NO. 19-004578-CV

COURTNEY WHITE	**§**	**IN THE 748th DISTRICT COURT**
	§	
Plaintiff,	**§**	**IN AND FOR**
v.	**§**	
	§	
AEROCOACH BUS WORKS, INC.	**§**	**TRAVIS COUNTY**
	§	
Defendant.	**§**	**STATE OF LONE STAR**

Prepared by:

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This case file was commissioned by the Texas Young Lawyers Association and was prepared by Marvin W. Jones for the 2021 National Trial Competition

NATIONAL TRIAL COMPETITION
COURTNEY WHITE v. AEROCOACH BUS WORKS, INC.

STATEMENT OF FACTS

This is a products liability action filed by Courtney White against Aerocoach Bus Works, Inc. as a result of injuries she sustained in a collision between a tour bus and a suburban utility vehicle on July 4, 2019. Ms. White was a passenger on the tour bus, which was westbound on Interstate 20 in Lone Star, headed for a Fourth of July concert. The tour bus swerved to avoid stopped traffic in its lane, and was subsequently struck by the suburban utility vehicle, which had departed its eastbound lanes. The collision resulted in a rollover of the bus, causing its window glass to become dislodged and to shatter. Ms. White sustained severe cuts and lacerations from the broken window glass.

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PLAINTIFF'S ORIGINAL COMPLAINT

TO THE HONORABLE COURT:

COMES NOW, Plaintiff Courtney White and files this Original Complaint against Aerocoach Bus Works, Inc., and for cause of action shows the Court as follows:

I.
GENERAL ALLEGATIONS

1. This is an action for damages within the jurisdictional limits of this Court.

2. Plaintiff is Courtney White, a resident of Travis County, Lone Star.

3. Aerocoach Bus Works, Inc. ("Aerocoach") is a corporation with its principal place of business in Paris, Dawson County, Lone Star. Its agent for service of process is Ronald McLean, its president, who may be served with process in this matter at 368 Barrow Drive, Normandy, Lone Star.

II.
FACTS

4. On July 4, 2019, Plaintiff was a passenger on a tour bus designed and manufactured by Aerocoach. She and her fellow passengers were traveling to a Fourth of July concert at Red Rocks near Barstow, Lone Star. As the tour bus approached Barstow, rain began to fall and traffic ahead of the tour bus had slowed (and possibly stopped) in the westbound

lanes of Interstate 20. In an effort to avoid rear-ending the traffic in front of it, the tour bus moved into the left- hand lane. Immediately after the bus moved into the left-hand lane, a Chevrolet Suburban traveling in the eastbound lanes of Interstate 20 swerved, crossed the median between the westbound and eastbound lanes, and struck the tour bus.

5. As a result of the collision, the motorcoach overturned onto its left side. During the collision sequence, the bus passengers were thrown from their seats due to the forces generated during the collision. As the bus tipped over onto its left side, five of the seven passenger windows shattered. Of the thirty-five occupants of the bus, six passengers were ejected from the tour bus and killed and the remaining passengers sustained serious injuries when they were thrown from their seats during the tipover event.

6. Plaintiff was thrown from her seat onto the left side of the bus, where broken shards from the shattered windows cut her face and hands, resulting in serious injuries and permanent scarring. These injuries incapacitated Plaintiff, who is no longer able to obtain gainful employment as a lipstick model.

III.
PRODUCTS LIABILITY

7. Aerocoach was negligent in the design of the tour bus in question. The Defendant owed the Plaintiff a duty of care. The Defendant had a duty to exercise reasonable care in the design of the bus, including a duty to assure that the bus adequately protected its occupants and did not cause its occupants to sustain unreasonable injuries and/or death. The Defendant failed to exercise ordinary care in the design, labeling, marketing, sale, testing and/or distribution of the bus in question into interstate commerce and ultimately to

consumers such as Plaintiff. Specifically, the tour bus in question was unreasonably dangerous in the following respects:

a. The tour bus had an inadequate occupant restraint system in that it did not have Type 2 restraints, i.e., a lap/shoulder belt combination to restrain passengers and keep them from being thrown around and from the bus;

b. The tour bus had an inadequate occupant restraint system in that it did not properly employ compartmentalization in its seating such that passengers would not be thrown around and from the bus;

c. The tour bus was designed with oversized windows that were unreasonably dangerous because they were easily broken or dislodged from their frames, allowing passengers to be ejected and allowing the windows to shatter and cause severe cuts and other injuries;

d. The tour bus had an inadequate occupant restraint system in that it failed to use reasonably available glazed glass windows to prevent passengers from being ejected from the bus and to prevent the window glass from shattering and causing severe cuts and other injuries; and

e. The tour bus failed to have a roof structure that would resist crushing in a rollover, allowing the roof to twist in the event of rollover, causing the windows to become dislodged and allowing passengers to be ejected and allowing the windows to shatter, causing severe cuts and other injuries.

8. The product defects in the tour bus were a producing cause of the injuries sustained by Plaintiff.

IV.
JURY DEMAND

9. Plaintiff hereby requests trial by jury.

V.
PRAYER FOR RELIEF

WHEREFORE, Plaintiff requests that the Aerocoach be cited to answer and appear, and that upon final hearing the Plaintiff have judgment for damages, pre-judgment and post-judgment interest as allowed by law, costs of suit and such other and further relief, at law or in equity, to which Plaintiff may be justly entitled.

