# Resource 1A: Safety features

*Directions: Correctly categorise each safety feature in the below list of 13 features as either a **crash avoidance feature** (which makes a crash less likely) or an **injury protection feature** (which reduces injury in a crash). Write the feature in the appropriate column of the table below.*

Anti-lock Brake System (ABS)          Seat Belts          Airbags          Electronic Stability Control (ESC)          Head Rests

Lane-Keep Assist          Active Cruise Control          Side-Impact Protection System          Crumple Zones  Blind Spot Warnings

Pedestrian Friendly Bonnet Design          Driver Fatigue Monitoring          Auto Emergency Braking (AEB) Intelligent Speed Adaptation (ISA)

| Crash Avoidance Features<br>(Features that make a crash less likely) | Injury Protection Features<br>(Features that reduce injury to road users in a crash) |
| --- | --- |
|  |  |

# Resource 1B: Safety features explained

| Safety Feature | Description |
| --- | --- |
| Anti-lock brake System (ABS) | Detects panic braking when sudden and forceful movement is applied to the brake pedal. When the system recognises sudden braking, it will add additional pressure to the brake. This allows the wheels on a motor vehicle to maintain tractive contact with the road surface according to driver inputs while braking, preventing the wheels from locking up (ceasing rotation) and avoiding uncontrolled skidding. |
| Seatbelts | For drivers and front-seat passengers, using a lap and shoulder belt reduces the risk of fatal injury by 60 percent in an SUV, van or ute and by 45 percent in a car. |
| Airbags | Airbags provide crucial cushioning for people during a crash. |
| Electronic Stability Control (ESC) | ESC is an extension of antilock brake technology that helps drivers maintain control of their vehicles on curves and slippery roads, and hence prevent skidding. ESC becomes active when a driver loses control of their car. |
| Head Rests | Attached to the top of a seat this safety feature reduces whiplash or serious neck and spinal injury. |
| Lane-Keep Assist | Technology that detects if a car is drifting in its lane. It provides alerts and warnings to help avoid or mitigate a crash. |
| Active Cruise Control | Improved cruise control that include warnings or assistance such as automatic braking to adjust the vehicle speed by detecting the distance and speed of the preceding vehicle and maintains an appropriate following distance. |
| Side-Impact Protection System | By having a reinforced energy absorbing honeycomb materials inside the doors, force is widely distributed across the vehicle. Resulting in less directional force being applied to a specific area. |
| Crumple Zones | Crumple zones are designed to absorb the energy from the impact of a crash. By absorbing the energy the crumpling prevents the energy traveling through the car. |
| Pedestrian Friendly Bonnet Design | These features reduce injury to the pedestrians whilst maintaining structural integrity. |
| Blind Spot Warnings | Alarm that alerts the driver if there is something in their blind spot. |
| Driver Fatigue Monitoring | Technology that provides warnings when it detects a driver falling asleep. This may help avoid or mitigate a crash. |

| | |
|---|---|
| Auto emergency braking (AEB) | AEB is a feature that alerts a driver to an imminent crash and helps them use the maximum braking capacity of the vehicle. AEB will independently brake if the situation becomes critical and no human response is made. AEB comes in three categories:<br><br>1. low speed system – works on city streets to detect other vehicles in front of the driver's car to prevent crashes and non-life threatening injuries such as whiplash<br>2. higher speed system – scans up to 200 metres ahead using long range radar at higher speeds<br>3. pedestrian system – detects pedestrian movement in relation to the path of the vehicle to determine the risk of collision. |
| Lane-Keep Assist | Technology that detects if a car is drifting in its lane or out of the lane. It provides alerts and warnings when this occurs which helps to avoid or mitigate a crash. Some versions will proactively steer the car back into the lane. |

# Resource 3: Crash analysis worksheet

*Directions: Look at the following four images of crashes and read the accompanying descriptions. For each image, based on the picture and description, record **what crash avoidance features** may have stopped the crash, and **what injury protection features** may have reduced injury for those involved.*

| Crash Image | Description of Crash | Safety Features |
|---|---|---|
|  | This is a rear-end crash, and one of the most common types of crashes for young drivers.<br><br>In this case, the black 4WD was forced to stop suddenly, and the silver car travelling behind it failed to stop in time.<br><br>As you can see, the silver car ran into the back of the 4WD and has significant damage. | **What crash avoidance features may have stopped this crash?**<br><br><br><br>**What injury protection features may have reduced injury to those involved?** |

This image shows a car about to merge into the lane that the truck is in.

