



**MGM College of Engineering &
Technology, Noida**

**Seminar Presentation
On
ADVANCEMENT IN SAFETY &
SECURITY IN AUTOMOBILES**

- Guided By:
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Associate Professor

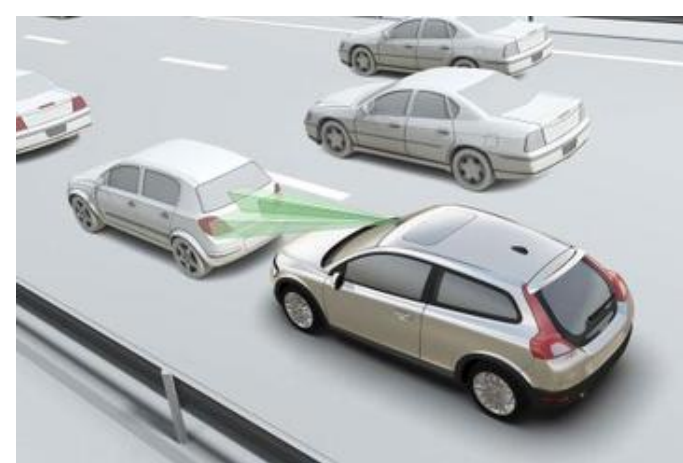
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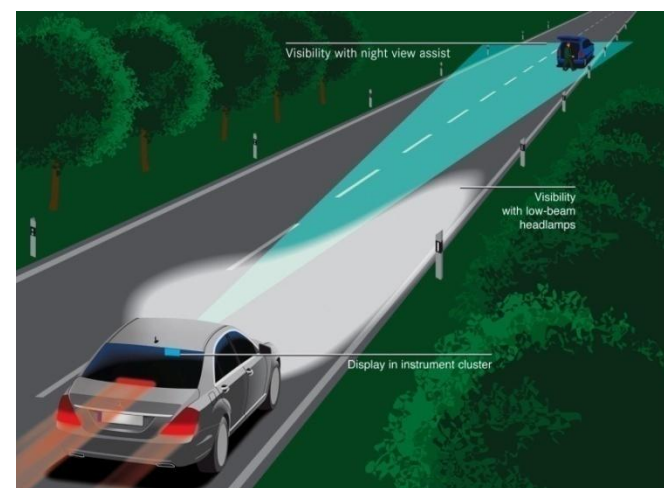
- Introduction
- Types of Safety System
 - ❑ ABS (Anti-lock braking system)
 - ❑ Collision Warning System
 - ❑ Sturdy Body Cell
 - ❑ Electronic Stability Control
 - ❑ Blind Spot Detector
 - ❑ Survival Cell
 - ❑ Air bags
 - ❑ Seat Belt

Need for Automobile Safety

- Protection of the driver and the passengers
- Protection of the car from primary damage
- Protection of the pedestrians
- Load reduction on Insurance companies



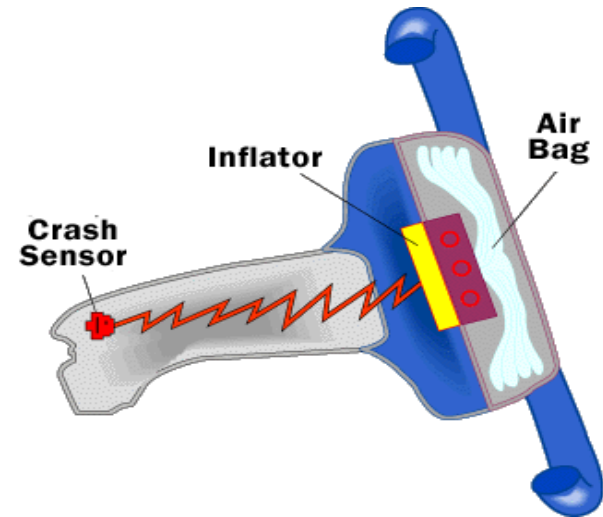
Some of the safety features used in Automobiles



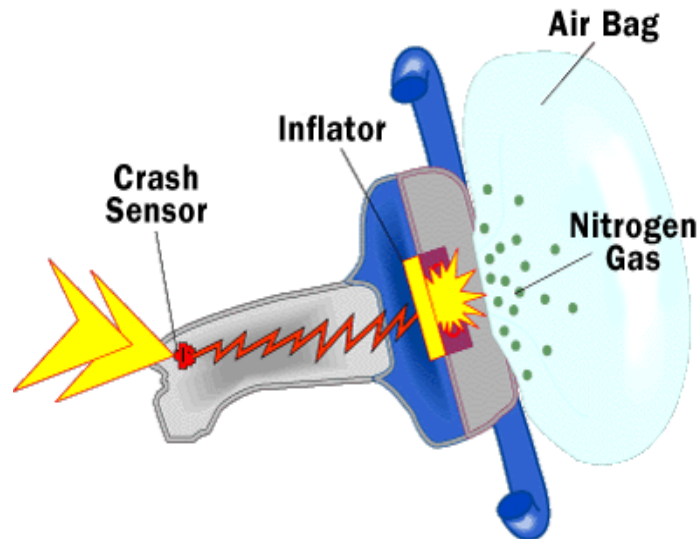
AIRBAGS

Components :

