

## 1.5 General Information: Safety Studies ESP®

10 years  
**ESP®**

### Safety Studies ESP®



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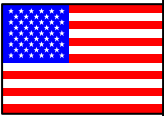

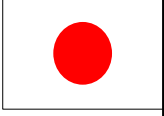
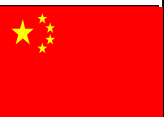
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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

### Road safety - a Public Health Issue



Source: The Ministry of Public Security PR China  
IRTAD, VDA, NHTSA, Bosch estimation

	Vehicles	261.0 Mio
	Injury Accidents	1.3 Mio
	<b>Fatalities</b>	<b>44,107</b>
	Vehicles	226.8 Mio
	Injury Accidents	1.9 Mio
	<b>Fatalities</b>	<b>42,643</b>
	Vehicles	14.6 Mio
	Injury Accidents	0.2 Mio
	<b>Fatalities</b>	<b>7,212</b>
	Vehicles	81.0 Mio
	Injury Accidents	0.9 Mio
	<b>Fatalities</b>	<b>8,877</b>
	Vehicles	22.2 Mio
	Injury Accidents	0.5 Mio
	<b>Fatalities</b>	<b>104,372</b>

all data 2003

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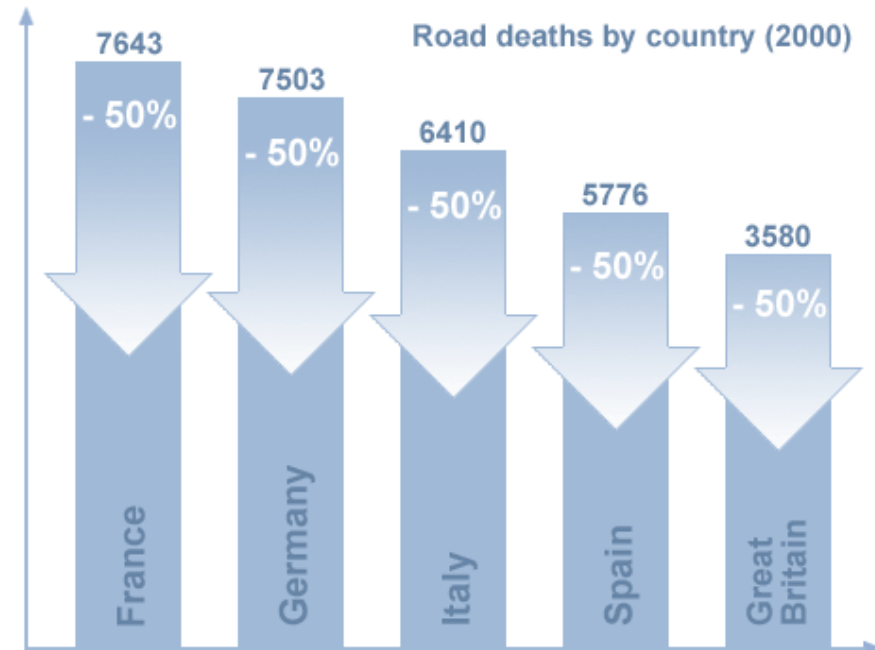
### Traffic safety in Europe

eSafety Initiative



Reduce road deaths  
by **50%**  
from 2000 to 2010  
by the promotion of  
**intelligent active**  
driving-safety systems.

Situation in 2000:  
accidents: 1 300 000  
injured: 1 700 000  
deaths: 40 000



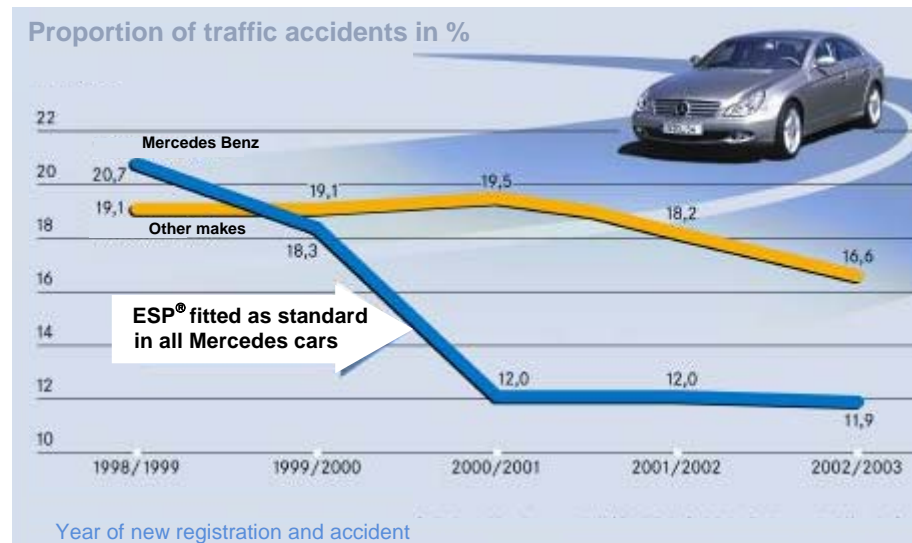
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# ESP<sup>®</sup> – counteracts skidding