Respectfully Submitted,

Law Offices of William H. Ford
4 Ford Fjord
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(210) 251-3500 (Facsimile)
Ford@Ford.com

/s/ William H. Ford
By: ______________________________
William H. Ford
Lone Star State Bar No. 1075896324

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DEFENDANT'S ORIGINAL ANSWER

TO THE HONORABLE COURT:

COMES NOW, Aerocoach Bus Works, Inc., and files this its Original Answer in response to the Original Complaint filed by Plaintiff.

I.
ANSWER TO PLAINTIFF'S ALLEGATIONS

1. Defendant admits the allegations contained in Paragraph 1 of Plaintiff's Original Complaint.

2. Defendant admits the allegations contained in Paragraph 2 of Plaintiff's Original Complaint.

3. Defendant admits the allegations contained in Paragraph 3 of Plaintiff's Original Complaint.

4. Defendant is without knowledge or information sufficient to either admit or deny the allegations contained in Paragraph 4 of Plaintiff's Original Complaint, and therefore denies same.

5. Defendant is without knowledge or information sufficient to either admit or deny the allegations contained in Paragraph 5 of Plaintiff's Original Complaint, and therefore denies same.

6. Defendant is without knowledge or information sufficient to either admit or deny the allegations contained in Paragraph 6 of Plaintiff's Original Complaint, and therefore denies same.

7. Defendant denies the allegations contained in Paragraph 7 of Plaintiff's Original Complaint.

8. Defendant denies the allegations contained in Paragraph 8 of Plaintiff's Original Complaint.

9. Defendant independently demands a trial by jury.

10. Defendant denies the allegations contained in the "Prayer" of Plaintiff's Original Complaint.

II.
AFFIRMATIVE DEFENSES

11. Without waiver of the foregoing but in addition thereto, Defendant invokes the affirmative defense of comparative negligence. Plaintiff had available to her a lap belt in the seat she was occupying, but deliberately chose not to utilize the lap belt. Her injuries were caused in whole or in part by her negligent failure to use the available restraint device.

12. Pleading further and without waiver of the foregoing, Plaintiff was negligent in standing in the aisle of the bus at the time of the accident rather than being seated.

III.
RESPONSIBLE THIRD PARTY

13. Pursuant to Lone Star Civil Remedies Code Section 69.082, Defendant identifies Gary Winters as a responsible third party and requests the Court to submit to the jury the issue of his fault and the percentage by which such fault caused or contributed to cause the accident in question. In particular, Gary Winters negligently operated his massive vehicle

at the time and on the occasion in question, which negligence caused or contributed to the accident in question.

IV.
<u>PRAYER</u>

WHEREFORE, Defendant requests that upon final trial that Defendant have judgment that Plaintiff take nothing by her suit, that Defendant be discharged from any and all liability, that Defendant recover court costs and for such other and further relief, at law or in equity, general or special, to which Defendant may show itself justly entitled.

Respectfully submitted,

LAW OFFICES OF DENNIS MAGGI
1300 Dove Street
Armadillo, Lone Star 76707
(949) 344-6810
(949) 601-1822 FAX
gary@wintersiscool.com

By: /s/ Dennis Maggi__________
Dennis Maggi
State Bar No. 207458974584

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of Defendant's Original Answer has been electronically filed and served to William H. Ford in accordance with efiling requirements.

By: /s/ Dennis Maggi__________
Dennis Maggi

WITNESSES:

Plaintiff

1. Courtney White (must be female)
2. Lynn Murray (may be either male or female)

Defendant

1. Taylor Joeckel (may be either male or female)
2. Andy Zielinski (may be either male or female)

EXHIBITS:

1. Photo of bus before accident
2. Photo of bus after accident
3. Not used
4. Autopsy/tox report Gary Winters
5. DPS report
6. FMVSS 222 School Bus Passenger Seating and Crash Protection
7. FMVSS 216a Roof Crush Resistance
8. NTSB report
9. Seating diagram (showing position of White vs Phillips as well as injuries to passengers)
10. Photo of inside of bus
11. Photo of Seats with Shoulder Belts
12. Text messages between Holt and Phillips
13. NHTSA information regarding school bus injuries
14. Federal Register re Occupant Crash Protection
15. Draft Memo to NHTSA
16. Memo to NHTSA
17. 49 CFR 571.209 re Type 2 restraints
18. Video: crash test: https://www.youtube.com/watch?v=VvhA7DkWnmA
19. Video: crash test: https://www.youtube.com/watch?v=0XuOb0Qwf5s
20. Video: crash test: https://www.youtube.com/watch?v=HRgBXg7wdqw
21. Video: crash test: https://www.youtube.com/watch?v=KbCciy8ePds&feature=emb_logo
22. Video: motorcoach crash test: https://www.youtube.com/watch?v=2gvuGeRNHMU
23. FMVSS Glazing Materials Proposal

24. FMVSS Withdrawing Glazing Proposal
25. AMECA Glazing Standard
26. Article re THC Intoxication

STIPULATIONS

1. Federal Rules of Civil Procedure and Federal Rules of Evidence apply.
2. All witnesses called to testify who have identified the parties, other individuals, or tangible evidence in depositions or prior testimony will, if asked, identify the same at trial.
3. Each witness who gave a deposition agreed under oath at the outset of his or her deposition to give a full and complete description of all material events that occurred and to correct the deposition for inaccuracies and completeness before signing the deposition.
4. All depositions were signed under oath.
5. For this competition, no team is permitted to attempt to impeach a witness by arguing to the jury that a signature appearing on a deposition does not comport with signatures or initials located on an exhibit.
6. Other than what is supplied in the problem itself, there is nothing exceptional or unusual about the background information of any of the witnesses that would bolster or detract from their credibility.
7. This competition does not permit a listed witness, while testifying, to "invent" an individual not mentioned in this problem and have testimony or evidence offered to the court or jury from that "invented" individual.
8. "Beyond the record" shall not be entertained as an objection. Rather, teams shall use cross-examination as to necessary inferences from material facts pursuant to National Rules 7.4. Any party wishing to file a complaint concerning a violation of this rule shall use the procedure found in Rule VIII(4).
9. The Plaintiff and the Defendant must call the two witnesses listed as that party's witnesses on the witness list.

