

PASSIVE BELT DANGERS

In the late 1960s and early 1970s, the National Highway Traffic Safety Administration was concerned with the lack of use of seatbelt systems in passenger cars. The National Highway Traffic Safety Administration began encouraging manufacturers to develop passive restraint systems. At first, automobile manufacturers were ready to develop airbags, believing that their development would eliminate the need for the 3-point manual belts. General Motors and Ford installed tens of thousands of airbags in production 1974, 1975, and 1976 vehicles. However, it became clear that the 3-point restraint system would still be required by the National Highway Traffic Safety Administration even if an airbag was provided. Thereafter, the automobile manufacturers became decidedly hostile toward the whole concept of airbags. The federal government passed a regulation requiring the phase-in of passive restraints by automobile manufacturers. Faced with this requirement of passive restraint systems, automobile manufacturers turned their efforts to the development of passive belts.

The National Highway Traffic Safety Administration promulgated Federal Motor Vehicle Safety Standard No. 208 which allowed the manufacturers to have a choice of three types of designs of systems. One of those choices allowed passive seatbelts. Passive restraints were required in at least ten percent (10%) of production passenger cars beginning in 1987 and were to be gradually phased in over the next four (4) years until 100% of the fleets were so equipped.

Passive seatbelts are also known as automatic seatbelts in some vehicles. One system was developed by Toyota and first appeared in its 1981 Cressida. This

system used a 2-point shoulder belt, attached to a retractor at the console and a motorized buckle or "mouse" that runs along the roof rail. When the front door is opened, the belt moves to its forward position allowing the occupant to enter and exit the vehicle. When the door is closed, the belt moves rearward to the B-pillar, bringing the motorized belt across the occupant's shoulder. This system is accompanied by a manual lap belt, a non-passive component. To comply with the requirements that the restraints be passive, this system incorporated a concept of knee bolsters, an enhanced, energy-absorbent lower portion of the instrument panel that would be contacted by occupants' knees in a frontal collision. Knee bolsters are designed to allow the relatively strong femur bones to handle the occupant loading in frontal collisions and supposedly to provide the same pelvic restraint as a lap belt. Toyota continued to utilize this restraint system to comply with the passivity requirements of the safety standards, and it was also adopted by Ford and Mazda vehicles, along with others.

The problem with this type of belt is that if the occupant forgets to latch the lap belt (and in many studies shows as many as 70% of the people forget to do so), the occupant is subject to "submarining" under the belt in a frontal or offset collision. When the occupant submerges, serious injuries occur to the abdomen as well as to the neck. Submarining is caused in frontal collision when the occupant's lower body moves forward and out from under the torso belt. This causes the occupant to be restrained primarily by his or her neck, leading to all-too-frequent incidents of spinal cord injury and even decapitation in collisions that involve relatively low speeds. Submarining can be prevented by effective pelvic restraints such as that

provided by a lap belt. Knee bolsters are provided as pelvic restraints with these systems, however, they are only effective when the occupant is seated erect, facing forward with minimal distance between the knees and knee bolsters. This is especially true with small females where the belt already rides in a high position. There have been many injuries and deaths resulting from submarining with this type of belt system.

Another form of passive belts are the door-mounted variety. These are most commonly found in General Motors products. This system has a buckle very similar to that found in 3-point manual systems so the belt system could be used as in a manual or passive mode. The GM cars pass the Federal Motor Vehicle Safety Standard because if the belt is buckled, then the door could be opened and the belt would string out of the door and the occupant could slide under the belt. Therefore, this design meets the definition of being a passive system. As a practical matter through, most occupants use the system as a manual belt. The primary problem with the design of the door-mounted system is that if in an accident the door latch failed, (which can and does happen), then the occupant is no longer belted and is subject to ejection. Ejection from a vehicle causes the probability of serious injury or death to go up dramatically.

Because of the inherent design flaws, the significant litigation and the further development of airbag systems, the passive belts were eventually phased out by most manufacturers. Most manufacturers have now opted for use of a 3-point manual belt with an airbag to meet the passive requirements of the federal regulations.

However, there are still many of these vehicles on the road, and many people are exposed to dangers which they probably have never even considered.