Active safety systems on the vehicle

INTRODUCTION

- As for vehicles, the systems responsible for safety can be divided into two groups (active - those that do everything to prevent a traffic accident, and passive - if a traffic accident occurs, the consequences are as minimal as possible).

1. Active vehicle safety

- The active safety of a vehicle is defined by the possibilities that the vehicle provides to the driver to operate the motor vehicle reliably and with the best possible control and thus avoid conflicting situations on the road.
- The main task of active safety is to do everything possible to prevent a traffic accident.

1. Active vehicle safety

- For the safe movement of the vehicle, of course, it is very important that following is operational:
  - ✓ vehicle stability
  - ✓ control device
  - ✓ braking system
  - ✓ Tires
  - ✓ light and signaling devices

2. Active safety systems on the vehicle

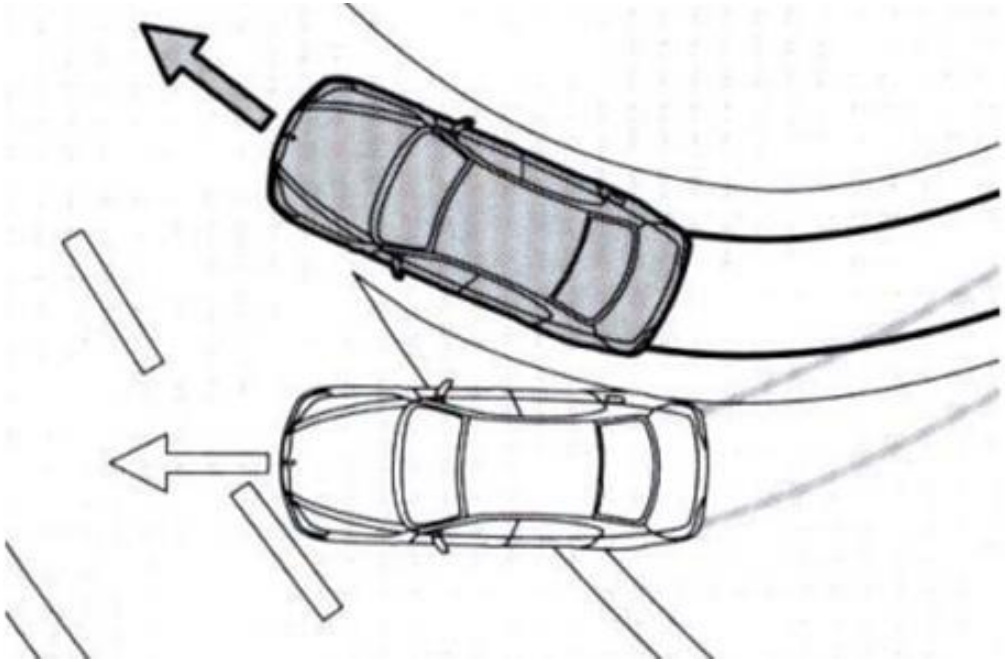
- There are many such systems on modern cars, such as :
  - ✓ Anti-lock Braking System (ABS)
  - ✓ Electronic Brake Force Distribution (EBD)
  - ✓ Electronic cornering brake control (CBC - Cornering Brake Control)
  - ✓ Drive wheel slip regulation system (ASR - Anti Slip Regulation)
  - ✓ Electronic Stability Program (ESP - Electronic Stability Program)
  - ✓ Active driving control (ACC - Active Cruise Control)
  - ✓ System to increase visibility when driving at night
  - ✓ System for detection of collision (PCW - Predictive Collision Warning)

2. Active safety systems on the vehicle

- ✓ Predictive Brake Assist (PBA)
- ✓ Tire Pressure Monitoring System (TMP)
- ✓ Lane Departure Warning System (LDW)
- ✓ Line Changing Assistant (LCA)
- ✓ Pedestrian detection system, and many others.

2.1. ABS – Anti Lock Braking System

- ABS, by regulating the brake pressure, prevents the wheels from locking. This allows the driver to still control the movement of the vehicle and to avoid drifting and sliding, however, despite the undoubted advantages, the driver must also get used to the response of ABS.