10. All exhibits in the file are authentic. In addition, each exhibit contained in the file is the original of that document unless otherwise noted on the exhibit or as established by the evidence.

11. It is stipulated that no one shall attempt to contact the problem drafter about this problem before the conclusion of the 2021 National Trial Competition Final Round. Contact with the competition officials concerning this problem must be pursuant to the rules of the competition.

12. The problem may or may not be based on actual events. No one shall attempt to search for any actual events, persons, lawsuits or other materials that might relate to an actual event or case.

13. 2021 is the year in which this case comes to trial.

14. Presentation and argument on pretrial motions shall be limited to a total time of sixteen minutes divided equally between the parties as follows: (1) the Plaintiff shall have four minutes to present any pretrial motions; (2) the Defendant shall have four minutes to respond to the Plaintiff's motion(s); (3) the Defendant shall have four minutes to present any pretrial motions; and (4) the Plaintiff shall have four minutes to respond to the Defendant's motion(s).

15. This competition permits teams to argue additional case law and other relevant authority to support the team's argument on motions and evidentiary issues. However, no additions or deletions are permitted to the provided jury instructions or to the jury verdict form.

16. Lone Star Civil Remedies Code Section 69.082 provides as follows:

> DESIGNATION OF RESPONSIBLE THIRD PARTY. (a) A defendant may seek to designate a person as a responsible third party by filing a motion for leave to designate that person as a responsible third party. The

> motion must be filed on or before the 60th day before the trial date unless the court finds good cause to allow the motion to be filed at a later date.
>
> (b) By granting a motion for leave to designate a person as a responsible third party, the person named in the motion is designated as a responsible third party for purposes of this chapter without further action by the court or any party.
>
> (c) The trier of fact, as to each cause of action asserted, shall determine the percentage of responsibility, stated in whole numbers, for the following persons with respect to each person's causing or contributing to cause in any way the harm for which recovery of damages is sought, whether by negligent act or omission, by any defective or unreasonably dangerous product, by other conduct or activity that violates an applicable legal standard, or by any combination of these: (1) each claimant; (2) each defendant; (3) each responsible third party who has been designated under this Section. 5.

17. Gary Winters was properly designated as responsible third party pursuant to Lone Star Civil Remedies Code Section 69.082.
18. No humans were harmed in the creation of this problem, and therefore the person plaintiff the plaintiff will likely not actually have scars on her face that would disqualify her from a career in lipstick modeling. So, nobody gets to cross examine on that issue.
19. The trial court ruled pretrial that the NTSB Report is admissible.
20. Lynn Murray's deposition was taken on March 18, 2020.
21. The problem drafter intentionally omitted pages to avoid unnecessary material in the case file. The absence of portions of reports or pages may not be the basis for an argument that the exhibits should be excluded from evidence.
22. The trial court overruled a Daubert challenge to Joeckel's testimony regarding accident reconstruction pretrial.

Q: Can you state your full name, please.
A: My name is Courtney White.
Q: Are you the plaintiff in this lawsuit?
A: Yes, I am one of the victims of that tragic bus crash.
Q: Did you suffer serious injuries as a result of that accident?
A: I'm surprised you have to ask. But yes, I did.
Q: Can you describe your injuries for us?
A: I was thrown into a broken window and was showered with broken glass. The glass cut me around my face and shoulders and legs.
Q: Let's back up a second. Where do you currently reside?
A: I reside in Armadillo, Lone Star. I've been there about five years now. I moved there to pursue my career in lipstick modeling.
Q: Where were you raised?
A: I was raised in Armadillo. I attended Armadillo High School.
Q: Did you graduate from Armadillo High School?
A: Yes, I graduated in 2007. I then went to Dime Box Community College.
Q: And where is that?
A: In Dime Box.
Q: Is that in Lone Star?
A: Everything happens in Lone Star.
Q: Just asking. Did you get a degree from the community college?
A: Yes, I got an associates degree from the community college, and then I went on to attend Lone Star State University in Alpine.
Q: Let me guess, Alpine is in Lone Star?
A: As I said, everything happens in Lone Star.

Q: Did you get a degree from that university?

A: Yes, I received a degree in microbiology.

Q: What did you do after you graduated from Lone Star State University?

A: I went to work for a defense contractor operating out of White Sands, New Mexico. I was working on things I can't discuss today.

Q: I thought everything happened in Lone Star?

A: Everything except the biological warfare job, which I did not just tell you.

Q: How long did you work for that defense contractor?

A: I worked there for about four years, then I quit to pursue my career in lipstick modeling. You can't wait too long to start that kind of career.

Q: I imagine not. Let's talk about the accident that is the basis of your lawsuit. When did that accident occur?

