

SAFETY

In brief:

- **ROPS (Roll Over Protection System)**
- **RSC (Roll Stability Control)**
- **Special Boron steel reinforced roof structure**
- **IC (Inflatable Curtain) – for all three rows of seats**
- **Lower cross-member for increased car-to-car crash compatibility**

Everyone expects Volvos to be safe – irrespective of vehicle type. With the launch of its first-ever SUV, Volvo Car Corporation enters an entirely new segment and the goal is perfectly clear: to lead the way in terms of safety.

This has meant an increased focus on several new areas. One of them is the important issue of the increased potential of roll-over accidents – because of an SUV's higher centre of gravity – and crash compatibility with smaller vehicles.

A Roll Over Protection System (ROPS) includes a new feature – Roll Stability Control (RSC) – which uses a gyro sensor to monitor the car's roll angle and speed. If the roll angle becomes critical it automatically applies the brakes and DSTC system to help the driver maintain control.

Volvo has also added extra strong Boron steel to the roof structure for maximum protection for occupants in the event of a roll-over, and has designed the Inflatable Curtain (IC) to stay inflated for longer than normal across all three rows of seats in case of a multiple roll-over.

Finally, the XC90's subframe has a lower cross member neatly concealed behind the front bumper so it impacts at the same height as the bumper of a conventional car's protective structure and crumple zones.

In Full:

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- **Lower cross-member for increased car-to-car crash compatibility**

Everyone expects Volvos to be safe – irrespective of vehicle type. With the launch of its first-ever SUV, Volvo Car Corporation enters an entirely new segment, and the goal is perfectly clear: to lead the way in terms of safety.

This holistic approach is – and always has been – one of the corner stones of Volvo's safety philosophy.

With the entry of Volvo Cars into the SUV market, there is increased focus on several new areas. One of them is the important issue of the increased potential of roll-over accidents because of an SUV's higher centre of gravity.

Roll-Over Protection System

Volvo's new Roll-Over Protection System, 'ROPS', tackles the problem from two directions:

- a stability-enhancing system, Roll Stability Control (RSC), minimises the risk of the XC90 rolling over in the first place
- increased protection for the occupants if the vehicle does roll-over

Owing to its higher centre of gravity, an SUV may have a higher risk of rolling over in certain critical situations compared with a conventional car. That is why the centre of gravity in the Volvo XC90 has been kept as low as possible compared to most SUVs. In fact, it is just 89 mm higher than that of the Volvo XC70.

However, this does not mean that Volvo has compromised on one of the properties that SUV buyers value so highly: a commanding seating position. The front seats are no less than 165 mm higher than in the Volvo XC70.

Roll Stability Control

In order to help reduce the risk of a roll-over situation, Volvo has developed an active stability-enhancing system known as Roll Stability Control or 'RSC'. The system uses a gyro-sensor to register the car's roll speed and roll angle to instantly calculate the terminal angle and roll-over risk.

If there is an obvious risk of rolling over, the DSTC (Dynamic Stability and Traction Control) anti-skid system is activated and responds by reducing the engine's power and braking one or more wheels as necessary until the car understeers and stability is regained.

This significantly helps reduce the risk of a roll-over accident initiated by extreme manoeuvres and is the only active stability-enhancement system to measure the car's roll angle.

Special Boron steel in a reinforced roof structure

If the Volvo XC90 experiences a roll-over the passive safety systems kick in.

The goal is to reduce the risk of occupants' heads from coming into contact with the car's interior roof panel or sides. So, Volvo has reinforced parts of the roof structure in the Volvo XC90 with extremely tough Boron steel, which is four or five times stronger than normal steel.

All seven seats are equipped with seat belt pretensioners to hold the occupants securely in place. In an accident, the pretensioner pulls the seat belt firmly across the occupant's body in order to help provide maximum protection.

To help prevent the head from striking the car's sides, the Volvo XC90 is equipped with Volvo's Inflatable Curtain (IC). IC also helps prevent the occupants or any limbs from being thrown from the car in an accident. In the Volvo XC90, the IC protects all three rows of seats.

The Volvo XC90's IC is specially adapted to stay fully inflated for longer to offer maximum protection in a roll-over scenario. If the occupant's head is resting against the window at the moment of inflation, the curtain will slip between the glass and the occupant's head.

Compatibility

The problem of compatibility – when an SUV collides with a car that sits closer to the road surface – was another important focus throughout the development of the XC90.

A typical SUV has a high ground clearance and thus often comes with high-positioned bumpers. This may create a greater risk of damage to the oncoming car and more serious injuries to its passengers as the lower car's protective beams and crumple zones simply slip below the front of the SUV without being activated.

In order to reduce the risk of this type of injury, the XC90's front suspension subframe is supplemented with a lower cross-member neatly concealed behind the front spoiler and positioned at the height of the beam in a conventional car.

The lower cross-member strikes the oncoming car's protective structure, activating its crumple zone as intended so the occupants can be given the maximum level of protection.

Considerable attention has also been given to the safety of pedestrians, cyclists and other relatively unprotected road-users. The entire front of the car features clean, gentle and smooth lines, and there are no protruding parts which may cause injuries.

The engine in the Volvo XC90 is installed low in the vehicle. As a result, the bonnet has no less than 80 mm of deformation space before there is any contact with the engine below it. It thus serves as a soft impact-absorbing "bumper", reducing the risk of serious injury if a pedestrian is thrown onto the bonnet.

High safety level in the third row of seats

The Volvo XC90's third row of seats provides a high level of passenger safety. There is generous space behind it, so collision force in a rear-end impact can be effectively absorbed and dissipated.

The occupants of the rearmost seats sit just above the rear axle, which is the optimum position in terms of side-impact safety. These seats also feature belt pretensioners, head restraints and protection from the Inflatable Curtain.

WHIPS, Volvo's award-winning Whiplash Protection System, is fitted in the two front seats of the Volvo XC90. WHIPS is activated in the event of a rear-end collision from speeds as low as 9 mph, helping to reduce trauma on the spine and neck and thus reducing the risk of injury.