

## TYPES OF SEAT BELTS

A **seat belt**, sometimes called a **safety belt**, is a safety harness designed to secure the occupant of a vehicle against harmful movement that may result from a collision or a sudden stop. As part of an overall occupant restraint system, seat belts are intended to reduce injuries by stopping the wearer from hitting hard interior elements of the vehicle or other passengers (the so-called second impact) and by preventing the passenger from being thrown from the vehicle.

### Lap

Adjustable strap that goes over the waist. Used frequently in older cars, now uncommon except in some rear middle seats. Passengers aircraft seats also use lap seat belts to prevent injuries.



### Sash

Adjustable strap that goes over the shoulder. Used mainly in the 1960s, but of limited benefit because it is very easy to slip out of in a collision.

### Automatic seat belts

Some vehicles have shoulder belts that automatically move forward to secure the passenger when the vehicle is started. A separate lap belt is usually included, and the lap belt must be fastened manually. Automatic seat belts have fallen out of favor recently, since the airbag became mandatory in many countries.

### Three-point

Similar to the lap and shoulder, but one single continuous length of webbing. Both three-point and lap-and-sash belts help spread out the energy of the moving body in a collision over the chest, pelvis, and shoulders. The three-point belt is the standard seat belt for road cars.



## Belt-in-Seat (BIS)

The BIS is a three-point where the shoulder belt attachment is to the backrest, not to the B-pillar. The first car using this system in the United States was the 1990 Mercedes-Benz SL. Some cars like the Renault Vel Satis use this system for the front seats. This system allegedly is safer in case of rollover, especially with 4-8 years old children, though other sources dispute this claim.



## Experimental production car safety belts

- *Criss-cross* Experimental safety belt presented in the Volvo SCC. It forms a cross-brace across the chest.
- *3+2 Point Seatbelt*: Experimental safety belt from Autoliv similar to the criss-cross. The 3+2 improves protection against rollovers and side impacts.
- *Four point "belt and suspenders"*: An experimental design from Ford where the "suspenders" are attached to the backrest, not to the frame of the car.
- *Inflatable Safety Belts*: An airbag is included within the belt for the rear seat belts.

## Five-point harnesses

Safer but more restrictive than most other seat belt types. They are typically found in child safety seats and in racing cars. The lap portion is connected to a belt between the legs and there are two shoulder belts, making a total of five points of attachment to the seat. (Strictly speaking, harnesses are never to be fastened to the seat—they should be fastened to the frame/sub-frame of the automobile.)



## Six-point harnesses

Similar to a five-point harness but includes an extra belt between the legs, which is seen by some to be a weaker point than the other parts. These belts are used mainly in racing. In NASCAR, the six-point harness became popular after the death of Dale Earnhardt. Earnhardt was wearing a five-point harness when he suffered his fatal crash. As it was first thought that his belt had broken, some teams ordered a six-point harness in response.

## Seven-point harnesses (5+2)

Aerobatic aircraft frequently use a combination harness consisting of a five-point harness with a redundant lap-belt attached to a different part of the airframe. While providing redundancy for negative-g maneuvers (which lift the pilot out of the seat), they also require the pilot to un-latch two harnesses if it is necessary to parachute from a failed aircraft.