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Results from the survey on effectiveness of **electronic stability control (ESC)*
--- The accident rate decreased by about 36% in the segments of single-car accidents and head-on clashes where ESC is expected to be effective ---

Survey Objectives

Many technical innovations that have been made recently to improve passengers' safety in collision events as well as to improve the accident preventive ability of automobile require us to assess their effectiveness. However, it is rather difficult for us to make such assessment that involves performance comparison because, at the moment, only a limited models use such innovative technologies and the test/valuation methods to compare the devices of different manufacturers under the same condition are not well established yet. We, therefore, decided to test the effectiveness of electronic stability control (a device to prevent slide/skid of automobile) in order to assist the consumers to understand the effectiveness of such safety device. We compared the data of cars with electronic stability control (ESC) to that of those without ESC in order to know the effectiveness of device in preventing accident.

Methodology

We selected ten (10) models that were originally designed and shipped without ESC but subsequently became to be equipped with ESC as a standard device so that we could distinguish the effectiveness of ESC alone and minimize the influence of other factors such as characteristics of model and customer segment. We analyzed the accident data held by the Institute for Traffic Accident Research and Data Analysis (ITARDA). We extracted 1,471 data of single-car accidents and head-on clashes*² that were not caused by drunk driving or drowsy driving and compared the accident rate (number of accidents per 10,000 cars) of cars with ESC to that of cars without the device.

Results

The research revealed that the accident rate decreased by about 36% in the segments of single-car accidents and head-on clashes where ESC is expected to be effective. This figure means that the accident rate of cars without the device decreased by about 2.2% for all ten models subjected for this survey.

For those accidents considered in this survey, it is estimated that:

- * ESC would decrease the accident rate of single-car accident by about 44% and that of head-on clash by about 24%;
- * ESC would decrease the accident rate of severely damaged case by about 62% and that of moderately damaged case by about 46%;
- * ESC would decrease the accident rate on dry road condition by about 20% and that on wet condition by about 58%; and
- * ESC would effective to decrease the accident rate on straights by about 42% and that on corners by about 36%.

Attachment: Results from the survey on effectiveness of electronic stability control

**In this report NASVA used Stability Control System, so we changed this to Electronic Stability Control(ESC).*

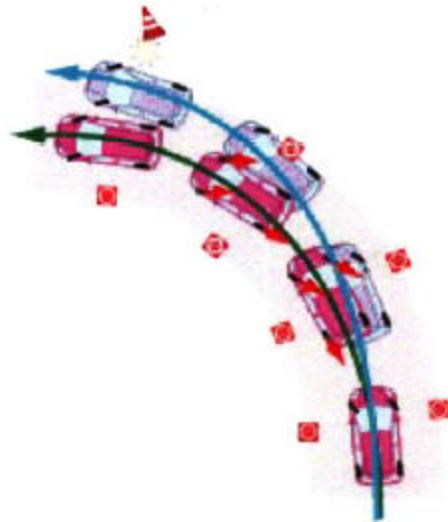
***1: Electronic stability control (ESC)**

A system that works to stabilize the behavior of automobile when it goes through corners.

ESC helps to maintain the stability of automobile when the car tends to skid when a driver makes a turn too hard or a road condition changes suddenly and becomes slippery. ESC provides an integrated control of motor output and braking force of each wheel when a skidding is detected and prevents spinning or going off the road.

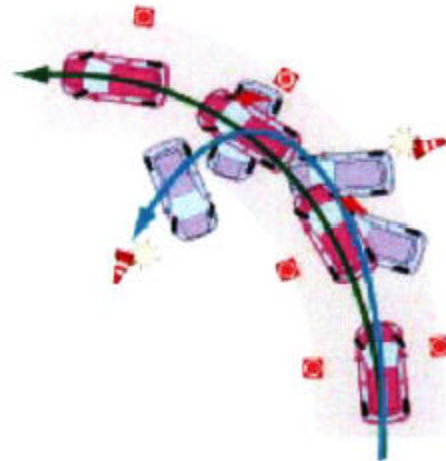
前輪の横滑りが発生した状態

Front tires are sliding



後輪の横滑りが発生した状態

Rear tires are sliding



***2: Head-on crashes**

“Head-on crashes” on ordinary roads and “crashes and minor collisions (excluding rear-end accidents and others)” on expressways were considered as head-on crashes for the survey.