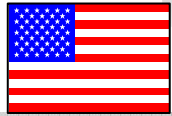
A DaimlerChrysler study shows:

“... that the proportion of serious accidents involving Mercedes-Benz cars has been cut by around **42%** thanks to the introduction of ESP<sup>®</sup> as a standard feature.”

(Source: DaimlerChrysler AG, using anonymous samples from accident data provided by the German Federal Statistics Office 1999-2003)

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# Studies about ESP<sup>®</sup> Effectiveness in Accident Reduction



### National Highway Traffic Safety Administration, 09/04

- accidents\* passenger cars -35%
- accidents\* SUV -67%

### Insurance Institute for Highway Safety, 10/04

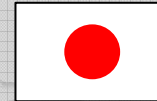
- accidents\* passenger cars - 41 %
- fatal accidents\* passenger cars - 56 %

### University of IOWA, 03/04

- no. of drivers keeping  
control of vehicle + 34 %

\*Single-vehicle accidents

ESP  
increases  
road  
safety



### Toyota, 05/03

- All single-car accidents - 35 %
- Severe accidents\* - 50%

### National Agency for Automotive Safety & Victims Aid 02/05

- All single-car accidents - 44 %
- Severe accidents - 62 %



### Daimler Chrysler, 05/04

- accidents Mercedes Benz - 42%

### Volkswagen, 02/04

- Fatalities - 35%

### Ford, 09/04

- accidents\* - 35%

### Swedish National Road Administration, 2002

- accidents - 22%

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# Studies prove effectiveness of ESP<sup>®</sup>

ESP<sup>®</sup> saves lives



GdV (1998)



Volkswagen (Februar 2004)



Ford (September 2004)



Daimler Chrysler (2002, update May 2004)



LAB (September 2004)



Swedish National Road Administration (2002)



University of Iowa (March 2004)



NHTSA (September 2004)



IIHS (October 2004)



Toyota (Mai 2003)



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### RESIKO\*-Study by GDV\*\*

**28% of all accidents** are driving accidents (driving accidents are accidents where the driver loses control about the vehicle w/o influence of others)

**25% of all accidents** with severe personal injury are caused by skidding

**60% of all accidents** with fatal injuries happen through side crashes caused mainly by skidding

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**Actively helps to prevent skidding**

**Published 1998**

\* retrospective safety analyse of collisions with passenger cars with severe injuries