In this case, the driver of the silver car attempted to merge without checking their mirrors, and seconds later collided with a truck because they did not leave adequate room for the truck (which struck the rear of the silver vehicle).

**What crash avoidance features may have stopped this crash?**

**What injury protection features may have reduced injury to those involved?**

In this image, a driver skids in foggy/wet conditions and slides into oncoming lanes of traffic.

The driver was travelling too fast for the conditions and this contributed to losing control of their car.

**What crash avoidance features may have stopped this crash?**

**What injury protection features may have reduced injury to those involved?**

This image shows a cyclist moments before a driver opens their car door and causes them to crash.

It also shows that even when you're stationary, or travelling as a passenger (not a driver), you can still cause a crash and need to take care.

It also demonstrates additional risks for other types of road users.

**Note**

Look at the direction that the driver is looking. If the driver had used the "Dutch reach" when opening the door their eyes could be drawn to the potential hazards around them.

**What crash avoidance features may have stopped this crash?**

**What injury protection features may have reduced injury to those involved?**

**Dutch reach explained:**

- When opening a car door use the hand which is furthest away from the car handle
- By doing this the passenger/driver are forced to turn their body towards the door
- This allows the passenger/driver to easily look over their shoulder to check for other road users

# Resource 4: Crash analysis worksheet answers

The following table contains sample answers (in the far-right column) to the crash analysis worksheet. They are sample answers, only.

| Crash Image | Description of Crash | Safety Features |
|---|---|---|
|  | This is a rear-end crash, and one of the most common types of crashes for young drivers.<br><br>In this case, the black 4WD was forced to stop suddenly, and the silver car travelling behind it failed to stop in time.<br><br>As you can see, the silver car ran into the back of the 4WD and has significant damage. | **What crash avoidance features may have stopped this crash?**<br><br>• ABS (to increase stopping distance)<br>• Active cruise control (which if activated could have automatically slowed the silver car)<br>• Automatic Emergency Braking (AEB) (which could have notified the driver of an impending collision)<br>• Driver-attention detection in case of distraction or fatigue<br>• Active braking (which could have automatically slowed the silver car)<br>• Intelligent Speed Adaptation (ISA) (ensures the car doesn't exceed the speed limit)<br><br>**What injury protection features may have reduced injury to those involved?**<br><br>• Seat belts (to prevent the driver being thrown forwards<br>• Airbag (to protect the driver's head)<br>• Crumple zones (to absorb the force of a serious crash)<br>• Head rests (reduce whiplash injuries) |

This image shows a car about to merge into the lane that the truck is in.

In this case, the driver of the silver car attempted to merge without checking their mirrors, and seconds later collided with a truck because they did not leave adequate room for the truck (which struck the rear of the silver vehicle).

**What crash avoidance features may have stopped this crash?**

- Lane-Keep Assist (to help keep the silver car in the correct lane)
- Blind spot indicators (to remind the driver of the silver car that there was something in their blind spot)
- Indicator (to signal to the truck that they were changing lanes)

**What injury protection features may have reduced injury to those involved?**

- Seat belts
- Airbags (to prevent injury to the drivers' head and side of body)
- Side impact protection system (to avoid the driver's body coming in contact with the side of the car)

In this image, a driver skids in icy conditions and slides into oncoming lanes of traffic.

The driver was travelling too fast for the conditions and this contributed to losing control of their car.

**What crash avoidance features may have stopped this crash?**

- Electronic Stability Control (ESC) (to help the driver keep control of the car and avoid skidding)
- ABS (so if the driver tried to slow down the car wouldn't skid)
- Active suspension (to help keep the car stable and in-control)
- Good tyres (to help maintain grip and decrease the likelihood of losing control)

**What injury protection features may have reduced injury to those involved?**

- Seat belts (to ensure the driver is not thrown around the inside of the car)
- Airbags (to protect the driver's head and body)

This image shows a bicycle moments before a driver opens their car door and causes them to crash.

It also shows that even when you're stationary, or travelling as a passenger (not a driver), you can still cause a crash and need to take care.

It also demonstrates additional risks for other types of road users.

**What crash avoidance features may have stopped this crash?**

- Side mirrors (to help the passenger see what is coming behind them)
- Using the "Dutch reach" method of opening the door. This allows the passenger/driver to check for other road users before opening the door
- Blind spot indicator (to remind both passenger and driver that things are coming from behind)
- Bell (for the cyclist)
- High visibility clothing (for the cyclist)

**What injury protection features may have reduced injury to those involved?**

- Helmet (for the cyclist)