Attachment

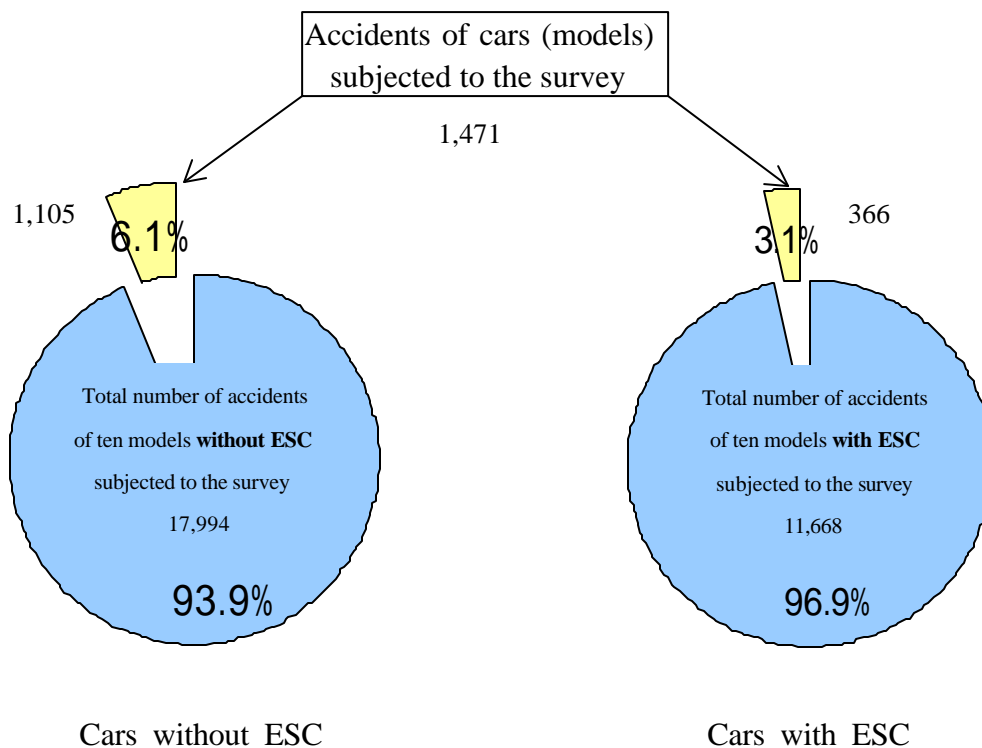
Results from the survey on effectiveness of electronic stability control (ESC)

1. Methodology

We selected ten (10) models that were originally designed and shipped without ESC but subsequently became to be equipped with ESC as a standard device so that we could distinguish the effectiveness of ESC alone and minimize the influence of other factors such as characteristics of model and customer segment.

We analyzed the accident data held by the Institute for Traffic Accident Research and Data Analysis (ITARDA). We extracted 1,471 data of single-car accidents and head-on clashes*² that were not caused by drunk driving or drowsy driving and compared the accident rate (number of accidents per 10,000 cars) of cars with ESC to that of cars without the device.

Number of accidents of cars with ESC and those without ESC for ten models subjected to the survey



Analysis was made for different road types (ordinary roads and expressways), different levels of damages of cars, different road surface conditions and different road settings (crossings, straights and corners).

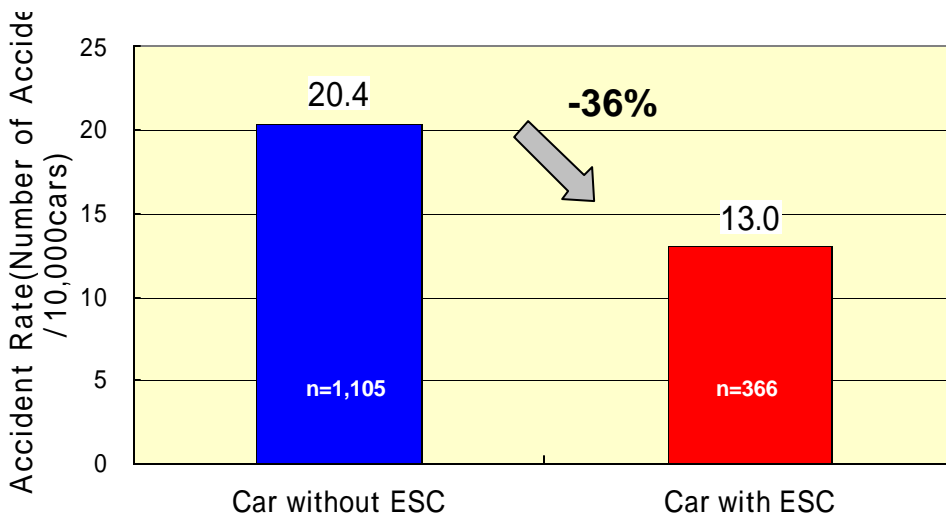
The effectiveness of ESC was assessed through the comparison of number of accidents of 10,000 cars with ESC to that of 10,000 cars without ESC.

