In commercial motor vehicle fleets, single vehicle run-off-the-road crashes and overturn crashes continue to challenge Safety Professionals and Risk Managers. Rollovers and run-off-the-road events account for a small number of all crashes but contribute to disproportionate costs for property damage and driver injuries.

Fatigue is frequently cited in many accident investigation reports as a contributing factor in vehicle crashes, often due to lack of rest stops or inadequate sleep. The use of cruise control may be adding to the effects of driver fatigue resulting in reduced vehicle control.

### SITUATIONAL AWARENESS WHILE USING CRUISE CONTROL

Independent studies in the USA and France evaluated the impact of the use of cruise control on driving behaviors. The Vinci Autoroutes in France, in conjunction with the University of Strasbourg, evaluated the effect of conventional cruise control on driver behaviors. The Federal Highway Administration in the United States conducted a human factors study on the use of adaptive cruise control. These studies concluded that the use of these types of cruise control systems significantly increased reaction times and decreased situational awareness relating to the five factors shown to the right.

1. Delayed perception of an event
2. Delayed processing and interpreting the event
3. Delayed selection of the response
4. Delayed decision to take action
5. Delayed initiation of the response
Conventional Cruise Control

The original design of conventional cruise control systems provided the driver with the ability to maintain a static speed for the vehicle under all operating conditions up to the vehicle’s capabilities. The driver must intervene when road, traffic or weather conditions change and determine when it is safe to use or disengage the system.

Conventional cruise control systems have been in place on commercial motor vehicles for more than 40 years, and during this time, governments and public safety organizations continue to investigate the risks and benefits of using these systems.

Adaptive Cruise Control

The next generation of cruise control is the adaptive cruise control which, under normal operating conditions can slow the vehicle or warn the driver of an encroachment into the space cushion ahead. This system provides one level of warning; however the driver must still decide when conditions change for the road, traffic or weather and determine when it is safe to use the system.

The Federal Highway Administration Human Factors Analysis study in 2013 evaluated the effects of using the more advanced type of cruise control, known as “Adaptive Cruise Control,” on reaction time and situational awareness when driving. Adaptive Cruise Control was expected to enable drivers to spend more time observing for driving hazards, however the study concluded that situational awareness and rapid response deteriorated due to drivers taking on additional non-driving related tasks inside the vehicle.

“Adaptive Cruise Control decreases situational awareness and response times due to drivers taking on additional non-driving related tasks inside the vehicle.”
EFFECTS OF CONVENTIONAL CRUISE CONTROL ON SAFE DRIVING BEHAVIORS

The VINCI Autoroutes Foundation, in conjunction with the Neurocognitive & Neurophysiological Research team at the University of Strasbourg in Strasbourg France, conducted research involving 90 drivers. The study included an equal mix of men and women in three age groups to determine how the use of conventional cruise control affected safe driving behaviors in a variety of high risk traffic and routine driving conditions. Some of the key measures used to evaluate driver performance included:

- EEMG brain wave measurements to determine fatigue and level of alertness/consciousness
- Reaction time to emergency conditions
- Vehicle stopping distances
- Ability to maintain a space cushion
- Ability to maintain lane position
- Self-assessment of fatigue/alertness

The tests were performed with and without cruise control activated and include multiple scenarios such as an accident ahead, toll booth, overtaking, lane changes, construction and radar traps.

In all cases the study results found that driver performance and situational awareness was reduced resulting in an increased response time when deactivating cruise control compared to drivers in full manual control of vehicle speed.

The study concluded that drivers had:

- Reduced alertness after just 30 minutes of cruise control use, 25% increase in fatigue
- Reduced eye movement checking mirrors, instruments and roadway
- Reduced control over vehicle direction resulting in a 33% increase in steering corrections for lane wandering
- Longer reaction times
- Stopping distances increased an average of 131 feet traveling at highway speeds
- Lane changes on average were performed with at least 10% less space cushion
- Reduced ability to merge into traffic after passing, due to continued engagement of cruise control
- Drivers spent more time in the passing lane
VEHICLE CRASH RATE

For drivers using cruise control there is an increased risk of fatigue, reduced alertness, delay in hazard recognition leading to driving errors and the following types of crashes:

- Run-off-the-road crashes due to increased lane wandering. Narrow roads increase the risk.
- Rear end collisions caused by delayed perception and application of vehicle brakes.
- Side swiping during lane change caused by reduced space cushion.

To determine if your organization's vehicle crash rate is affected by the inappropriate use of cruise control, a thorough analysis of all crash data for a period of at least three years should be completed.

Analyzing Vehicle Crash Rate

- What type of crash occurred and how long from the last rest stop did the crash happen?
- How many on-duty hours preceded the crash?
- Did the crash result from running off the road (on a straight away or curve), being rear ended, or changing lanes?

Document Road Factors

- Note contributing environmental factors such as rain, ice, snow, traffic, and road conditions.
- Document other factors particularly if the cruise control was in use. Cruise control increases the risk of crashes in slippery conditions, on narrow roads, or in heavy traffic especially after more than one hour of continuous use.

Review Driver’s Logs

- Review the driver's logs, specifically rest stops, on-duty time and the timing associated with the time of the crash along with the traffic, weather and road conditions. This data should be available in the driver's logs and crash investigation reports.
6 BEST PRACTICES FOR USING CRUISE CONTROL

Below is a summary of the safe practices for the use of cruise control in commercial vehicles recommended by transportation safety associations and government transportation safety agencies.

- Use cruise control when on the open highway in clear weather.
- Limit the time cruise control is active to no more than 30 minutes.
- Do not activate cruise control in heavy traffic or while driving in adverse weather such as rain, fog, ice or snow.
- Keep your feet on the floor in a position to easily activate the brake and accelerator pedal.
- Maintain a high level of alertness.
- Stop more frequently to reduce increased mental fatigue caused by the use of cruise control.
CONCLUSIONS

The use of the cruise control on commercial vehicles is an effective short-term method to provide a break from right leg fatigue during long-term application of the accelerator pedal. The risks of prolonged usage of cruise control increases the risk of rear end collisions, collisions during lane changes and run-off-the-road accidents resulting from increased mental fatigue, reduced situational awareness and increased reaction times.

Drivers who are already fatigued are at risk of further reductions in alertness when using cruise control. The use of cruise control is not recommended during any type of weather event or in city driving with heavy traffic. Many transportation safety organizations including NHTSA (National Highway Traffic Safety Administration), the ASSE (American Society of Safety Engineers), and ATA (American Trucking Association) and all the vehicle manufacturers have issued cautionary statements in the use of cruise control.

Lockton Technical Resources

Lockton Risk Control is available to assist with data analytics, report preparation and executive presentation.

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