



THE ASSOCIATION

MAY 2019

STUDY CITES REAR SEAT DANGERS

IIHS Status Report, Vol. 54, No. 3

INSIDE THIS ISSUE:

STUDY CITES REAR SEAT DANGERS 1

LAW ENFORCEMENT VEHICLE SAFETY 3

TEST YOUR SKILL 3

THE ACCURACY OF DRAG FACTOR TABLES 4

TIRE FAILURE & ANALYSIS SEMINAR 5-6

A new IIHS study of frontal crashes in which belted rear-seat passengers were killed or seriously injured suggests that more sophisticated restraint systems are needed in the back. Front-seat occupants have benefited greatly from advancements in restraints — the umbrella term for airbags and seat belts, which work together during a crash to keep a person in the proper position and manage forces on the body. Back-seat occupants haven't benefited from this technology to the same extent.

IIHS first looked at rear-seat injuries and fatalities in 2014 (see "[Laying the groundwork for safety improvements for back-seat occupants](#)," Dec. 23, 2014). Failing to buckle up was a big factor, but many older adults and children over age 9 suffered injuries even when belted. The new study takes a closer look at the specific types of injuries belted back-seat passengers age 6 or older sustained in front crashes. IIHS is using the information to develop a new front crash test that will evaluate occupant protection in the rear as well as the front. The Institute is currently conducting a series of research crash tests as part of this project.

"Manufacturers have put a lot of work into improving protection for drivers and front-seat

passengers. Our moderate overlap front crash test and, more recently, our driver-side and passenger-side small overlap front tests are a big reason why," IIHS President David Harkey says. "We hope a new evaluation will spur similar progress in the back seat."

As soon as a frontal collision starts, seat belts in the front seat tighten around the occupants, thanks to embedded devices called crash tensioners. At the same time, the front airbags deploy within a fraction of a second. Depending on the crash configuration, the side airbags may deploy too.

The tightened belts and deployed airbags keep the front-seat occupants safely away from the steering wheel, instrument panel and other structure when the vehicle stops abruptly, even if the force of the crash pushes that structure inward. To reduce the risk of chest injuries, these belts also have force limiters, which allow some webbing to pool out before forces from the belt get too high.

In the rear seat, side airbags protect passengers in a side crash, but there are no front airbags, and the seat belts generally lack crash tensioners and force limiters. Although intruding structure is usually not an issue in the back seat during a frontal collision, crash forces can cause a back-seat passenger to col-

lide with the vehicle interior. Seat belts can prevent that, but, as the new study shows, seat belts without force limiters can inflict chest injuries. For the study, IIHS researchers used two national databases to find 117 crashes in which rear-seat occupants were killed or seriously injured. The most common type of injury, found in 22 of the injured occupants and 17 of the 37 fatalities with documented injuries, was to the chest.

Of the fatal cases, most were considered survivable, meaning there was sufficient space in the vehicle for the passenger after the crash. This contrasts with a 2003 IIHS study of fatally injured children in child restraints. In that study, the crashes in which child restraints were properly used were generally unsurvivable (see "[How can child restraints be improved to save more lives?](#)" June 11, 2003). "Child restraints are so effective that when young children in properly used restraints die, it's usually because the crash was so severe that improving the restraints wouldn't have made a difference," says IIHS Senior Research Engineer Jessica Jermakian, the lead author of the new paper.

(Continued, page #2)

MORE ABOUT: REAR SEAT SAFETY

IIHS STUDY



(Continued from Page #1)

"The fact that our sample had mostly survivable crashes tells us that we need to do a better job restraining adults and older children in the back seat."

In many of the cases in the new study, the back-seat passengers were injured more severely than the front-seat occupants, suggesting the restraints in the rear didn't perform as well as the ones in the front.

Using information in the case records — including things like photographs, police and medical records, and crash investigation and autopsy reports — the researchers determined that the rear-seat chest injuries were mostly due to excessive forces from the shoulder belt.

Force limiters like the ones in the front seat would be one way to reduce belt injuries. Another possible solution is an inflatable seat belt of the type introduced by Ford and Mercedes-Benz. These belts inflate in a crash to

better distribute forces across the torso and chest. Head injuries were the second-most common injury type in the study. They were present in nine injured passengers and 18 fatalities.

Many of the fatal head injuries occurred in crashes considered unsurvivable. In some nonfatal crashes, passengers hit their heads against the vehicle interior, but researchers couldn't confirm any such incidents in the fatal cases, which generally had less detailed information about injuries.