A: It happened on July 4, 2019. I was riding on a tour bus headed to a concert at Red Rocks in Lone Star. We were going to a country-western shindig honoring the Fourth of July.

Q: Were you with a group or were you traveling alone?

A: I was with a group of my friends, and we had boarded a tour that bus was dedicated to this specific concert. We were supposed to travel out there, go to the concert, return to Armadillo, all in the same day.

Q: Before you left earlier that day, were you presented with a choice of buses to get on?

A: Yes, there were four buses sitting there. We chose this particular bus because it had extremely large windows. We thought that would give us a better view of the splendid landscape in the area.

Q: Can you identify Exhibit 1?

A: Yes, that's a photo of the tour bus. I took it just before we boarded.

Q: When you got on the bus, did the driver speak to you about the use of seatbelts?

A: You know, I noticed that the bus had seatbelts. I asked the driver about the seatbelts and if the passengers were required to use them. I thought it would be pretty darn uncomfortable to have a seatbelt on for the amount of time we'd be on that bus.
Q: What did the driver tell you about that?
A: The driver said Aerocoach put the seatbelts there for a reason.
Q: Where were you seated in the bus?
A: I was about in the middle, just ahead of the rear wheels of the bus.
Q: Were you seated in the window seat or the aisle seat?
A: My friend, Laura Udall, was with me, and she wanted a window seat, so I was seated in the aisle seat. But the way those buses are made, the aisle seats are elevated just slightly above the window seats, so you still get a spectacular view out those huge windows.
Q: I'm handing you a seating diagram of the type of bus you were on, marked as Exhibit 9. Can you show us where you were seated?
A: Yes, I was in the seat that is marked as 22.
Q: Did you fasten your seatbelt?
A: No.
Q: Did you think that was prudent?
A: It's a bus. Who wears a seat belt on a bus? I certainly never have.
Q: Can you identify Exhibit 10?
A: Yes, that is a photo of the inside of the bus.
Q: Does this accurately depict the seats?
A: Yes, the seats were pretty close together. My knees were almost touching the seat back in front of me. I thought it was pretty uncomfortable, really. Seems like they were trying to cram as many seats as they could into a certain space.
Q: Prior to the time of the accident itself, did you notice anything unusual on the bus?

A: You know, about 40 minutes into the trip, I started noticing that the driver was spending a lot of time making eye contact with one of the passengers. Her name tag said, "Susan Phillips." She was sitting in a seat just behind mine, the one that is marked as seat 27 on the diagram you showed me. I could see out the corner of my eye that she was returning those looks. I wondered what that was all about at the time. I really wanted the driver to keep his eyes on the road, not on Ms. Phillips.

Q: Do you know whether the driver was looking at Ms. Phillips at the time of the accident?

A: I really don't know, but the odds were he was because he was staring at her for seconds at a time, then he would look down at the road and start looking at her again.

Q: By the way, did you happen to notice whether Ms. Phillips was traveling with anyone else?

A: Well, there was a man with her. They were both wearing wedding rings. He was seated on the window, and spent the whole time staring at the beautiful scenery outside.

Q: Okay, what do you recall about the accident itself?

A: We were traveling westbound on Interstate 20. We were getting close to Barstow at the time?

Q: California?

A: Interstate 20 does not go to California. We're talking about Barstow, Lone Star.

Q: I see. So what happened?

A: The first I knew that anything was wrong was that we had topped an overpass. There had been a very sudden downburst, and I looked up through the windshield and saw a line of stopped cars in our lane. I felt the bus swerve to the left. He just barely missed the car ahead of us in the right lane. Then, just as I thought we were out of danger, I saw a car come across the median. What I remember next is that there was a huge impact, and the bus started to roll onto its side.

Q: What do you next remember?

A: I remember the bus being on its left side, and I remember a lot of glass flying through the air. I remember a lot of passengers being thrown out that side. My friend, Laura, was thrown out of one of the broken windows and seriously hurt.

Q: You mentioned that the seats were very close together. Were you thrown into the seat back ahead you?

A: No. You know, those seats were really close together and my back and legs were getting stiff sitting there, so I was standing up when we topped that overpass and things started going wrong.

Q: Were you standing in the aisle?

A: I don't think so. I had been standing with my back leaning against the seatback in front of me, watching Susan watch the driver. But all that's a little fuzzy.

Q: So you could have been standing in the aisle?

A: I guess anything's possible. Except my lipstick modeling career. That's not possible now.

Q: What do you recall happening next?

A: When the bus started to roll, I was thrown sideways. Laura came out of her seat and fell on top of me and knocked me into the seats across the aisle, then I kind of lost track of what was happening, but I wound up a couple of rows back from where I started, and on the other side of the bus, laying in some shattered glass.

Q: After the bus came to rest, what did you do?

A: I had to crawl out of the bus through one of the broken windows. I found my friend Laura, and made sure she was alive and looked at her injuries. I then started looking around for the other passengers.

Q: What did you see?

A: It was horrible. Everybody that was thrown out of the bus was either dead or seriously hurt. I had never seen that many people injured that badly.

Q: Can you identify Exhibit 2?

A: Yes, that photo shows the bus on its side after the accident.

Q: Do you know what happened to the bus driver?

A: He died at the scene. Just before he died, I went over to where he was laying. He looked up at me and said "I should have made you wear your seatbelts."

Q: Did you hear him say anything else?

A: Yes, he said, "Where is Susan?"

Q: Did you know who he was talking about?

A: Not at the moment, but I assume he was talking about that woman he was making eyes at all that time.

