



# Road Safety..... ..... **Information**

April 2005

## Seat Belts: Technology

This fact sheet about seat belts discusses current technology:

- Pretensioners
- Load limiters
- Seat Belt Reminder Systems (SBR)

It is part of a range of fact sheets about seat belts, other titles are:

- "Seat Belts: Advice and Information"
- "Seat Belts: History"
- "Seat Belts: Law"

### Pretensioners

Seat belt pretensioners tighten the webbing in a crash to remove the slack in the belt and this helps to reduce the occupant's movement and distribute the load over the whole body.

Pretensioners tighten the seat belt, in the first vital milliseconds of a crash, by using a very small pyrotechnic charge. Pretensioners will need replacing after a vehicle has been involved in a collision.

The pretensioners usually use the same sensor system as the vehicle's airbag to detect a rapid deceleration caused by a collision, and deploy. This can help to ensure that an integrated protection is achieved between the systems, by keeping the occupant in a position where the airbag will be most effective in reducing the risk of injury. By removing the slack in the seat belt, the risk of the occupant coming loose from the belt and being ejected is also reduced.

There are two types of pretensioner, both of which are equally effective in removing the slack from the belt. Buckle pretensioners work by pulling the belt buckle downwards towards the floor, whereas other pretensioners are located in the B-pillar and pull the belt tight from the top attachment.

### Load Limiters

Some car seat belts are fitted with load limiters, which have been developed because of the relatively small risk that seat belts may cause occupant injury from the restraining force. They respond when the belt is applying a large restraining force, and release a small amount of belt to compensate. The load that the belt applies on the occupant is kept below a threshold, above which the risk of injury would be higher.

This is an important consideration when elderly occupants are using the seat belt, as the aging of bones makes them brittle and increases the risk of injury.

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## **Seat Belt Reminder Systems (SBR)**

Despite publicity campaigns and legislation on the use of seat belts, not everyone uses them. Some of the excuses given for not wearing a seatbelt are, they forget to put them on, or they are only travelling short distances. Only 86% of men and 94% of women wear their seat belts in the front and around one third of rear seat occupants still don't wear their seat belts.

To increase the use of seat belts and encourage people to use them, vehicle manufacturers have developed reminder systems, which alert occupants that seat belts aren't being worn.

The systems tend to operate by detecting the weight of an occupant in the chair and whether the belt is buckled. If it detects an occupant isn't wearing a seat belt, an alarm will sound.

Although no legal criteria define when the reminder system will alert the driver or passengers that a seat belt isn't being worn, there are several voluntary standards produced by EuroNCAP. Systems meeting these are awarded points in the tests for their fitment, and the inclusion of this technology in EuroNCAP will hopefully encourage their addition to new vehicles.

You should consult your vehicle's manual, which will tell you exactly when, and how the system will warn you that seat belts are not being used. Systems can have both audio and visual alerts. Usually there will be a light on the dashboard but an alarm may sound after the vehicle has moved a certain distance, travelled for a certain length of time, or exceeded a certain speed.