1. Crash Sensor
2. Inflator System
3. Inflatable Airbag



Airbag before collision



Airbag after collision

ANTI-LOCK BRAKING SYSTEM (ABS)

Components :

1. Speed Sensor
2. Valves
3. Pump
4. Controller

anti-lock brake system



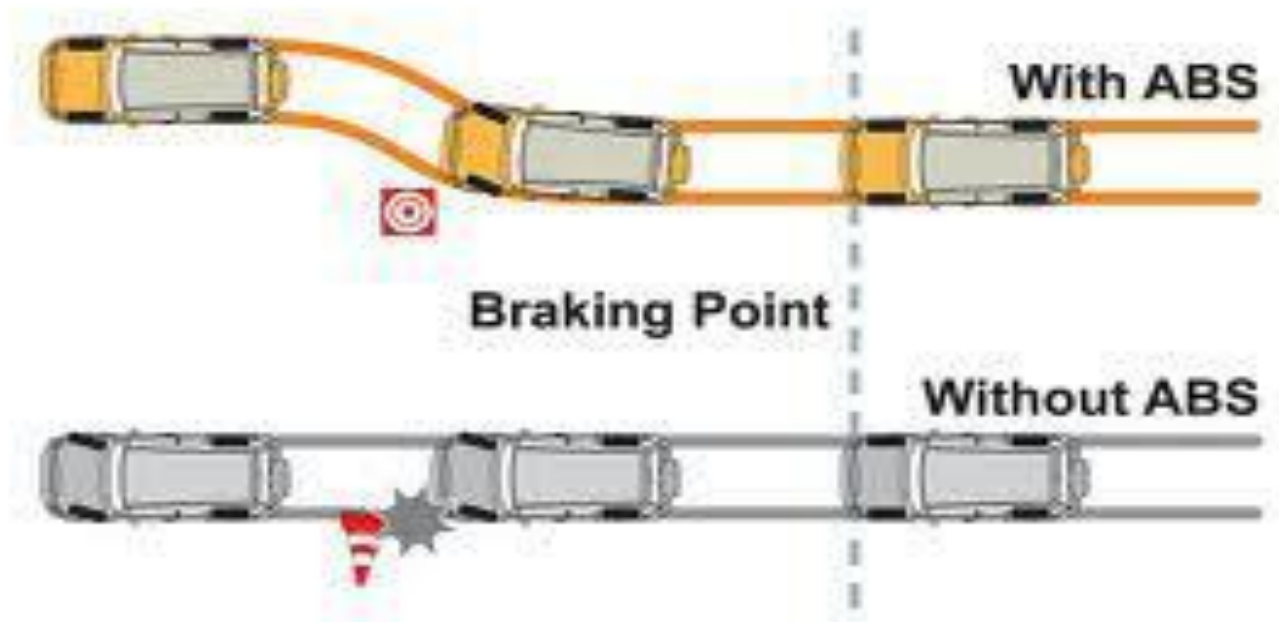
Without ABS

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With ABS

ABS

- It is an automobile safety system that allows the wheels of the vehicle to maintain contact with the road surface.



TRACTION CONTROL SYSTEM

- Traction control systems prevent wheel spin in slippery conditions when the vehicle needs to be accelerated.
- Anti-lock braking systems use wheel speed sensors to identify when a rotating wheel is about to lock up so that the brake pressure can be reduced in order to keep the wheel rotating. Traction control systems use these same wheel sensors to monitor wheel speed during acceleration but now monitor when a drive wheel starts to spin

TRACTION CONTROL SYSTEM (TCS)