\*\* General Association of German Insurance Companies

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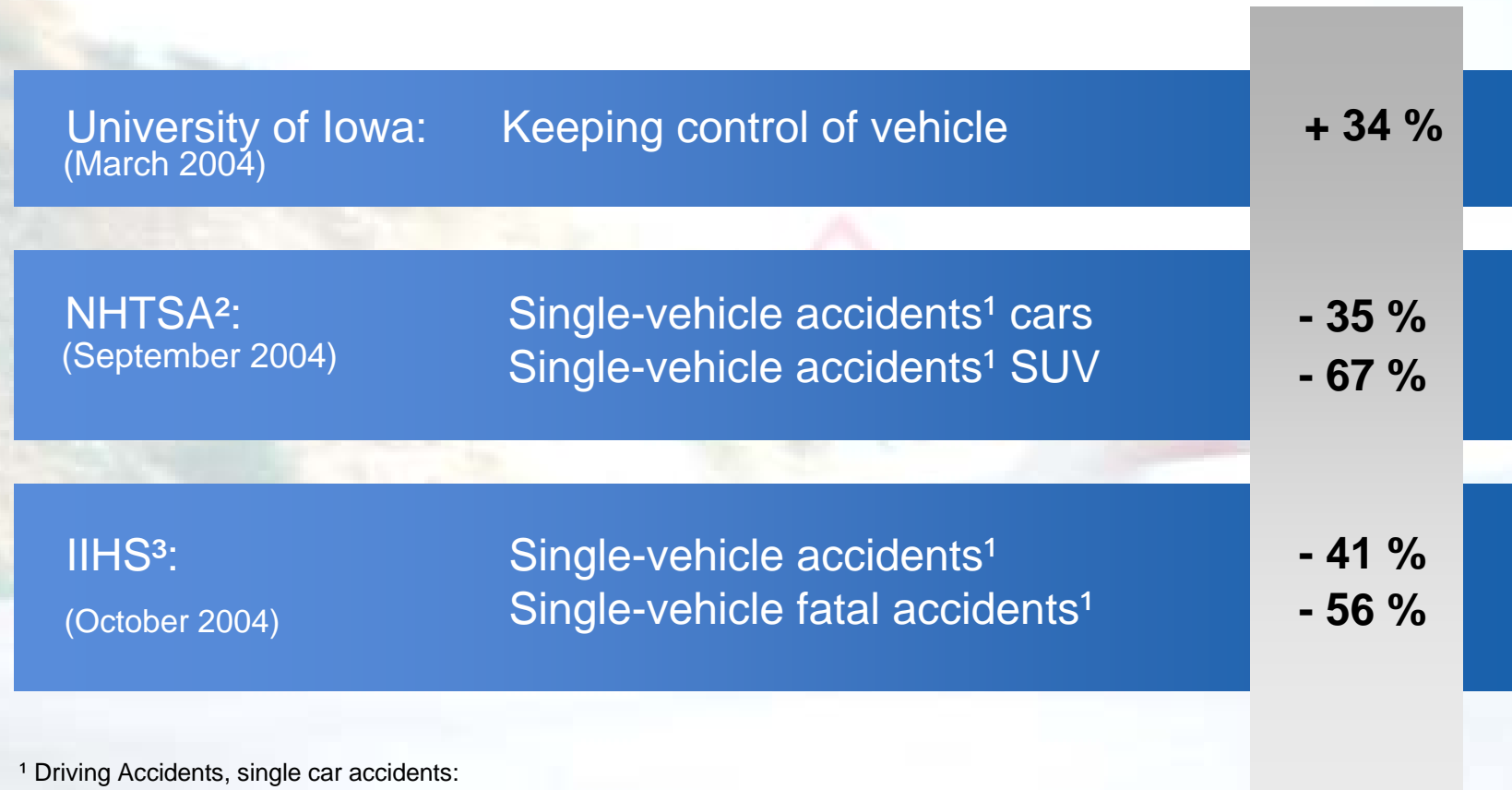
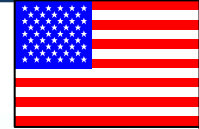
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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# US Studies prove effectiveness of ESP<sup>®</sup>



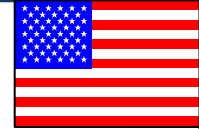
<sup>1</sup> Driving Accidents, single car accidents:  
Loss of vehicle control w/o contact with other vehicles

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

### University of IOWA



#### Methodology/Data

- Use of the National Advanced Driving Simulator (NADS) owned by NHTSA, an advanced simulator that provides high-fidelity environment
- 3 loss-of-control scenario simulations: road incursion, left curve with decreasing radius, wind gust
- 2 vehicles: passenger car Oldsmobile Intrigue with Bosch ESP<sup>®</sup> system  
SUV Ford Excursion with ContiTeves ESP<sup>®</sup> system
- 120 participants from 3 age groups balanced by gender

#### Results

- 34 % more drivers maintained control of vehicles equipped with ESP<sup>®</sup> than drivers of vehicles without ESP<sup>®</sup>
- Loss of control is 8 times higher with cars not equipped with ESP<sup>®</sup> (27.9 %) than cars equipped with ESP<sup>®</sup> (3.4 %).