This survey shall be considered as a pilot survey based on the limited number of samples equipped with ESC. Detailed analysis of greater precision shall be made as the car with ESC becomes more and more popular.

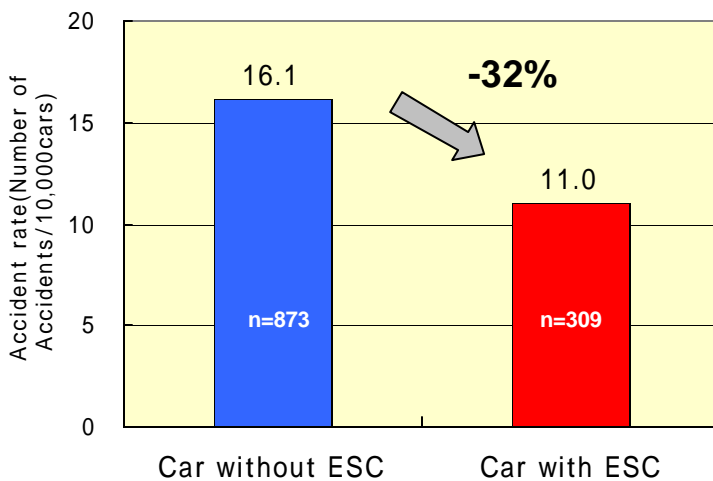
Note: “Head-on crashes” on ordinary roads and “crashes and minor collisions (excluding rear-end accidents)” on expressways were considered as head-on crashes for the survey.

2. Results

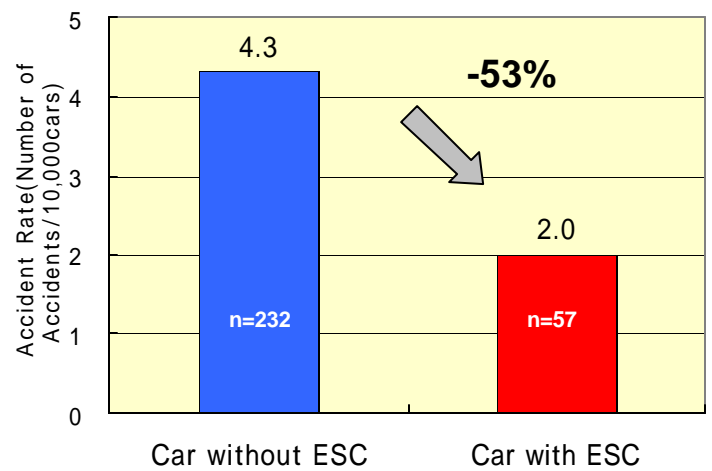
1) Accident rate on ordinary roads and expressways