With TCS

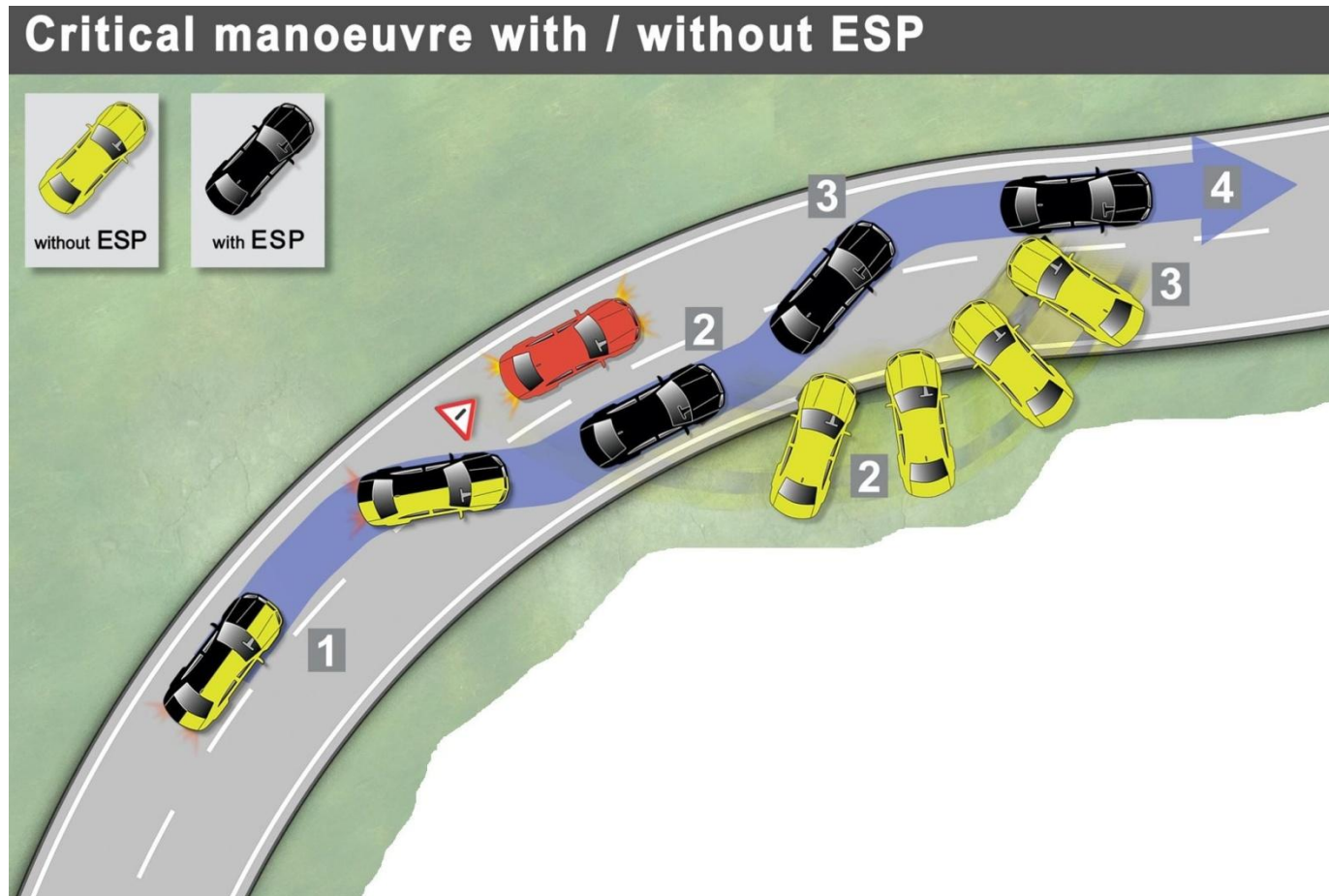


Without TCS

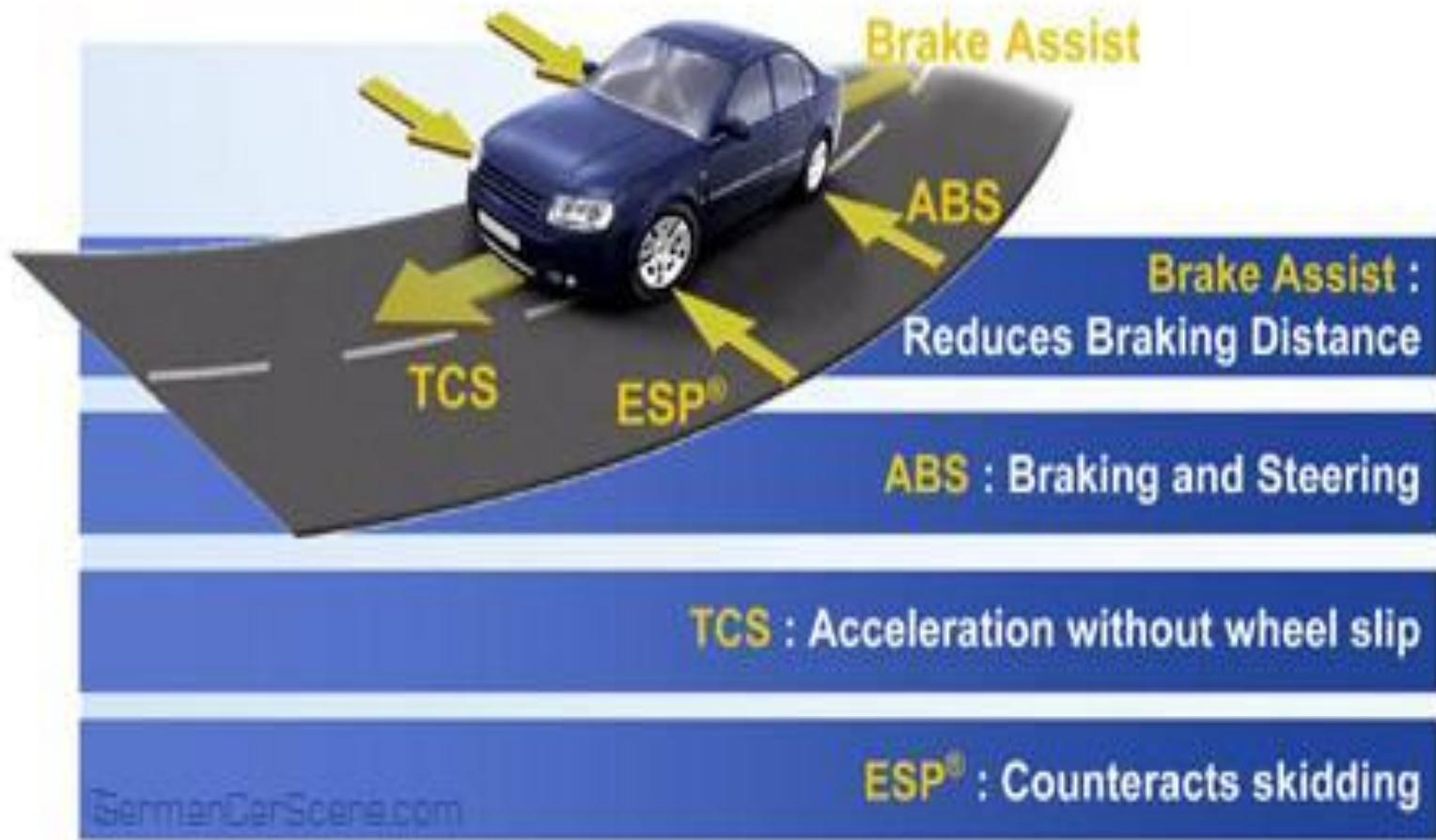
ELECTRONIC STABILITY CONTROL

- An Electronic Stability Control coordinates the ABS, Traction Control, and the "yaw" of the vehicle (how much a car rocks side-to-side). The individual systems are combined in an effort to reduce tire spinning, skidding, and traction-less cornering, keeping the tires in maximum contact with the road. Found mostly on luxury models, stability systems are slowly working their way into more vehicles.

ELECTRONIC STABILITY PROGRAMME (ESP)



Electronic Stability Program (ESP®)



