

Understand the causes of rollover accidents to prevent them.

Rollover accidents make up approximately 10% of all truck-involved fatality accidents. Many of these accidents are single-vehicle crashes where the truck driver dies. Preventing rollovers should constantly be on the mind of every truck driver. This bulletin discusses the major causes of truck rollovers and reviews best practices for eliminating these accident types.

Vehicle and load characteristics.

A truck and trailer's ability to resist rolling is based primarily on its design, condition, weight and distribution of weight/center of gravity (CG). The following factors impact stability:

- **Condition of the vehicle:** Tire, steering, and suspension problems can significantly decrease the stability of a truck and trailer, making it easier to roll. These components should be thoroughly inspected during pre- and post-trip inspections and appropriate repairs made.
- **Height of the load:** As the load's height increases, the CG rises vertically, making it easier to roll. Drivers should ensure heavier cargo is positioned lower, if possible, to keep the CG low.
- **Positioning of the load:** Loads that are not equally centered side to side shift the CG horizontally, reducing the vehicles stability. Drivers should supervise loading when possible to ensure loads are properly centered.
- **Shifting of loads:** Loads that shift during transit cause the CG to shift. Drivers should ensure loads are adequately secured within their container (bin, tote, etc.) and to their pallet. Containers and pallets should be secured to prevent movement on the trailer.
- **Liquid surging:** Most drivers are familiar with the surging of liquids in tank trailers and the resultant rollovers that can occur. But drivers must also respect liquid surge when hauling smaller portable tanks and totes containing liquids and slurries. Surging in a number of smaller tanks can have significant impact on the CG, particularly during turns.



Load shifted during 15 mph left turn due to improper securement.



Taking ramps at unsafe speeds often results in a rollover. Wear a seatbelt!

Turns, curves and ramps.

A significant number of rollover accidents occur while turning, driving through curves and on exit ramps. As a truck drives forward, the vehicle's weight and speed generate a force largely in the downward and forward direction. As a truck turns, a portion of the forward forces are directed to the side. If the sideways forces exceed the truck's rollover threshold, the truck will roll over. When possible, road design engineers slope curves and ramps to counteract these side forces. If they are unable to slope them adequately, they post reduced speed limits to minimize turning forces.

Unfortunately, ramps and curves are largely designed, and speed limits set, to address rollover thresholds for passenger vehicles, not trucks. Drivers must recognize this and adjust their driving behavior to compensate:

- Enter all turns, curves and ramps below the posted speed limit. A general rule of thumb is to drive 10 mph less than the posted speed, but slower may be required due to vehicle, load and road factors.
- When making any turn, make sure you are in the appropriate lane and have slowed to a safe speed before beginning the turn. Many turn-related rollovers occur when a driver is not paying attention and has to quickly change lanes and begin a turn at an unsafe speed.
- Be attentive to signs and other indications that the road will be curving, and begin reducing your speed before entering the curve.
- For exit ramps, be in the right lane well in advance of the deceleration lane, and move into the deceleration lane as soon as possible. This gives you more time to decelerate to below the posted ramp speed.
- Drivers should be particularly cautious when entering a roadway from a curved ramp. As the truck moves from the ramp, which is sloped to reduce turning forces, to the flat roadway, the protection of the slope is lost (see photo below). Drivers need to recognize this hazard and not merge too quickly. Utilize the acceleration lane to stabilize and get up to speed before merging into traffic.
- Reduce speed considerably when weather conditions warrant; ice, snow, rain, and wind are of concern.
- Reduce speed considerably if any of the vehicle or load characteristics discussed in the previous section exist.

Inattention, speeding, following too closely and overcorrecting.

A surprisingly large number of truck rollovers occur on straight roads when a driver loses control of his or her vehicle or has to make evasive maneuvers. To prevent these rollovers, drivers should:

- Pay full attention to driving duties. Daydreaming and performing distracting activities divert your mind and eyes away from the forward roadway, significantly limiting your ability to recognize and respond to hazards.
- Maintain a safe speed and a proper following distance. Excessive speed and tailgating reduces your ability to recognize and respond to hazards. Hard braking and sharp swerving result in side forces well beyond the truck's rollover threshold.
- Know how to maneuver when your vehicle drifts off the paved roadway. Rollovers often result when drivers overcorrect to get their truck back on the pavement and the resultant forces, combined with hitting the lip of the pavement, roll the vehicle. If you find you have drifted off the paved surface, hold straight and slow until you reach a speed safe enough to return to the pavement. Of course, hazards alongside the shoulder may warrant other actions.

Drivers should always wear a seatbelt to reduce injuries in the event of a rollover.



Coming out of a cloverleaf at an unsafe speed.

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