一般道路および高速道路 Ordinary roads and expressways

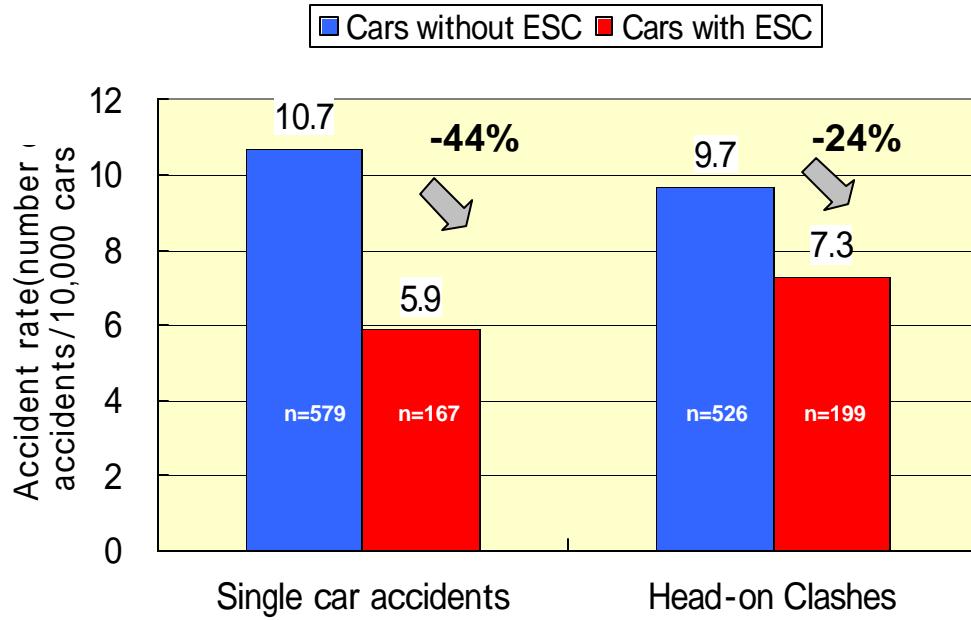


一般道路 Ordinary roads

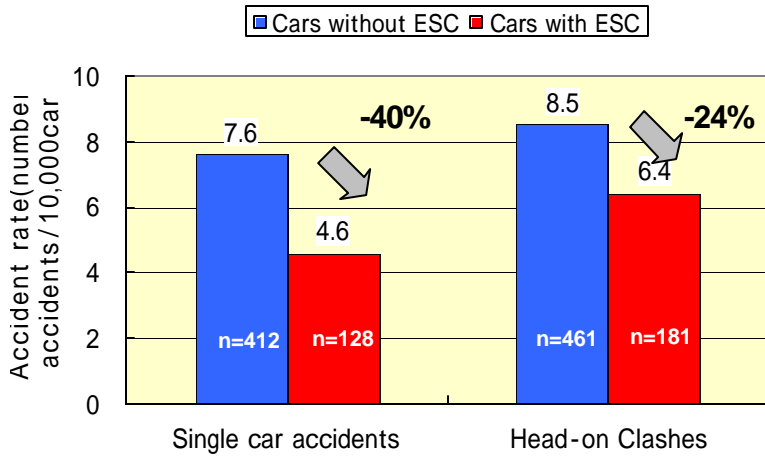


高速道路 Expressway

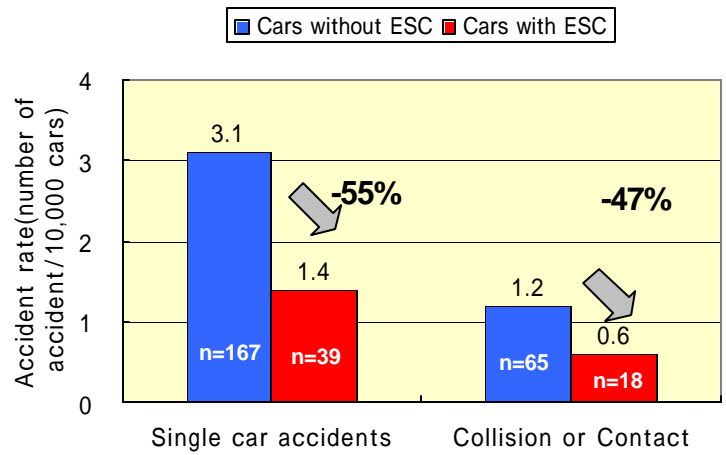
2) Accident rate for different types of accidents