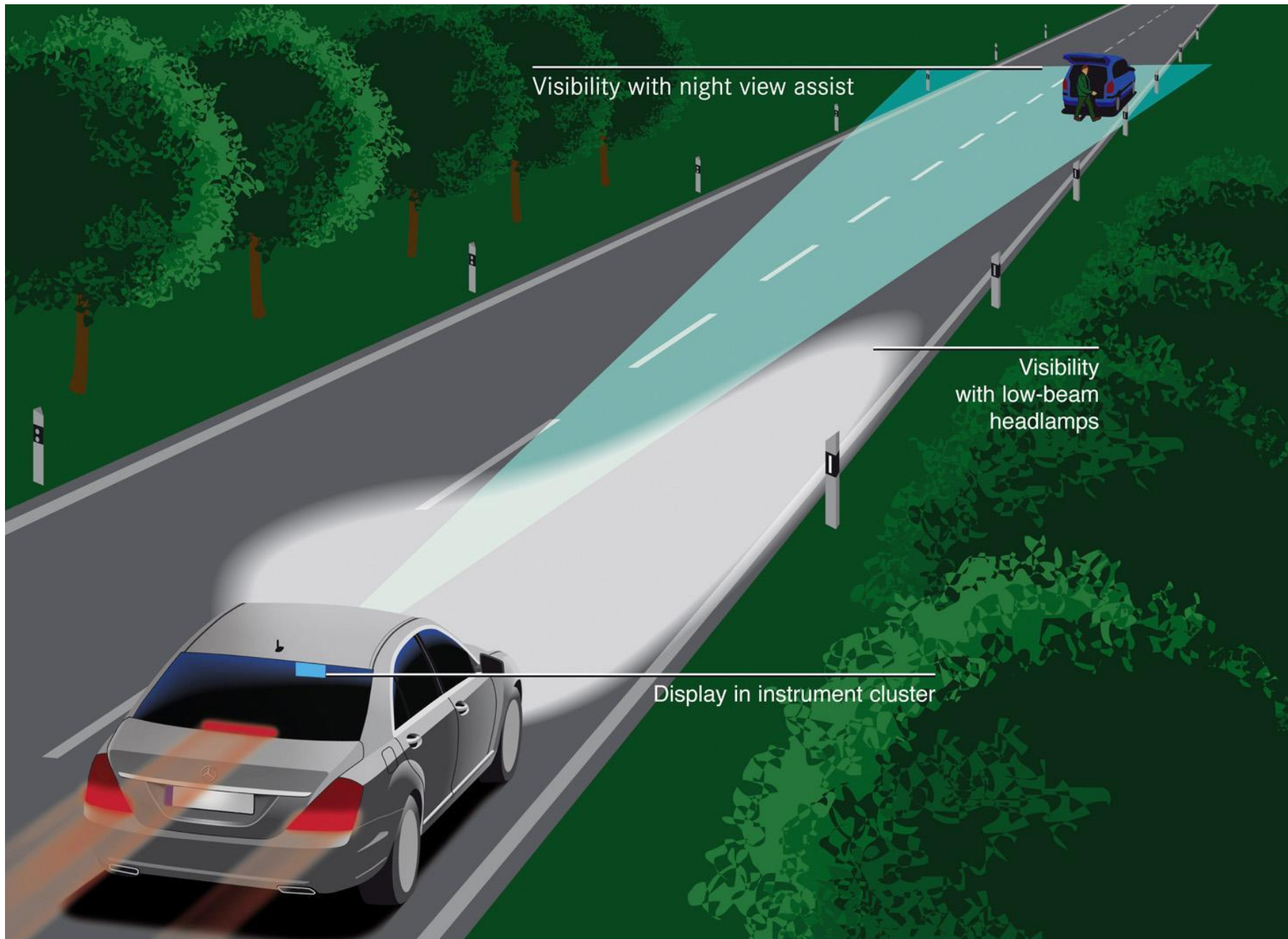
NIGHT VISION ASSIST

- Night vision systems use video cameras that are sensitive to infra red to detect the heat given off by humans and animals against the colder background of the roadway environment. Infra-red emitters may also form part of the vehicle's headlights to help detect objects at greater distances than is possible using only the naked eye with conventional lighting.

NIGHT VISION ASSIST



Virtual Screen displaying Night Vision



Visibility with night view assist

Visibility with low-beam headlamps

Display in instrument cluster

TYRE PRESSURE MONITORING SYSTEM

- Tyre Pressure Monitoring Systems (TPMS) are a way of warning a driver that a tyre is incorrectly inflated, which will decrease the safety and performance of the vehicle, and increase the risk of an accident
- It is difficult to spot an under inflated tyre visually, especially without a fully inflated tyre as comparison

This can have many consequences; such as:

- Increased wear of the tyres treads which will lead to a higher chance of aquaplaning in the wet.
- Reduced handling characteristics and a reduced control of the vehicle.
- Longer stopping distances.
- Higher chance of the tyre delaminating, which could lead to a sudden tyre failure.

TIRE-PRESSURE MONITORING

Types :