Q: Were you able to locate Ms. Phillips?

A: Yes, she and her husband were both thrown out of the bus. Unfortunately, she didn't make it. Poor dead Susan.

Q: Were there other passengers that were not thrown out of the bus?

A: There were several of us that were not thrown out of the bus.

Q: What was their condition?

A: Some of them suffered injuries that were pretty serious, but none of them died as a result of the accident. There was one person who was wearing a seatbelt, wouldn't you know it? That person suffered what I later learned to be a broken pelvis bone.

Q: How did you learn that?

A: I saw her the next day at the hospital where I was being treated. She was in a wheelchair, being pushed down the hall by a nurse. I stopped her and asked her what injuries she sustained. That's when she told me about her pelvis being broken and all. The nurse said the pelvis injury was pretty severe and they'd probably have to do surgery.

Q: Have you told us everything you remember about this accident?

A: Yes, I have.

DEPOSITION OF LYNN MURRAY
MARCH 18, 2020

Q: Can you state your full name?
A: Yes, my name is Lynn Murray.
Q: Where do you reside?
A: I reside at Belgrade.
Q: Serbia?
A: No, Lone Star.
Q: Where were you raised?
A: Fred.
Q: Fred who?
A: Not Fred who, Fred, Lone Star. It's small, but it's there.
Q: Did you graduate from high school in Fred?
A: Yes, then I went to school at Lone Star A & M, which is located in Snook.
Q: Did you get a degree at that university?
A: Yes, I received a degree in mechanical engineering, and I subsequently received a master's degree in that same subject.
Q: When did you first have employment outside of school?
A: I went to work for a company that manufactures trucks. I worked for Volvo Trucks for approximately ten years as a design engineer.
Q: During your time at Volvo, did you have an opportunity to become familiar with federal regulations that apply to motor vehicles generally?
A: Yes, I dealt with various federal regulations in terms of the design of trucks.
Q: Where did you go after you finished your employment with Volvo?
A: I went to work for a school bus manufacturer in Segovia.
Q: Segovia, Spain?

A: Lone Star. The school bus manufacturer was Thomas Coach Works. I worked there as a design and regulatory compliance officer for approximately ten years. I then quit that job and established a private consulting company.

Q: Have you been asked to look into an accident that occurred July 4, 2019 involving a tour bus and a suburban?

A: Yes, I took a look at that in order to determine whether the tour bus, as designed, was unreasonably dangerous.

Q: What did you review in that connection?

A: I reviewed the NTSB report, a report from the Department of Public Safety, various regulations applicable to the situation, other depositions in this case, photographs that were taken, and the internal memo generated by Aero Coach, the manufacturer of the bus involved in this case.

Q: Based on your review of those materials, did you come to any opinions or conclusions regarding whether this bus was unreasonably dangerous?

A: Yes, I came to six essential opinions.

Q: Can you state those for us in a summary fashion?

A: Yes, first, it is my opinion that the bus was unreasonably dangerous and defectively designed because the lap belts installed on the tour bus did not present the passengers with a viable safety alternative. Second, a safer alternative design was available with respect to passenger restraint when the bus was built. Third, the side windows of the tour bus were way too large, which contributed to their propensity to break on impact. Fourth, it is my opinion the bus should have been equipped with glazed windows, a safer alternative design available when the bus was manufactured. And finally, it is my opinion that the bus was unreasonably dangerous because it did not comply with roof crush standards and the roof twisted causing the windows to shatter.

Q: So, let's go back to the first opinion. You stated that the lap belts installed in the bus were inadequate because they did not present the passenger with a viable safety alternative. What do you mean by that?

A: Well, in my opinion the bus was unreasonably dangerous because it did not have Type 2 seat restraint systems. That would be a lap belt plus a shoulder belt. Federal Motor Vehicle Safety Standard 209 provides for a safer alternative design that was available to Aerocoach.

Q: Can you identify Exhibit 5?

A: Yes, that is the DPS report from the officer who investigated the accident. It shows the date of the manufacturer of this bus to be 2014.

Q: Was the failure to follow section 209 causal of the injuries to the plaintiff in this case, in your opinion?

A: Yes, if the bus had been equipped with 3 point restraint systems in accordance with section 209, the plaintiff would have been restrained in her seat and would not have been thrown into the glass that had accumulated at the side of the bus when it rolled over.

Q: In your opinion, did the design of the bus seats comply with Section 222 of the Federal Motor Vehicle Safety Act?

A: The tour bus did provide for compartmentalization of the passengers as a means of protecting them in a crash, but it did not address or protect against ejection due to rollovers. Those forces are side to side, and not from the front or back.

Q: And what is compartmentalization?

A: This refers to a method of passenger restraint where you design the seats to be close enough together and built with certain specifications so that the passengers are theoretically kept within the seat area during an accident rather than ejected.

Q: Your second opinion is that the side windows of the bus were too large. What did you mean by that?

A: This tour bus was touted as having a great view because the windows were so big. The windows extended from near the roofline to a point even with the seat bottoms. The windows were, therefore, more subject to breaking than the smaller windows you see on safe buses. So these super large windows shattered when the bus rolled over, and that resulted in two bad things. One, passengers were more subject to being ejected, and second, passengers were exposed to broken glass, as was the case with the plaintiff.

Q: To your knowledge, was the plaintiff ejected from the bus?

A: No, that's not where her injuries came from.

Q: Your third opinion has to do with the windows as well. You've stated that bus should have been equipped with glazed windows. Why is that?