一般道路および高速道路 Ordinary roads and expressways



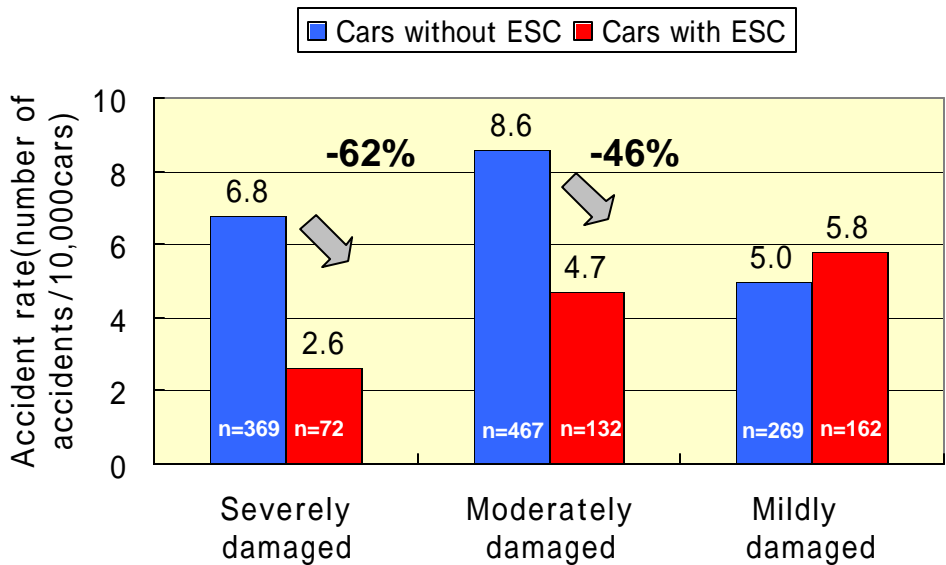
一般道路 Ordinary roads



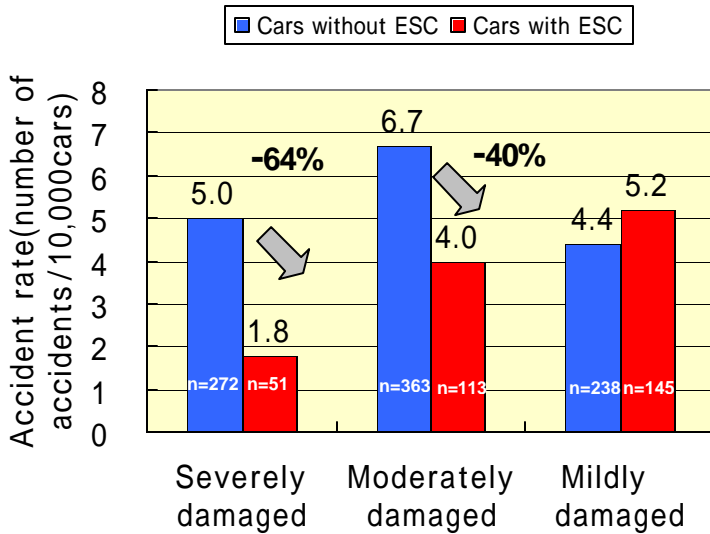
高速道路 Expressway

Both single-car accidents and head-on crashes decreased on ordinary roads as well as on expressways.

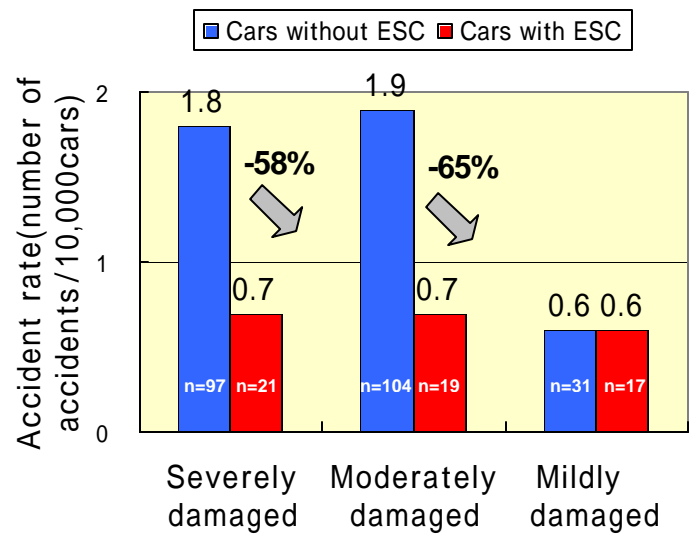
3) Accident rate for different levels of damages of cars