1. Direct
2. Indirect

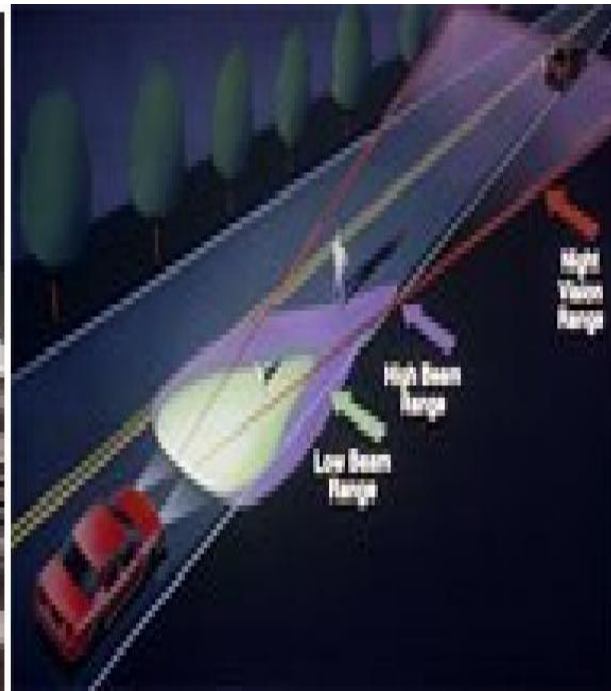




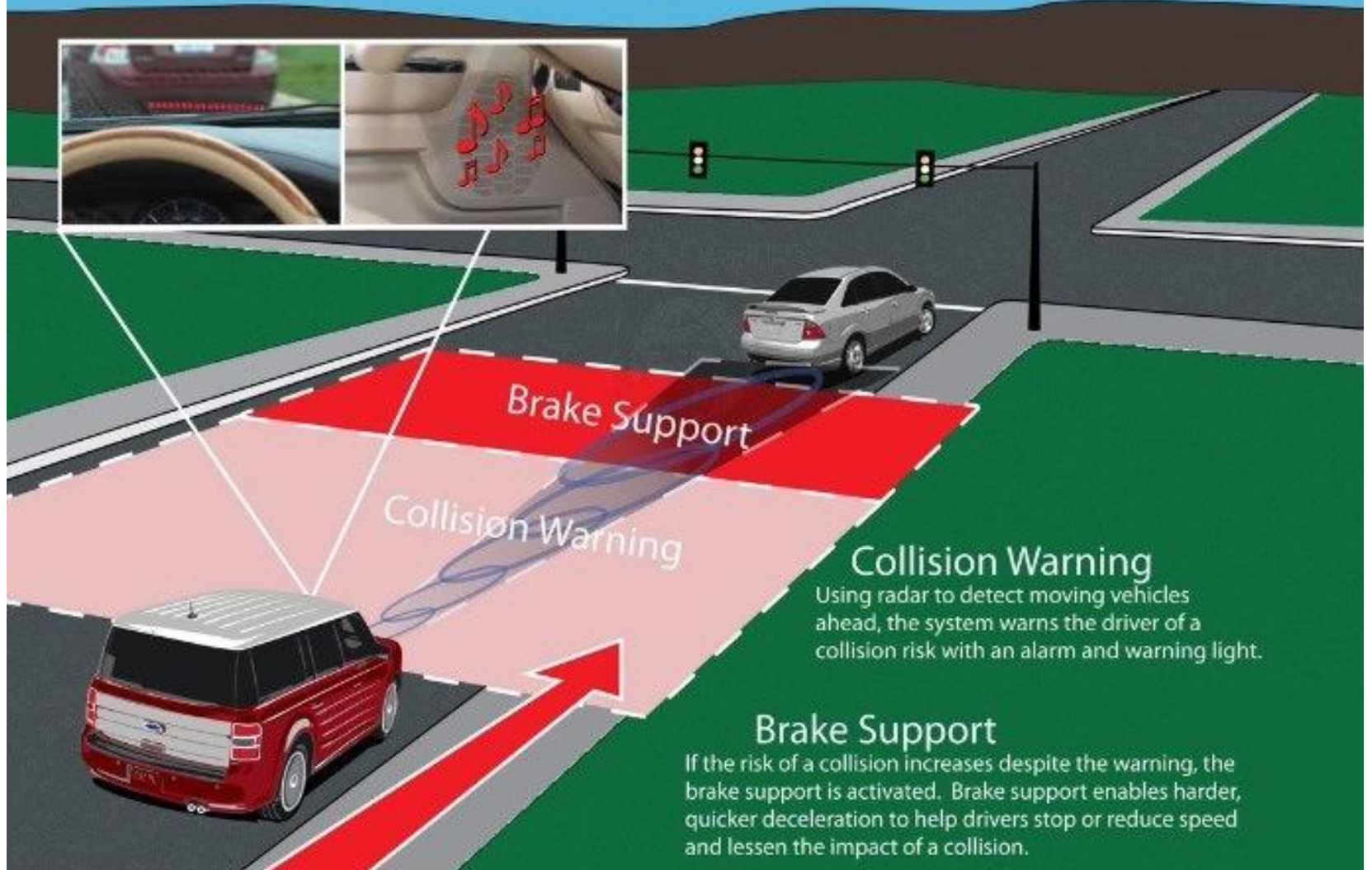
AUTOMATIC BRAKING

Uses INFRA-RED rays





Collision Warning with Brake Support



Collision Warning

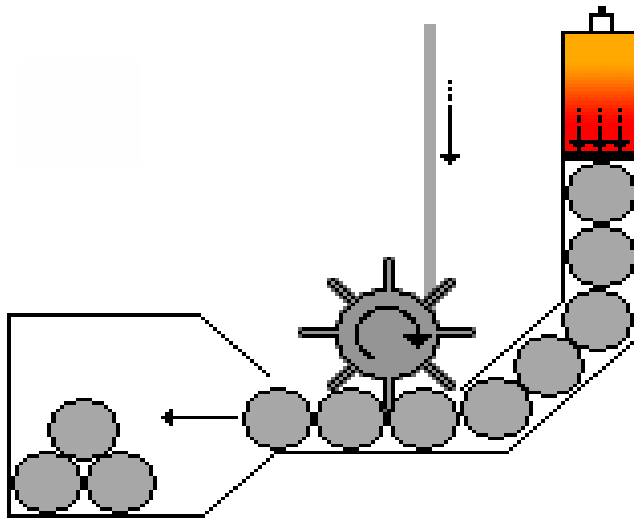
Using radar to detect moving vehicles ahead, the system warns the driver of a collision risk with an alarm and warning light.

Brake Support

If the risk of a collision increases despite the warning, the brake