#### Published

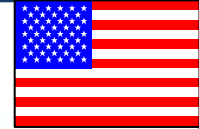
March 2004, SAE World Congress, Detroit

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### NHTSA\*



#### Methodology/Data

- Analysis of crash data from the 5 states with high use of VIN numbers (Vehicle Identification Number)  
(source: FARS - Fatality Analysis Reporting System)
- 2,182 Passenger Cars data points and 607 SUVs data points
- Comparison of vehicles without ESP® and changed to 100% ESP®
- Includes MB, BMW, Toyota, Lexus and GM luxury vehicles

#### Results

- SUV's showed a 67% reduction in single vehicle crashes and 63% reduction in fatal single vehicle crashes in SUV's with ESP®
- Passenger cars showed a 35% reduction in single vehicle crashes and 30% reduction in fatal single vehicle crashes in passenger cars with ESP®

#### Published

September 2004

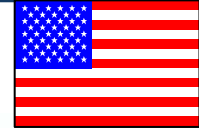
\* National Highway Traffic Safety Administration

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

### IIHS\*



#### Methodology/Data

- Analysis of Crash data from the 7 states over a 2 year period (source: FARS - Fatality Analysis Reporting System) 2,182 Passenger
- Includes MB, BMW, Jaguar, Volkswagen, Audi, Volvo, Toyota, Lexus and GM luxury & sport vehicles w/o & with ESC
- no separation between Passenger cars and SUVs

#### Results

- 41% reduction of single vehicle crashes for ESP<sup>®</sup> equipped vehicles
- 41% reduction for single vehicle crashes with injuries for ESP<sup>®</sup> equipped vehicles
- 56% reduction of single vehicle crash fatalities for ESP<sup>®</sup> equipped vehicles
- Potential to save more than 7,000 lives per year in the U.S.

#### Published

October 2004

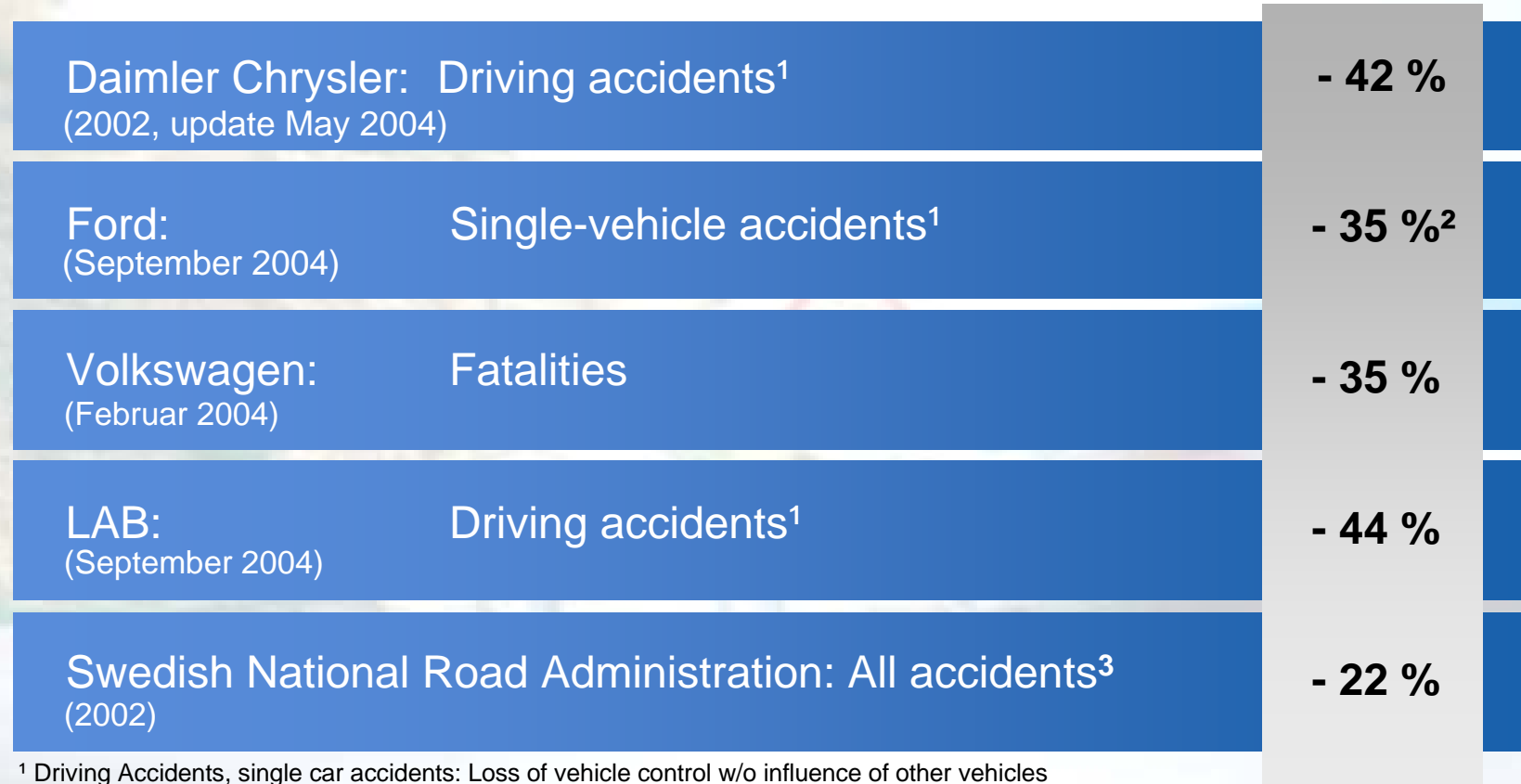
\* Insurance Institute for Highway Safety

