

The First, Second and Third Collision

(And the first 7/10ths of a second of a collision)

Risk Engineering – Your Business Insurance Specialists



Collision #1

The vehicle collision

During a vehicle accident, your car comes crashing to a stop. At 30 mph, an auto hitting a stationary object will likely crumple in about two feet and stop in less than one second. As the car crushes, it absorbs some of the force of the collision.

Collision #2

The human collision

The second collision is the “human collision.” At the moment of impact, passengers in the car that are unrestrained are still travelling at the vehicle’s original speed. When the car comes to a complete stop the passengers continue to be hurled forward until they come in contact with some part of the automobile. For example, the steering wheel, the dashboard, the front windshield or the back of the front seat. Humans in a crash can also cause serious injuries to other humans when they collide with each other. People in the front seat of a car are often hit by rear-seat passengers as they fly forward with incredible force. Look at it like this. If you are traveling down the road at 65 mph and suddenly need to apply the brakes, any loose objects will continue to move at 65 mph. Even a relatively small object such as a pen or a cell phone traveling at that speed could cause severe injuries if they were to hit a person. A heavier object such as a laptop computer could become a deadly weapon. The safest place to carry anything but passengers is in the trunk. If you absolutely must carry something inside the passenger compartment, the safest place to do so is on the floor behind the driver or passenger seat.

Collision #3

The internal collision

In a motor vehicle crash, even after a human body comes to a complete stop, internal organs such as the heart, liver and kidneys are still moving. Suddenly, these internal organs slam into other organs or the skeletal system. This “internal collision” is what often causes serious injury or death and is the reason why emergency service workers frequently find victims dead at the scene with little or no outward signs of injury.

What actually happens in a crash in less than one second?

Newton’s first law of motion states: A body remains at rest unless a force makes it move. A force is required to change the speed or direction of a moving body. This law means that it will take a force to start and stop an object in motion.



What happens in the first 7/10ths of a second during impact

First fractions of a second	What happens during impact
In the first tenth of a second:	The car and everything inside are going at the speed of the vehicle, for the purposes of demonstration we will pick 35 mph. The front bumper strikes a tree and begins to deform. The front center of the car slows to 0 mph; the rest of the car and its occupants continue moving forward at 35 mph.
In the second tenth of a second:	The bumper continues to deform as the energy of the crash is being dissipated, the radiator and fan begin to crush, the engine and frame strike the tree and begin to decelerate.
In the third tenth of a second:	The frame and body of the car continue to deform, the passenger compartment, front dash and windshield have decelerated to 20 mph. The car's passengers are still traveling forward at 35 mph.
In the fourth tenth of a second:	The frame of the car decelerates to 20 mph and continues to dissipate the energy of the crash. The safety belts and passengers continue forward at 35 mph.
In the fifth tenth of a second:	The safety belts begin to deform by stretching to decelerate the passenger in a comparatively gentle manner. Occupants decelerate to 25 mph, the car frame has decelerated to 15 mph. Unbelted occupants continue forward at 35 mph. Loose objects from the back seat and deck continue forward at 35 mph.
The sixth tenth of a second:	The safety belts have reached their deformation limits. Belted occupants decelerate to 10 mph, the dashboard and windshield decelerate to 0 mph. The car body, frame and engine continue to absorb the energy from the crash. Unbelted occupants continue forward to strike the dashboard, steering column and windshield at 35 mph. Loose objects from the rear seat and deck come flying forward to strike the front seat passengers at 35 mph. The unsecured objects in the back of the vehicle could strike with enough energy to cause injury or death.
In the seventh tenth of a second:	The frame and body have finished deforming and rebound in the opposite direction (reaction to the crash action); the belted occupants rebound from the safety belts, their heads continue back to come into contact with the head restraints. Unbelted occupants reach 0 mph by striking the windshield, steering column and dashboard, they deform and crush. Their internal organs, still going 35 mph, strike their rapidly decelerating body frames.

The crash is essentially over. The belted-in occupants count their lucky stars and continue on with their lives. Unbelted occupants are taken to the hospital or sadly, the morgue.

(<http://www.floridadriver.com/src/English/Regular4/topic/chap02.html>)

Get in the habit

Always keep the inside of your vehicle free of loose objects. Remember that in an emergency braking situation or, more importantly, in a crash any loose objects can become projectiles and seriously injure you or any of your passengers, including children.

Minivans and SUVs present another set of problems. Because the cargo and passenger compartments are one in the same, there is no secure place, such as a trunk, to carry luggage or any other items. Most of those vehicles come equipped with a cargo net, when new. It is important to use that net to secure any

cargo, including groceries when transporting them. It is the only dependable way to prevent objects from injuring the vehicle's occupants under heavy braking or a crash.

Trash in our vehicles is not something that we might not think of as problematic. An object such as a discarded water bottle or soda can could roll out from under the driver's seat and lodge itself between the brake pedal and the floor, preventing you from getting your vehicle stopped at the moment of need. Make it a habit at the end of each day to remove any and all "clutter" from inside your vehicle, so that you start each day safely.



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