support is activated. Brake support enables harder, quicker deceleration to help drivers stop or reduce speed and lessen the impact of a collision.

SEAT BELTS

Pretensioners and webclamps

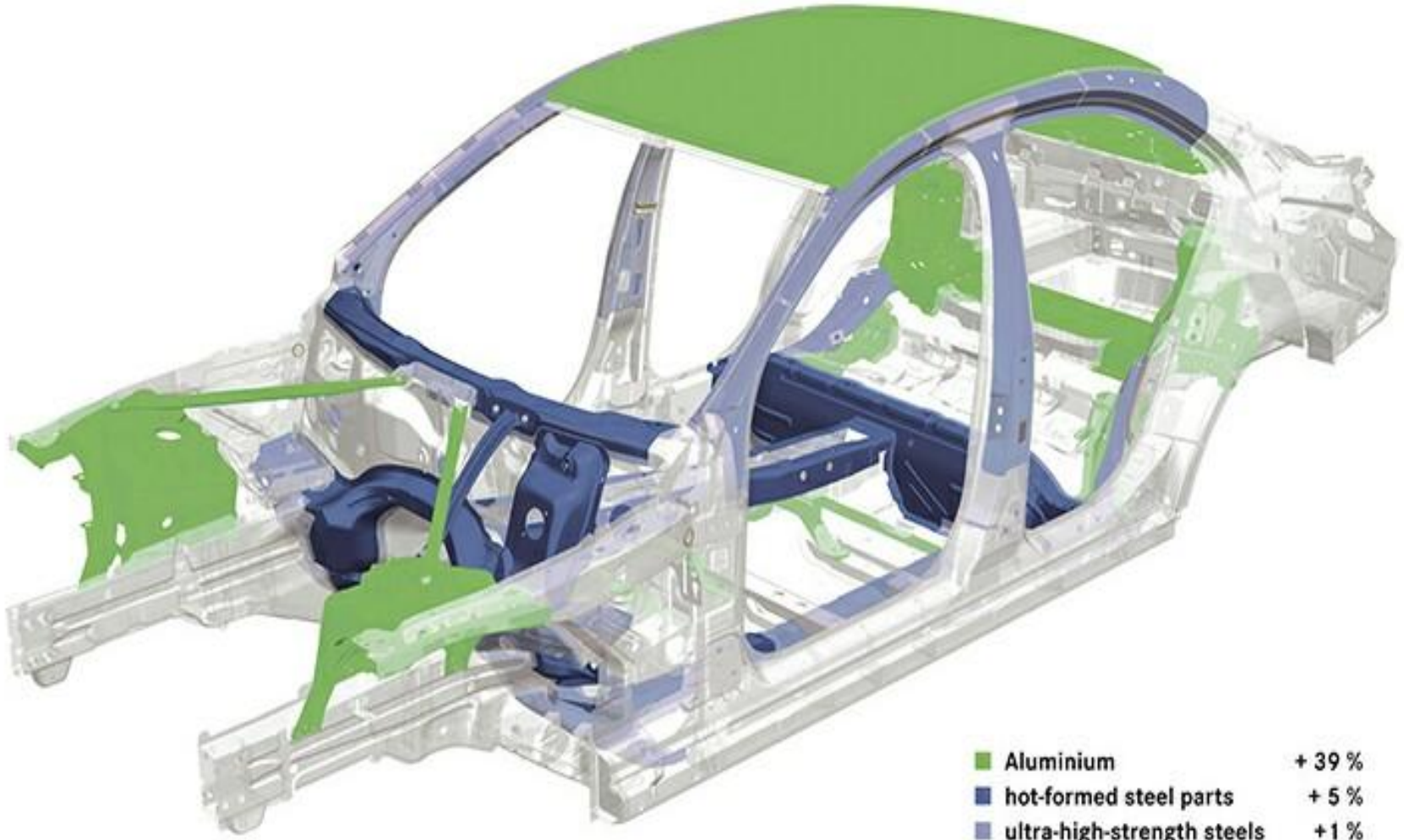


Pyrotechnic pretensioner diagram

Sturdy Body Cell:

- It is a rigid cell made up of aluminum, steel, hot formed ultra steel & ultra high strength steel.
- Obtained by heating them under certain pressure hot formed ultra steel is used.