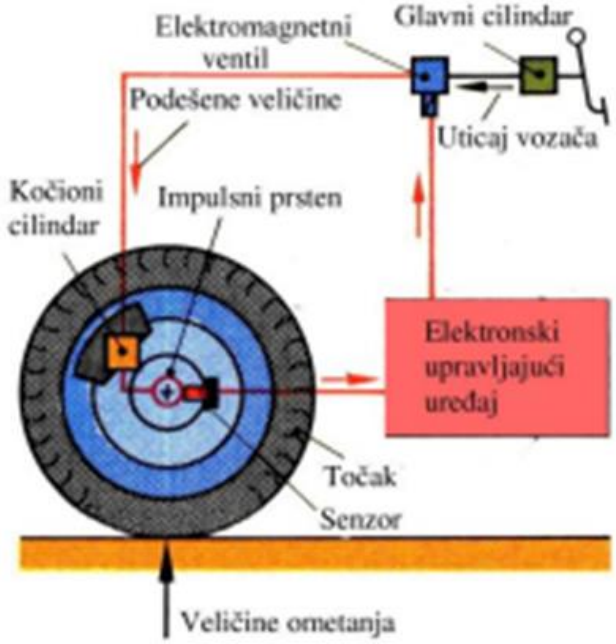


2.1. ABS – Anti Lock Braking System

- With this system, controlling the speed of rotation of individual wheels, without the will of the driver, it acts to reduce the pressure in the braking system on individual wheels, which maintains their rotation (prevents the blocking of the rotation of the wheels) and prevents the occurrence of wheel and vehicle slippage during braking, thus maintaining the desired path of the vehicle.

2.1. ABS – Anti Lock Braking System

- Sensors on all wheels give impulses to the steering device, which gives an impulse to the valves to maintain the pressure in the brake devices on individual wheels so that the wheel is always on the verge of blocking, preventing the wheel from locking.



2.1. ABS – Anti Lock Braking System

- During braking, it can happen that one of the wheels blocks, which the control device registers as a large "slip" - a large difference in the number of revolutions, and then it gives a signal to the individual valves to "regulate" the pressure in the brake system.

a) Ponašanje vozila bez ABS-a

b) Ponašanje vozila sa ABS-om

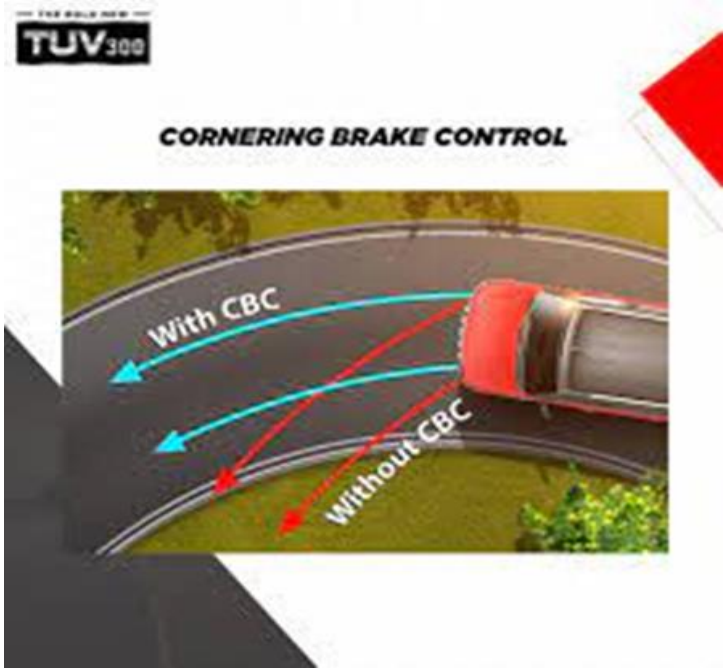
2.2. EBD – Electronic Brake Force Distribution

- This system prevents the possibility of the wheels from locking and thus from slipping. The EBD system enables the correction of the distribution of braking forces depending on the vehicle load.
- We can see EBD as a software addition to ABS, which is able to replace the brake corrector (fifth brake cylinder) and based on various data, estimate how much braking force is needed by individual wheels depending on the situation.