A: This goes hand in glove with the problem caused by oversized windows. If you're going to make crazy big windows, then you should use glazing on them. Glazed windows were a safer alternative design that was available when the bus was manufactured in 2014. Window glazing helps prevent shattering, and also helps contain the passengers within the bus itself so that they are not ejected.

Q: Is there currently a federal safety standard mandating glazing on side windows on a tour bus?

A: Well, not really. On the other hand, several bus manufacturers have adopted glazed side windows as a standard practice because a bus with unglazed glass is unreasonably dangerous, in my humble opinion.

Q: Can you identify Exhibit 23?

A: Yes, Exhibit 23 is a glazing standard that was proposed by the National Highway Transportation Safety Institute. It provides for glazing materials on vehicles like this one.

Q: And can you identify Exhibit 25?

A: Yes, Exhibit 25 is a certification program put in place by the Automotive Manufacturers Equipment Compliance Agency. This provides a means of certifying safety glazing on glass. In my opinion, had this standard been followed with respect to the glass in this tour bus, the glass would not have shattered and the plaintiff would not have suffered the life altering injuries.
Q: Can you identify Exhibit 6?
A: Yes, Exhibit 6 is FMVSS 222, having to do with seat spacing requirements. Essentially, this is a standard that provides for compartmentalization as a means of passenger restraint.
Q: Did the seats in this bus comply with FMVSS 222?
A: Technically, they did.
Q: In your opinion, was compartmentalization an adequate remedy for the failure to put in 3 point seat belts?
A: No, compartmentalization only helps if there's a head on crash. Here, there was a rollover and the seat compartmentalization was not effective to arrest passenger movement on a side-to-side basis.
Q: Is compartmentalization effective if the passengers are standing at the time of an accident?
A: If they're standing behind the seat back in front of them, compartmentalization might keep them inside an area that we call the box of safety.
Q: Or might not?
A: Or might not.
Q: Can you identify Exhibit 11?
A: Exhibit 11 is a photograph or exemplar of bus seats showing how shoulder belt restraints can be incorporated with lap belts. In my opinion, this is a safer alternative design that was available to Aero Coach at the time the bus was manufactured. It was a safer alternative to mere lap belts or compartmentalization and should have been used on this bus.

Q: Your last opinion is that the bus did not comply with roof crush standards and was therefore unreasonably dangerous; what is that opinion based on?

A: That opinion is based on Exhibit 7 the FMVSS Standard 216a for roof strength requirements.

Q: Can you identify Exhibit 7?

A: Yes, Exhibit 7 is a copy of FMVSS 216a which sets forth roof strength requirements.

Q: Did the roof here become crushed to the point someone was injured?

A: Not really, but the roof did twist, which allowed the glass in those extra large unglazed windows to shatter. If the roof had complied with the standards in 216a, it is my opinion that the twisting would not have occurred and the glass more than likely would not have shattered.

Q: Can you identify Exhibit 13?

A: Yes, Exhibit 13 is a NHTSA publication relating to school bus safety.

Q: How does Exhibit 13 bear on your opinions?

A: This publication points out that school buses are among safest form of transportation that we have in the United States today. While we are not dealing with a school bus in this particular case, this publication points to the fact that the federal motor vehicle safety standards that apply to school buses make them much more safe than regular buses. In my opinion, those same standards ought to be applied to motor coaches and other tour buses like the one involved in this case.

Q: Can you identify Exhibit 14?

A: Exhibit 14 is a copy of Regulation 571.208, and it includes a discussion of the various factors going into the regulations regarding occupant crash protection in buses manufactured on or after November 28, 2016.

Q: How does Exhibit 14 bear on your opinion?

A: Well, while this bus was manufactured before 2016, this exhibit demonstrates the availability of safer alternative means of protecting passengers on buses at the time the bus was built in 2014.

Q: Did you read the entirety of Exhibit 14 including the comments that were made by others?

A: Yes, I probably read each and every line, each and every sentence, just as I did with all the other exhibits in this case.

Q: Can you identify Exhibit 18?

A: Yes, that is a videotape of a crash test involving school bus restraint. It demonstrates the inadequacy of lap belts alone in a bus situation.

Q: Were the exemplar seats in this demonstration designed in compliance with compartmentalization requirements?

A: They appear to have been, and they demonstrate that compartmentalization alone is inadequate to protect children. Or adults, for that matter.

Q: Can you identify Exhibit 19?

A: Yes, this is video of a school bus crash test, showing what happens in a typical accident where the students are unrestrained and you are relying entirely on compartmentalization.

Q: How does Exhibit 19 bear on your opinions in this case?

A: Well, you can see that in the school bus situation, compartmentalization allows students to be thrown around the bus pretty freely. Particularly with the understanding that students don’t sit straight in the seats in the first place.

Q: Can you identify Exhibit 22?

A: Yes, Exhibit 22 is video of a Greyhound bus crash test. In my opinion, the bus in this crash test is very similar to the bus that was involved in the accident that injured Ms. White.

Q: How does Exhibit 22 bear on your opinions in this case?

A: In my opinion, the bus involved in this crash test and Exhibit 22 is very similar to the bus that was involved in this case. You can see from Exhibit 22 that even at 35 mph, the driver is always going to die. You can also see that the windows are going to shatter and come out of their frames. Finally, you can see what happens to the passengers even with the type of seats that were involved in the bus involved in this case. From this video, you can understand that compartmentalization doesn’t work to keep passengers inside the seating areas.

