

# Oklahoma Highway Safety Fact Sheet

Seat Belts

October 28, 2002

## 2002 Seat Belt Survey<sup>1</sup>

Statewide Oklahomans are buckling up more than ever. The summer 2002 observational study shows that seat belt usage has climbed from 67.9% in 2001 to 70.1% in 2002. There is, however, a notable disparity in seat belt usage between automobiles and pickup trucks. Statewide safety belt use in automobiles reached 75.4% while use in pickup trucks is only 58.0%.

The 2002 results also reveal that differences in belt usage by race are not significant, but substantial differences appear when males and females are compared. Seat belt usage by white drivers and passengers was 69.5%; the figure for non-whites was 70.2%. Women buckled up at a rate of 75.3%, whereas men used seat belts at a rate of 64.8%.

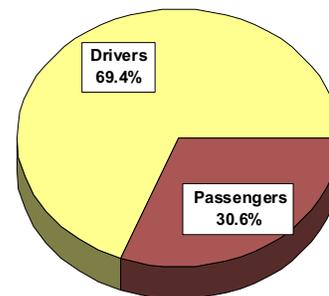
## 2000 Fatality Victims

In 2000, 662 Oklahomans lost their lives on Oklahoma's roads and highways. Of these 662 fatalities, 553 were in passenger vehicles or pickup trucks and 64% were not using safety belts or child restraints. These fatalities included 384 drivers and 169 passengers.

There were 407 fatalities in passenger vehicles. Of these 407 fatalities, 57.7% (235) were not using safety belts. Of the 235 fatalities not using safety belts in passenger vehicles 59.6% (140) were male.

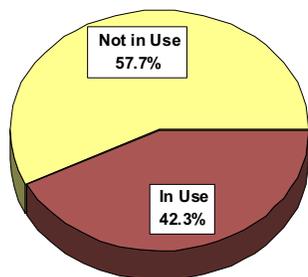
There were 146 fatalities in pickup trucks. Of these 146 fatalities, 80.1% (117) were not using safety belts. Of the 117 fatalities not using safety belts in pickup trucks, 79.5% (93) were male.

### Fatalities in 2000 Crashes



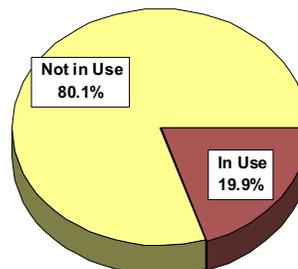
### Fatalities in Passenger Vehicles (2000)

#### Safety Belt Use



### Fatalities in Pickup Trucks (2000)

#### Safety Belt Use



<sup>1</sup> James, Thomas E., PhD., Long, Edward, and Hall, Kathy. (2002). Oklahoma Seat Belt Observation Study: Summer 2002. University of Oklahoma. Norman, Oklahoma.

## Why Seat Belts?<sup>2</sup>

To understand the value of safety belt use, it's important to understand some of the dynamics of a crash. Every motor vehicle crash is actually comprised of three collisions.

The first collision is known as the car's collision, which causes the car to buckle and bend as it hits something and comes to an abrupt stop. This occurs in approximately one-tenth of a second. The crushing of the front end absorbs some of the force of the crash and cushions the rest of the car. As a result, the passenger compartment comes to a more gradual stop than the front of the car.

The second collision occurs as the car's occupants hit some part of the vehicle. At the moment of impact, unbelted occupants are still traveling at the vehicle's original speed. Just after the vehicle comes to a complete stop, these unbelted occupants will slam into the steering wheel, the windshield, or some other part of the vehicle interior. This is the human collision.

Another form of human collision is the person-to-person impact. Many serious injuries are caused by unbelted occupants colliding with each other. In a crash, occupants tend to move toward the point of impact, not away from it. People in the front seat are often struck by unbelted rear-seat passengers who have become high-speed projectiles.

Even after the occupant's body comes to a complete stop, the internal organs are still moving forward. Suddenly, these organs hit other organs or the skeletal system. This third collision is the internal collision and often causes serious or fatal injuries.

During a crash, properly fastened safety belts distribute the forces of rapid deceleration over larger and stronger parts of the person's body, such as the chest, hips and shoulders. The safety belt stretches slightly to slow your body down and to increase its stopping distance.

The difference between the belted person's stopping distance and the unbelted person's stopping distance is significant. It's often the difference between life and death.

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Oklahoma Highway Safety Office  
3223 N. Lincoln Blvd.  
Okla. City, OK 73105-5403  
Phone: 405/523-1570  
Fax: 405/523-1586  
Web site: [www.dps.state.ok.us/ohso](http://www.dps.state.ok.us/ohso)

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### Science and Crashes

Newton's First Law (The Law of Inertia) states every body (your car) continues in its state of rest or of uniform speed in a straight line unless it is compelled to change that state by a net force (their car) acting on it.

Newton's Third Law of Motion states whenever one object (your car) exerts a force on a second object (their car), the second object (their car) exerts an equal and opposite force on the first (your car).

These laws apply not only to the vehicle, but to the vehicle occupants. You can see the results of these forces when looking at the crumples and dents on vehicles involved in crashes. These same forces act on the bodies of vehicle occupants, not only externally but internally as well.

Cars are designed with crumple zones so they may slow down over a longer period of time, which keeps the force smaller. However, this safety feature alone will usually not prevent serious injury or death to the occupants of a car during a crash. The crumple zone only slows the car more gradually.

OK, the crumple zone slows the vehicle, but what about the occupants? To slow the movement of the occupants more gradually, they must be attached to the car (use a seat belt). Otherwise, the car may come to rest more slowly but the occupants come to rest immediately upon impact with the already stopped interior of the car. Stopping in a small amount of time means the force must be very large. When the car stops, what's going to stop you? The interior of the car or your seat belt?

Source:  
<http://www.geocities.com/CollegePark/Den/2335/Newton.htm>. 10/24/02.

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<sup>2</sup> National Highway Traffic Safety Administration.