一般道路および高速道路 Ordinary roads and expressways



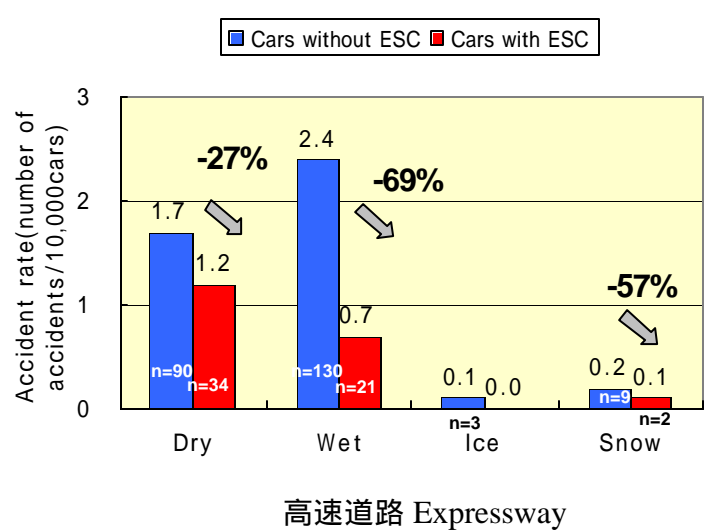
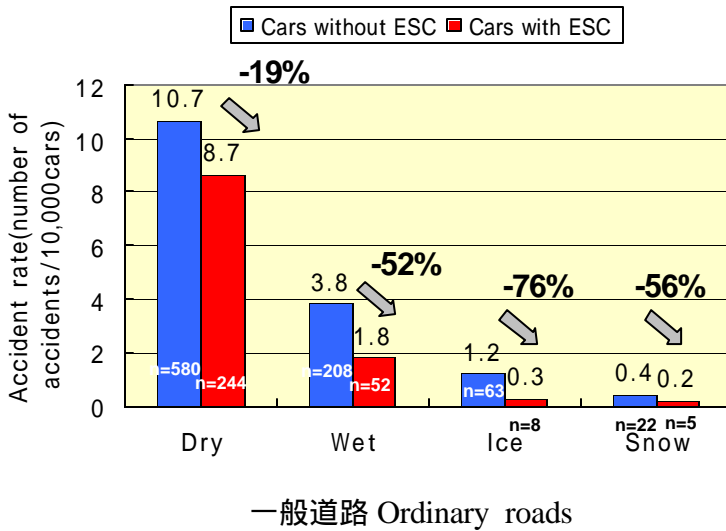
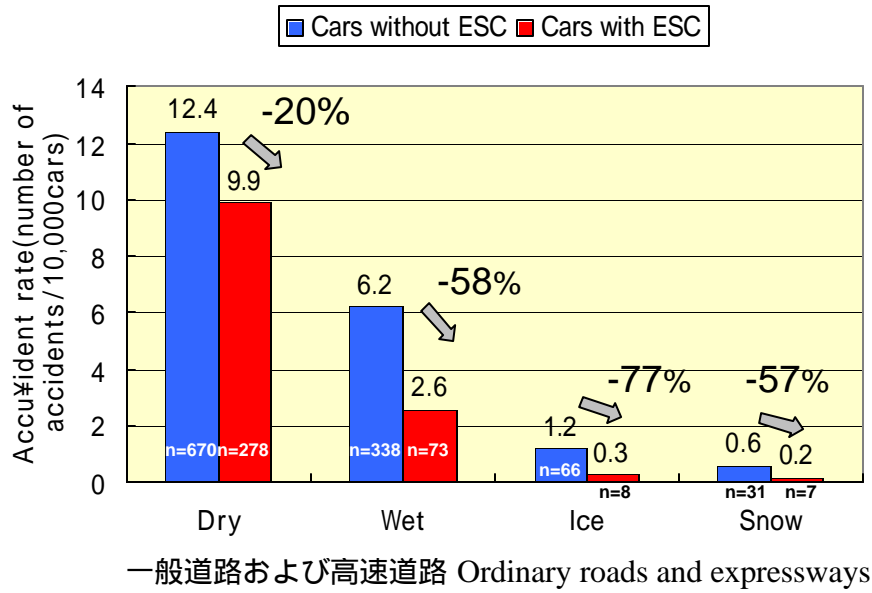
一般道路 Ordinary roads



