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When Should An Airbag Deploy?

Computers using sensors analyze split-second data to make that decision

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Many motorists feel more secure in their cars, knowing that in the event of a serious collision, an airbag will deploy and perhaps save them from fatal injuries. But airbags don't always deploy when drivers think they should.

"I had an accident on May 8, 2010 in my 2007 Corolla LE. The driver door was crushed and the car declared totaled," Lauren, of Mount Vernon, N.Y., told ConsumerAffairs.com. "My car had six airbags. Not one airbag deployed to protect me from the inside of the car."

Lauren wanted to know why her airbags didn't deploy. After all, she was in a collision serious enough to total her car. Shouldn't the airbags have popped out? Not necessarily.

"When I called Toyota regarding the accident, a girl from their financial department wanted to know what that had to do with the next payment and informed me that I wasn't hit hard enough for the airbags to deploy," Lauren said. "Mind you that the car and I were slammed from the middle of the street to up on the sidewalk."

But that doesn't necessarily mean the airbags failed. And the speed of the car and the force of the impact don't, in and of themselves, determine when the airbags spring into action.

Airbag standards change in 1999

In 1999 the federal government changed its air bag standards because it said airbag deployment was sometimes causing significant injury and even death. Particularly at risk, the government found, were children and small adults. Also, occupants not wearing a seatbelt interacted with the airbag differently than those wearing restraints.

As a result, cars now have sensors that analyze different types of data during a crash and make a split second decision about whether to deploy the vehicle's airbags. Some sensors are located outside the car and react to an object striking the vehicle. Some are located inside the car and measure the size and weight of the occupants.

"Manufacturers are developing an assortment of technologies, commonly referred to as advanced air bag technologies, to reduce the risks still further, for children, as well as adults," the National Highway Traffic Safety Administration (NHTSA) reported in 1999. "These technologies include dual-stage inflators which enable air bags to inflate with two different levels of power and which can be linked to various types of sensors including those that sense crash severity, belt use, and seat position (i.e., the location of a vehicle seat on its track). Occupant weight sensors and pattern sensors can be used to prevent an air bag from deploying at all in the presence of children."

For example, NHTSA said the 1999 Hyundai Sonata introduced a weight sensor designed to prevent the passenger air bag from deploying unless a weight of more than 66 pounds is detected on the passenger seat. Honda introduced a dual stage inflator in its 1999 Acura. The 2000 Ford Taurus and Honda Accord, which were among the highest selling models in the country at the time, installed dual-stage air bags.

Speed and damage not good indicators

"Because air bag sensors measure deceleration, vehicle speed and damage are not good indicators of whether or not an air bag should have deployed," NHTSA said on its website. "Occasionally, air bags can deploy due to the vehicle's undercarriage violently striking a low object protruding above the roadway surface. Despite the lack of visible front-end damage, high deceleration forces may occur in this type of crash, resulting in the deployment of the air bag."

Since the late 1990s, the effort has been to reduce the instances of airbag deployment, not increase them. The reason is airbags -- while they can save your life in a head-on crash -- can just as easily kill or injure you if they deploy under other circumstances.

While noting that serious airbag injuries are rare, NHTSA says they can happen.

"Serious or even fatal injuries can occur when someone is very close to, or in direct contact with an air bag module when the air bag deploys," NHTSA said.

With recent emphasis on preventing potential airbag injuries, and with onboard computers deciding to deploy or not to deploy, its perhaps not surprising that airbags don't deploy in every collision, even in ones where occupants think they should have.