress to propose a ban on handheld texting while driving. Ford also clarified its employee policies to explicitly ban the practice. And, Ford Driving Skills for Life, Ford's driver education program, includes modules on the importance of avoiding distracted driving.

In addition, Ford designed and introduced SYNC®, our voice-activated in-car connectivity system, which has been shown to enhance the ability of drivers to keep their eyes on the road and hands on the wheel while using cell phones and music players. Recently completed simulator research at Ford has shown that SYNC substantially reduces drivers' eyes-off-road time and improves lane-keeping, speed maintenance, and object and event detection response times, when compared to handheld devices for the same tasks. (See the above video for an example. It shows how long it takes a driver to find a song on an MP3 player manually vs. using SYNC's voice-activated system.) This study evaluated driver performance, not driver behavior in the real world. However, these performance effects are consistent with the 100-Car VTTI Study, and strongly suggest that SYNC will reduce driver distraction and thus improve driving safety in situations where a hand-held device would otherwise be used. In addition, these findings were recently confirmed by independent, on-road testing performed by the VTTI and published at the most recent SAE Congress.

Ford recognizes the fact that drivers will use cell phones and music players while driving, and that evolving technologies like text messaging are growing increasingly popular. Text messaging is a particular concern, as it requires significant time looking away from the roadway to operate. Ford's SYNC system addresses this concern as well: when a text message arrives, it does not display that message but instead reads it aloud through text-to-speech technology, and then provides a list of canned replies for the driver to select rather than key-in or compose manually. SYNC also locks out certain features (such as adding or editing a phone book contact) while driving.

The next generation of SYNC will allow for more conversational commands, and will allow customers to use voice commands to control smart-phone applications such as OpenBeak (an app for posting messages to Twitter), Pandora (for music streaming) and Stitcher (for podcast streaming). Pandora and Stitcher report that more than 40 percent of their users use this feature in their vehicle.

We believe that further education is needed to help drivers understand the importance of focusing on the driving task and keeping their hands on the wheel and eyes on the road. Ford plans to continue to work with the government and other safety-related groups to discuss measures that can effectively reduce driver distraction and improve driving safety. We also plan to participate in continued research that can further our understanding of safe driving and help spread the message of safe driving.