高速道路 Expressway

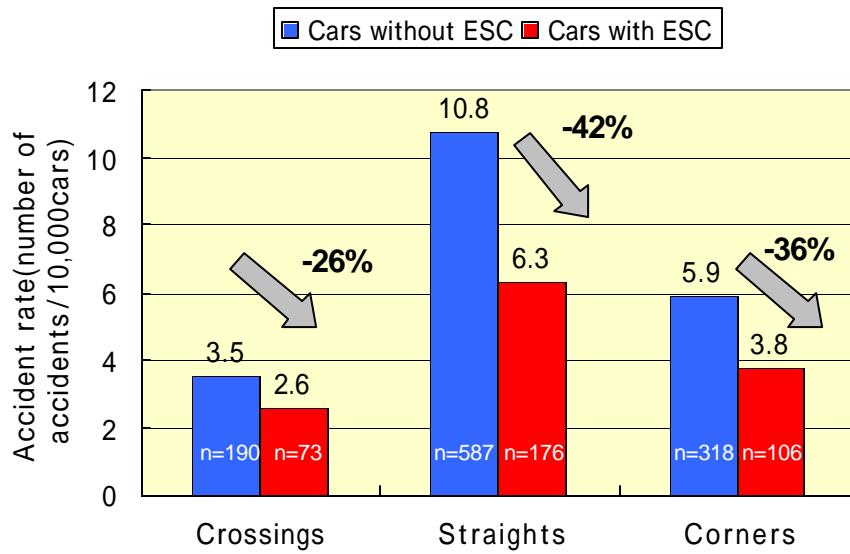
When you compare the accident rates before and after the introduction of ESC for different levels of damages of cars, severely to moderately damaged accidents decreased significantly for the cars that were equipped with ESC. The increase in numbers of mildly damaged accidents can be attributable to the general scale down of severity of damage in each incident due to the introduction of ESC. Also, the mildly damaged accidents include those at a lower speed without skidding where ESC doesn't make much difference.

4) Accident rate for different road surface conditions

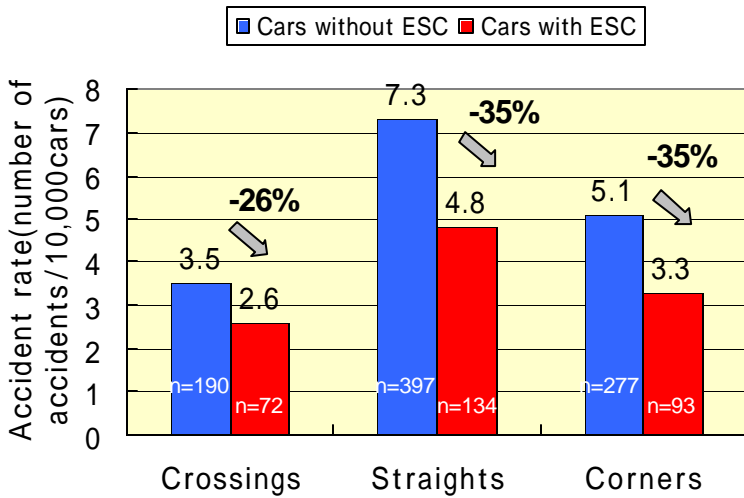


Accident rate on wet condition decreased much compared to dry condition.

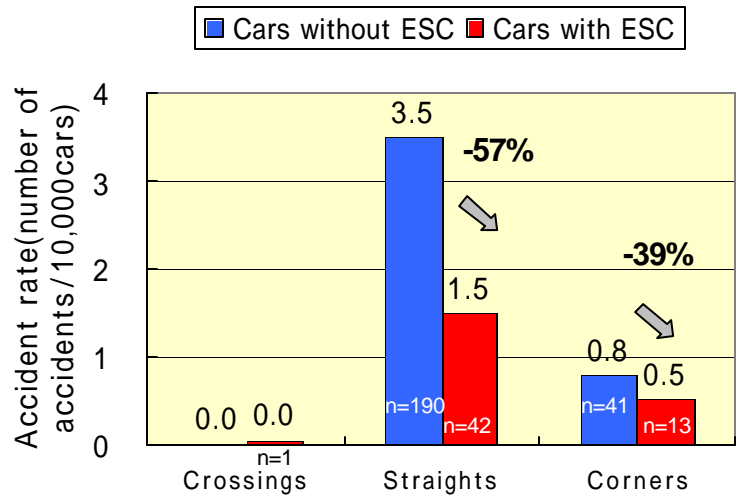
5) Accident rate for different road settings



一般道路および高速道路 Ordinary roads and expressways



一般道路 Ordinary roads



高速道路 Expressway

Accident rate at straights and corners decreased much compared to crossings.

Reference

Ten(10) Models for study

1. Audi A4
2. TOYOTA ARISTO
3. TOYOTA WINDOM
4. TOYOTA CROWN SEDAN
5. TOYOTA CROWN Hard Top
6. TOYOTA CROWN MAJESTA
7. NISSAN SKYLINE SEDAN
8. TOYOTA CELSIOR
9. TOYOTA Century
10. TOYOTA Mark- (Include CHASER, CRESTA)