- Hot-formed ultra-high-strength steel
- Ultra-high-strength steel
- Steel
- Aluminium



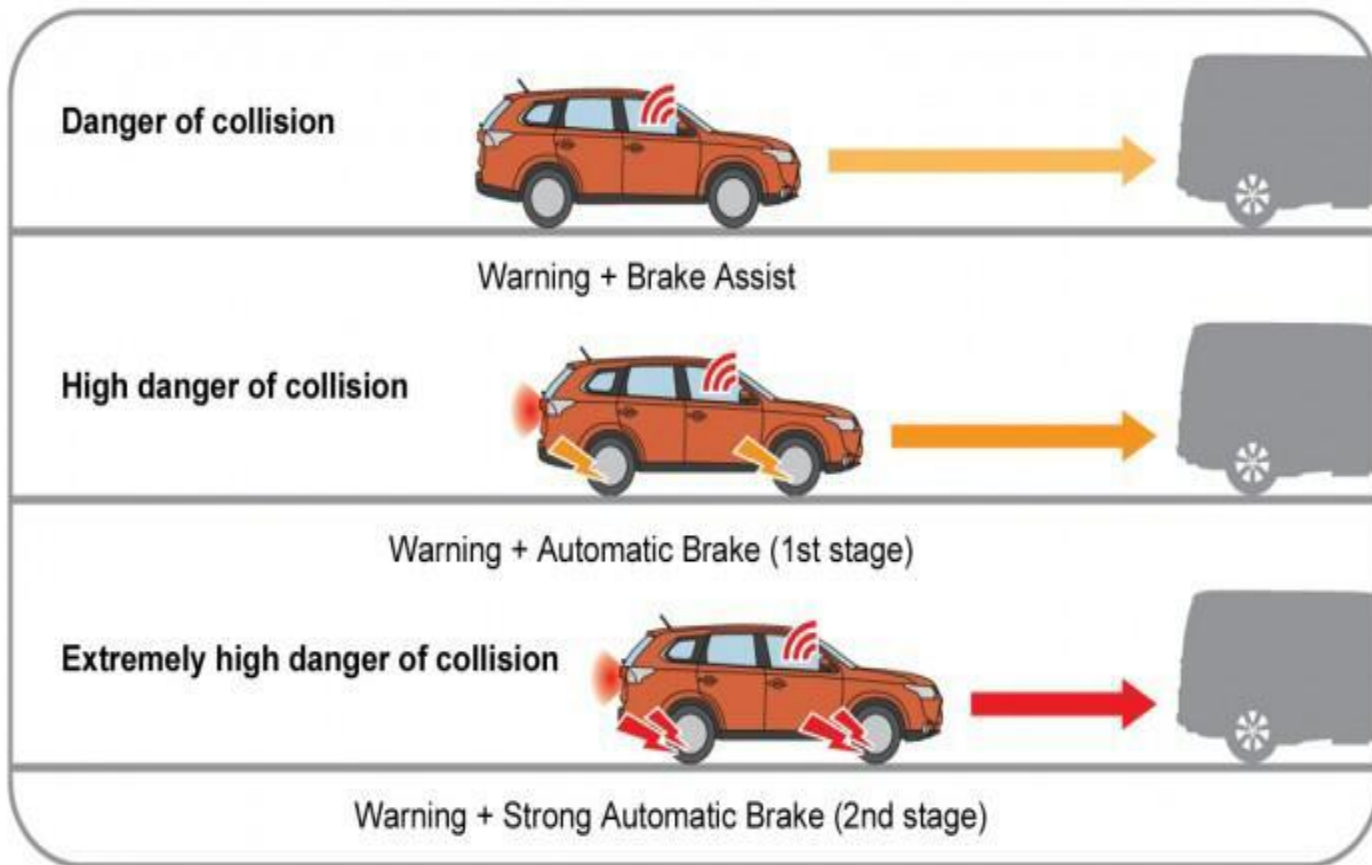
 Aluminium	+ 39 %
 hot-formed steel parts	+ 5 %
 ultra-high-strength steels	+ 1 %

Global Outstanding Assessment (GOA Body)

GOA or **G-Con** is Toyota and Honda Motor Co.'s internal passive safety standard respectively.



Collision warning system:



PARKING SENSORS



THANK YOU