Still, head injuries are a concern, so it's important that anything done to reduce forces on the chest doesn't raise the danger that the passenger's head moves too far forward. Too much forward movement could allow a passenger's head to come into contact with the front seatback or other parts of the vehicle interior. "This is a big reason why force limiters usually go hand in hand with crash tensioners," Jermakian says.

"With a crash tensioner, a person is held firmly against the seat from the beginning of the crash, so a slight loosening of the belt from the force limiter isn't a big a problem."

Manufacturers might also find a way to equip rear seats with frontal airbags — for example, deploying from the roof — but so far that hasn't been done in any production vehicle.

IIHS isn't prescribing a particular solution for the back seat. Instead, the Institute believes a crash test that evaluates rear-seat protection will prompt automakers to figure out what combination of technologies works best. "We're confident that vehicle manufacturers can find a way to solve this puzzle in the back seat just as they were able to do in the front," Harkey says.



The Best Excuses for Crashes

www.letterpile.com

Here are a few of the best Stupid Excuses for crashes as published by www.letterpile.com:

....."I was on my way to the doctor with rear end trouble when my universal joint gave way causing me to have an accident."

...."A truck backed through my windshield onto my wife's face."

....."There was no damage to the car as the gate post will testify."

....."The pedestrian had no idea which direction to run, so I ran over him."

....."The guy was all over the road. I had to swerve a number of times before I hit him."

....."A Bull was standing near-by and a fly must have tickled him because he gored my car."

....."I was thrown from the car as it left the road. I was later found in a ditch by some stray cows."

2019 Membership:

If you haven't sent in your 2019 Membership renewal, please do so ASAP! The Association relies on your membership to keep its commitment to giving members quality training throughout the year. We can't do it without your help!

If you've misplaced your renewal form, please send a request to: IndianaIACAI@gmail.com

IACAI SKILL REVIEW



This issue of the IACAI Skill Review is a blast from the past and includes questions related to crash investigation/reconstruction from past issues:

1. Elderly drivers often attempt to compensate for deteriorating abilities by:
 - A. Driving less frequently
 - B. Driving at or straddling the fog line
 - C. Driving during the daytime hours only
 - D. All the above are ways in which the elderly compensate

2. The hardest color to see with the human periphery is:
 - A. White
 - B. Red
 - C. Silver
 - D. Black

3. True/False With regard to interstate highway conditions, the more emergency lighting that is placed on an emergency vehicle, the safer the emergency vehicle is.

4. On heavy vehicles, the axle which serves only to support additional gross weight is called a _____ axle.
 - A. 3rd Axle
 - B. Supporting Axle
 - C. Tag Axle
 - D. Axillary Axle

5. A _____ transforms and multiplies the force developed by the brake chamber into a torque with applies the brakes via the brake camshaft.
 - A. Air brake reservoir
 - B. Check valve
 - C. Slack adjuster
 - D. Pre-tensioner

Answers will appear in the next edition of the Association.

VISIT US ON THE WEB @ WWW.IACAI.COM



FMCSA Seeks Public Comment on Pilot Program to Allow Drivers Ages 18-20 to Operate Commercial Motor Vehicles in Interstate Commerce

The U.S. Department of Transportation's (USDOT) Federal Motor Carrier Safety Administration (FMCSA) today announced that it is seeking public comment on a potential pilot program that would allow drivers ages 18-20 to operate commercial motor vehicles (CMVs) in interstate commerce.

"Commercial trucks and buses are essential to a thriving national economy, and the Department wants to ensure the public has an opportunity to comment on this important potential change," said U.S. Transporta-

tion Secretary Elaine L. Chao.

Drivers ages 18-20 may currently only operate CMVs in interstate commerce. In July 2018, [USDOT announced](#) the details of the Commercial Driver Pilot Program required under the Fixing America's Surface Transportation (FAST) Act, which allows certain 18- to 20-year-olds with military training to operate CMVs in interstate commerce.

Today's action requests comments on a second pilot program to allow non-military drivers ages 18-20 to operate CMVs in interstate commerce. FMCSA re-

quests comments on the training, qualifications, driving limitations, and vehicle safety systems that FMCSA should consider in developing options or approaches for a second pilot program.

"We want input from the public on efforts that offer the potential to create more jobs in the commercial motor vehicle industry, while maintaining the highest level of safety. We encourage all CMV stakeholders to submit comments on a potential interstate pilot program for younger drivers," said FMCSA Administrator Raymond P. Martinez.

How Accurate are Drag Factor Tables?

In a recent discussion posted on a well-known Crash Reconstruction website, the question was brought up about the accuracy of published drag factor tables, in this case, from NUTI's Traffic Accident Reconstruction Manual, Vol. 2, 1990, by Lynn Fricke.