Q: Can you identify Exhibit 20.

A: Yes, Exhibit 20 is a video of a crash test with a truck hitting a school bus from the side.

Q: How does this video bear on your opinions in this case?

A: This video shows what happens when the glass breaks in one of these buses. People get ejected.

Q: Can you identify Exhibit 21?

A: Yes, Exhibit 21 is a crash test showing a rollover of a school bus and what happens to the passengers.

Q: How does Exhibit 21 bear on your opinions?

A: Exhibit 21 shows us that if passengers are unrestrained by Type 2 seat belts, that is a shoulder and lap belt combination, they tend to be thrown around the compartment of the bus. When that happens, they strike other objects in the bus and they strike each other, and they are exposed to such things as broken glass, which is what happened here.

Q: Have we covered all of your opinions in connection with this matter?

A: Yes, we have.

DEPOSITION OF TAYLOR JOECKEL
FEBRUARY 4, 2020

Q: Can you state your full name for the jury, please.

A: My name is Taylor Joeckel.

Q: Can you spell that for the jury?

A: T – A – Y –L – O – R.

Q: I meant the last name.

A: J – O – E – C – K – E – L.

Q: Where do you reside?

A: I live in Angeles.

Q: You mean Los Angeles?

A: No, Angeles, Lone Star. It's over there close to Winkperry.

Q: What is your occupation/profession?

A: I am an officer with the Lone Star Department of Public Safety.

Q: How long have you been with the Lone Star DPS?

A: I have been with Lone Star DPS for fifteen years.

Q: Where were you raised?

A: Garden City.

Q: Kansas?

A: No, Garden City, Lone Star. It's north of Big Lake.

Q: Did you graduate from high school in Garden City?

A: No, we didn't have a town big enough to have a high school. Barely had a Dairy Queen. So I actually graduated from high school in Big Spring, home of the Mighty Fighting Steers.

Q: What did you do after graduation?

A: I went to a community college in Justiceburg, and I took courses in criminal justice.

Q: Did you get a degree from that community college?

A: Yes, I got an associate's degree in criminal justice from Justiceberg.

Q: What did you do after that?

A: I finished a degree at Lone Star State, which is in Petersburg.

Q: Virginia?

A: Lone Star.

Q: What did you do after finishing college?

A: I joined the Department of Public Safety, after taking the requisite training at the DPS Academy.

Q: At the academy, were you trained in accident investigation?

A: Yes, we had extensive training in accident investigation.

Q: And after you got out of the academy, what did you do?

A: I started patrolling the highways of the great state of Lone Star, making sure that justice prevailed both east and west of the Pecos.

Q: During the course of your fifteen years, have you had an opportunity to investigate motor vehicle accidents?

A: I have investigated approximately 250 motor vehicle accidents. I happen to be in a very accident prone area of Lone Star.

Q: Did you investigate an accident that occurred on July 4, 2019 near Barstow?

A: Yes, I responded to a call for assistance with respect to that accident, and I arrived at the scene shortly after it occurred.

Q: Can you identify Exhibit 5?

A: Yes, that is the report that I did with respect to this particular accident.

Q: Based on your training and experience in investigating accidents, did you form opinions or conclusions with respect to how this particular accident happened?

A: Yes, I think the accident resulted from a number of factors. The first of those factors was an improper reaction to a sudden downpour of rain.

Q: Who is responsible for that improper reaction?

A: There was a person named Tim Williams driving a Prius west bound on Interstate 20. Apparently, Mr. Williams had never seen rain before, being from the western part of the state. When it started raining hard, Mr. Williams apparently slammed on his brakes. This caused an avalanche of other events. Several other vehicles were following him in the right hand lane of Interstate 20. They had to apply their brakes rapidly in order to avoid hitting him, which would not have been a bad idea.

Q: What happened after that?

A: Well, a whole line of cars had come to a stop in the right-hand portion of the road. At that point, Padon Holt, who was driving the tour bus, topped an overpass, which had obscured his view of the line of stopped cars. When he saw the line of cars, it was too late for him to stop in order to avoid striking the rear-most vehicle in that line. He then reacted poorly by trying to swerve to the left lane.

Q: In your opinion, had Mr. Holt been paying proper attention to the driving task, would he have been able to stop in time to avoid the traffic in the right-hand lane?

A: Yes, he had sufficient braking distance to come to a complete stop in the right-hand lane. In my opinion, swerving to the left lane, which is what he did, was both unnecessary and improper.

Q: What happened after Mr. Holt swerved to the left lane?

A: Well, as luck or fate would have it, there was an east bound Chevrolet Suburban being operated by a person named Gary Winters. Mr. Winters apparently became distracted, looking at the line of stopped cars in the opposite direction, and failed to maintain control of his vehicle. Mr. Winters then skidded across the median between the eastbound and westbound lanes of Interstate 20 and struck the tour bus on the left front corner.

Q: Then what happened?

A: Because of the impact, the bus, which was already leaning to the left due to the movement of the driver, overturned.

Q: Leaning to the left?

A: Yes, the driver overcorrected by swerving to the left to get into the left lane.

Q: Did the overturn of the bus cause injuries?

A: It caused injuries and death. When I got to the scene, there were dead people lying in and under the bus. There were injured people wandering around incoherently. Both the driver of the tour bus and the driver of the Suburban were deceased at the scene.

Q: Let's back up and reconstruct what you just told us. Did you form an opinion as to what started this sequence of events?