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# European Studies prove effectiveness of ESP<sup>®</sup>



<sup>1</sup> Driving Accidents, single car accidents: Loss of vehicle control w/o influence of other vehicles

<sup>2</sup> Up to 35% reduction, depend on accident scenario

<sup>3</sup> Except rear-end impacts on dry road surface

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## 1.5 General Information: Safety Studies ESP®

# DaimlerChrysler



### Methodology/Data

- Analyses of all traffic accidents registered by the German police between 1999 and 2002 (source: Federal Statistical Office Germany):  
Data contains accidents only from new car registrations

### Results

- ESP® is standard equipment since 1999 in all Mercedes passenger cars:  
Reduction of loss of control accidents with Mercedes passenger cars by 42%

### Published

2002, update May 2004

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

### Ford



#### Methodology/Data

- Analysis of German accidents data 1994-2003 (source: GIDAS)
- Case-control approach for prove ESP<sup>®</sup> effectiveness

#### Results

Developed different scenarios for accident avoidance potential

Estimated accident avoidance potential of ESP installation for several combinations of covariates

	scenario 1	scenario 2	scenario 3	scenario 4	scenario 5
age of driver	18	38	38	38	60
passengers	yes	no	no	yes	no
tread depth	2	5	5	5	8
rain	yes	no	yes	no	no
day / night time	night	day	day	day	day
estimated accident avoidance potential of ESP installation	35,6%	21,3%	26,3%	19,0%	12,5%

#### Published

September 2004, ESAR (Expert Symposium on Accident Research)

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# Volkswagen



### Methodology/Data

- Analysis of German accidents data (source: GIDAS and Volkswagen)

### Results

Equipping all vehicles in Germany with ESP<sup>®</sup> (in 2002) would achieve:

- Reduction of fatalities by 35%
- Reduction of severe injuries by 25%
- Beside seat belts, ESP<sup>®</sup> is the most efficient safety procedure
- ESP<sup>®</sup> is more efficient than Airbags

### Published

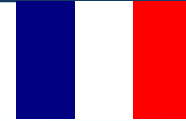
February 2004

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

LAB\*



### Methodology/Data

- Analysis of accidents data of Renault Laguna on French roads
- Comparison Laguna1 without ESP<sup>®</sup> and Laguna2 with 100% ESP<sup>®</sup>

### Results

- Reduction of risk for driving accidents by 44%
- ESP<sup>®</sup> is very useful on French roads

### Published

September 2004

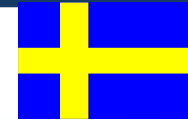
\* Laboratoire d'Accidentologie, de Biomécanique (Renault and PSA)

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# Swedish National Road Administration



### Methodology/Data

- Data from accidents occurring in Sweden during 2000 to 2002 were used to evaluate the effectiveness of ESP<sup>®</sup> (statistically computed)

### Results

- Effectiveness on all accidents, except rear-end impacts on dry road surface, with best estimate 22.1%
- Effectiveness on roads with lower friction was substantially higher, best estimates 31.8% and 38.2% , for wet roads and roads covered with ice or snow, respectively.

### Published

2002

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# Japanese Study proves effectiveness of ESP<sup>®</sup>



Toyota:  
(May 2003)

Severe single vehicle accidents<sup>1</sup>

- 50 %

<sup>1</sup> Driving Accidents, single car accidents:  
Loss of vehicle control w/o contact with other vehicles

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## 1.5 General Information: Safety Studies ESP<sup>®</sup>

# Toyota



### Methodology/Data

- Analysis of Japanese accidents data

### Results

- Reduction of severe single vehicle accidents by 50%
- Reduction of severe frontal crashes by 40%
- Reduction of fatalities and injuries in driving accidents and frontal crashes by 35%

### Published

May 2003, JSAE Automotive Engineering Exposition, Yokohama