The question specifically asked about the validity of using the coefficients of friction values as shown in Exhibit 14, (Page 62-14).

The question posed is a

very valid question with regard to coefficients of friction. For those unfamiliar with the exhibit, it is a chart with various road surfaces showing minimum and maximum coefficient of friction values in both dry and wet conditions. The chart is not all inclusive and does not include all the variables that most crash investigators come across during their crash investigations. The chart does include useful information, but should not be relied upon as gospel. As folks

responded to the question, it became clear that as a crash investigator, one should do testing whenever possible to either verify the results as published in the chart, or to disprove those results. There are many newer types of road surfaces out there which are not included in the chart and do not reflect the coefficients of friction as published. Using accelerometers or doing skid testing is the best way to develop your drag factors needed in your investigations.

The Indiana Association of Certified Accident Investigators
P.O. Box 1566
Warsaw, IN 46581-1566

The Association is published quarterly as a service to members of the Indiana Association of Certified Accident Investigators.

Articles submitted are the responsibility of the author; the IACAI assumes no responsibility as to an article's content.



PLEASE POST!

**Extremely Rare
Training Opportunity!!!**



Tire Forensics and Tire Failure Analysis

Wednesday, June 19, 2019

8:00 a.m. to 5:00 p.m.



Fishers Police Department

4 Municipal Drive
Fishers, IN 46038

Nationally Renowned Instructor: T. J. Tennent – “The Tyre Guy”



Mr. Tennent is the owner of Tennent and Associates, Nashville, TN., specializing in expert tire/wheel forensics and analysis. He is retired as the Engineering Manager for Firestone Consumer Products and Bridgestone/Firestone Government Products (local, state, federal and Department of Defense). Formerly, he was the Project Manager of Bridgestone Motorsports/Firestone Racing and the Bridgestone Motorcycle Racing



Program. Mr. Tennent is the Board Chair of the Tire and Rim Association, Motorcycle Subcommittee, and serves on the Lipscomb University Engineering Board of Advisors. He also served as Board Chair for the Society of Automotive Engineers and is a member of the Motorcycle Industry Council. Mr. Tennent has been teaching accident investigation to law enforcement for more than 10 years. IPTM sponsors Mr. Tennent.

IACAI Members \$299.00

Non-Members \$349.00



Fee includes Tire Industry Association's "Passenger and Light Truck Tire Conditions Manual" to the first 30 registered attendees (retail value \$285). The manual will be used as part of this training. Additional manuals will be available for purchase from Mr. Tennent at a reduced rate)



Class size is limited to 40 attendees

(The first 30 registered receive the Tire Conditions Manual at no additional charge)

8 ACTAR CEU's

~~May 17, 2019~~ is the deadline to register and pay

Extended to June 12th, 2019!!

Course Outline:

Baseline Analysis (1.5 hours) Commercial Tires (1 hour) Consumer Tires (1 hour)
 Field Practice (1 hour) Accident Case Studies (2 hours) Knowledge Application (1.5 hours)

Recommended Periodicals:

- *1....Tire Industry Association Passenger and Light Truck Tire Conditions Manual
 - **2....Tire and Rim Association Annual Yearbook
 - 3....Tire Maintenance Council Commercial Radial Tire Conditions Manual
- *(Included with the first 30 registered participants. Recommended purchase for this class – one per person)
 **(Recommended purchase for this class – one per agency)

Indiana Association of Certified Accident Investigators is a non-profit organization dedicated to the professional education and training of crash investigators and reconstructionists throughout the State of Indiana.
 Like us on Facebook [www.facebook.com.IACAI](http://www.facebook.com/IACAI) or visit us online at www.iacai.com

IACAI is a proud sponsor of WREX2023 April 17-21, 2023



INDIANA ASSOCIATION OF CERTIFIED ACCIDENT INVESTIGATORS
 Post Office Box 1566
 Warsaw, Indiana 46581-1566

Forwarding and Address Correction Requested

REGISTRATION FORM

NAME: _____ E-MAIL: _____
 AGENCY/COMPANY: _____
 MAILING ADDRESS: _____
 CITY: _____ STATE: _____ ZIP: _____
 WORK PHONE: _____ CELL PHONE: _____
 IACAI 2019 PAID MEMBER: YES. NO *Confirmation email will be sent to email above upon payment*

MAKE CHECKS PAYABLE TO: IACAI

TUITION FEE: IACAI MEMBER \$299.00
 NON-MEMBER \$349.00

RETURN THIS FORM WITH PAYMENT BEFORE MAY 17, 2019 TO:

IACAI
 PO Box 1566
 Warsaw, IN 46581-1566