2.2. EBD – Electronic Brake Force Distribution

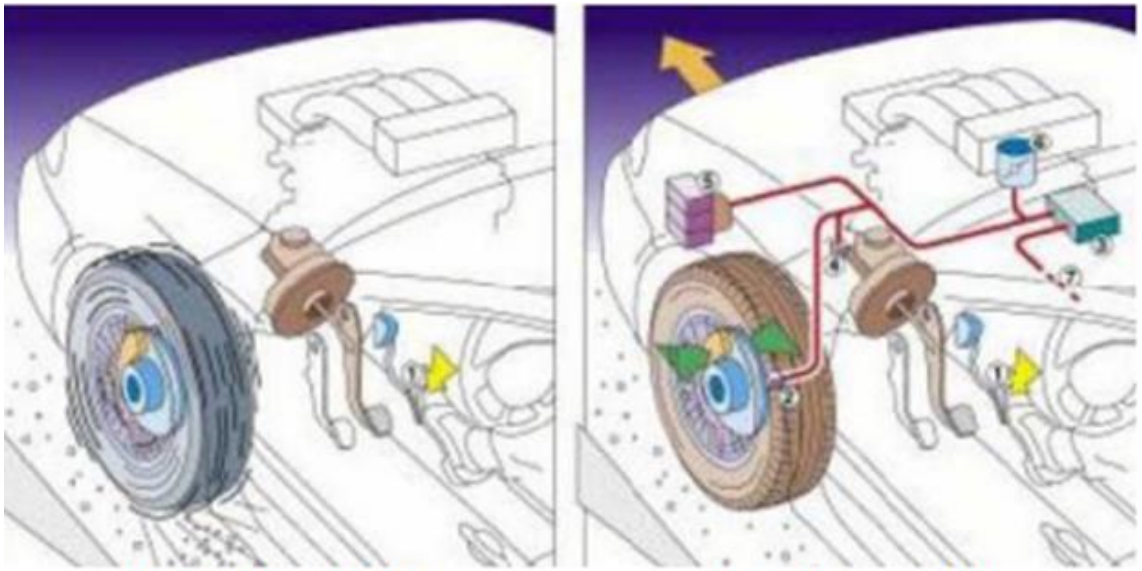
2.3. CBC – Cornering Brake Control

- CBC uses the vehicle's electronic control unit to receive data from multiple sensors. CBC then adjusts brake torque, brake pressure, cornering speed and stopping distance, helping the driver maintain control of the vehicle while turning in and out.



2.4. ASR – Anti Slip Regulation

- Traction control (ASR), which, as a supplement to ABS, primarily has the task of relieving the driver and ensuring the stability and controllability of the vehicle during acceleration. In this sense, if the wheel shows a tendency to slip, ASR instantly adjusts the torque of the engine to the torque that can transfer the wheel to the surface at the given moment.



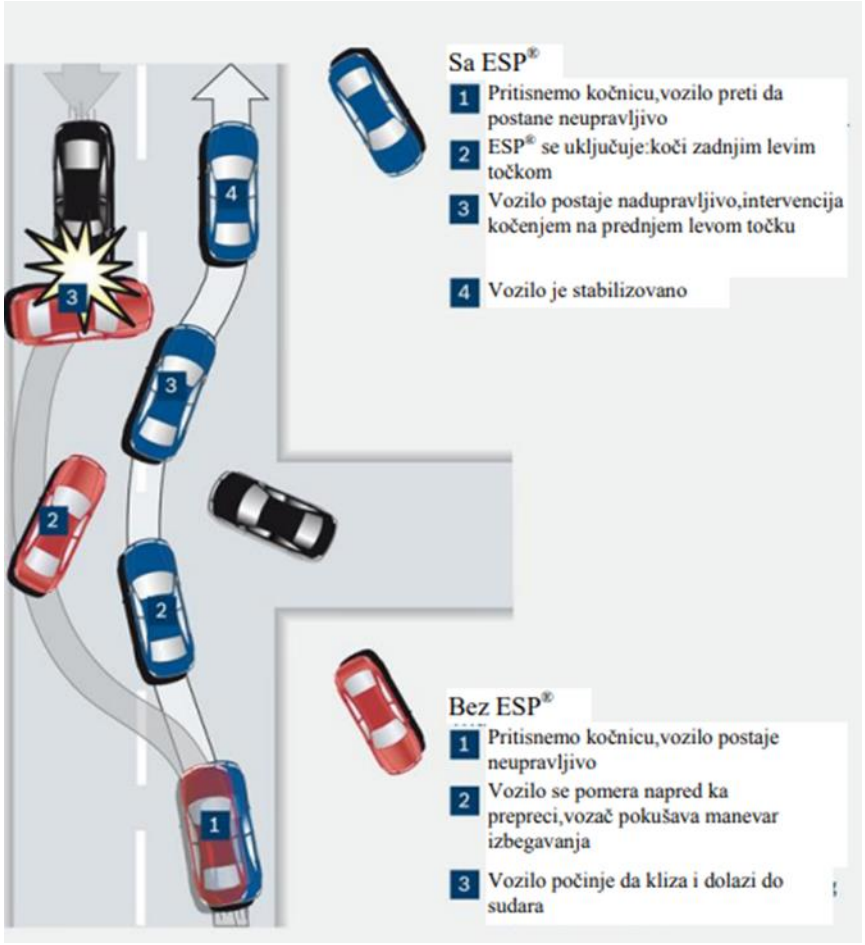
Vozilo bez ASR

Vozilo sa ASR

2.5. Elektronski program stabilnosti (ESP – Electronic Stability Program)

- Ovaj sistem ima ulogu da poboljša trakciju vozila, a nikako ne omogućava da se brže vozi kroz krivine ili po klizavom putu. Dakle, ovaj sistem samo pomaže vozaču da zadrži kontrolu nad vozilom.
- ESP prepoznaje ako je proklizavanje neminovno i interveniše munjevito. Vozaču ostaje kontrola nad vozilom i ne dolazi do klizanja pod uslovom da se fizički ne prelaze granice. ESP je uvek aktivan.

2.5. ESP – Electronic Stability Program



THANK YOU