A: The sequence of events was initiated when Mr. Williams, who was driving the Prius, panicked as a result of the sudden downpour of rain. That set everything into motion.

Q: You have indicated an opinion that the bus driver might have shared some fault here; why is that true?

A: Well, during the course of my investigation, it came to my attention that the bus driver may have been distracted from his driving task at the time he topped the overpass. That would explain why he reacted improperly, swerving to the left instead of stopping. As I said, he had sufficient braking distance to come to a complete stop, in my opinion.

Q: Were you able to determine the source of his distraction?

A: Yes, in talking with Ms. White, I determined that the driver had been glancing in his rearview mirror at a specific passenger all throughout the journey. It is my opinion that he has distracted by this passenger and therefore reacted improperly to the emergency in front of him.

Q: Can you identify Exhibit 12?

A: Yes, once I became aware that the driver may have been distracted, I determined the identity of the distraction, one Susan Phillips. Ms. Phillips was killed in the incident, but her husband is living. I asked him if he noticed anything like what Ms. White described. He disclaimed any such action.

Q: Were you able to determine, to your satisfaction, whether he was being truthful in that remark?

A: I got a search warrant for Ms. Phillips' cell phone, and discovered the text message that you see in Exhibit 12.

Q: Is it your testimony that Exhibit 12 came from Ms. Phillips' cell phone as a result of a search warrant?

A: Yes, and as you can see, Exhibit 12 indicates that there might have been some prior interaction between the two of them. Therefore, in my opinion, Ms. White's observation that Ms. Phillips was distracting the bus driver is probably accurate.

Q: Can you tell us with a reasonable degree of certainty whether the bus driver was in fact looking at Miss Phillips when he topped the overpass?

A: No, I can't.

Q: Now, let's go back to the moment of the accident. Were you able to determine why Mr. Winters lost control of his Suburban?

A: Well, there are two things about that. First, someone at the scene told me that she was sitting in one of the stopped cars, and saw Mr. Winters go by. He was staring at the line of parked cars.

Q: And what's the second thing?

A: If you look at Exhibit 4, the autopsy report, you will note that a sample of blood was taken from Mr. Winters at autopsy. That sample was analyzed and it was determined that he had a level of THC in his blood at 2.8. This is suggestive of impairment.

Q: What is the level of THC that is regarded as being intoxicated while driving?

A: In this state, 5.0 ng/ml is considered intoxicated.

Q: So, the autopsy shows only 2.8 ng/ml. Was he, therefore, impaired?

A: That's why I said it is suggestive of intoxication. Two things are possible. Either Mr. Winters was smoking dope just before the accident, or he had been toking prior to the accident, with enough time for the THC level in his blood to subside somewhat. There's also a factor here of whether he was a hardcore marijuana user or not.

Q: How does that affect your analysis?

A: Well, if you look at Exhibit 26, an article on THC intoxication, you will see that some people are less susceptible to levels of THC in the blood stream because they are beginning users or not experienced users, and conversely, heavy users may be more intoxicated at 2.8 than other people. Not that I have any experience in this area, but if I did I would tell you that people who smoke marijuana every day can just pass by a joint and get high due to residual levels of THC in their blood. All in all, I concluded that the level of THC in Mr. Winters' blood stream was suggestive of impairment, as was the fact that he just lost control of a vehicle that size without any other apparent reason.

Q: Can you identify Exhibit 8?

A: Yes, that's the report that the National Transportation Safety Board did with respect to this accident. Because it involved a bus and interstate highway and all that, the NTSB did an investigation and issued an accident report.

Q: The report includes a probable cause section. Did you review that?

A: I sure did.

Q: Did the probable cause paragraph in Exhibit 8 influence your opinion?

A: Well, of course. For one thing, it agreed with my opinion concerning the initial event that caused this accident. Mr. Williams should not have stopped that Prius in the road. It also confirms my observation that the driver may have been distracted by activities inside the motor coach, specifically, his eye flirting with Susan Phillips.

Q: Anything else?

A: Yes, I agree that the driver of the bus overreacted to the traffic situation and made a sharp left maneuver. I think that maneuver set the bus up for a rollover when the Suburban hit it.

Q: Under the section entitled "Safety Issues", the NTSB investigator came to the conclusion that there were deficiencies in the passenger restraint systems; do you have any opinions in that regard?

A No, I've got nothing on that.

Q The NTSB investigator also said there were deficiencies in the motor coach operator's procedures for requiring passengers to utilize seat belts, do you have any opinions in that regard?

A: Well, I'd ticket a passenger in the back seat of a Volkswagen Beetle for not wearing a seat belt, but I've never ticketed any bus passenger for that. Bus drivers, yes. Passengers? No.

Q: Did you attribute any fault to Ms. White, the plaintiff?

A: Not at all. She was just sitting there like a good citizen.

Q Finally, the NTSB report says that there were shortcomings in the median barrier system; do you have an opinion about that?

A: Well, look, if you've ever been out on Interstate 20 in that part of the state, it is a long straight highway, with the emphasis on long. There aren't median barrier systems on that whole structure of road. I don't really think it's fair to criticize the great state of Lone Star for not putting a barrier system out there in the boonies. All in all, it just seemed to me the NTSB investigator was going a little overboard on stating what the probable cause of this accident was.

Q: But you would agree that if Lone Star had provided a medium barrier system, even a simple cable stretched between posts, it might have deflected the Suburban and prevented this tragedy?

A: Sure, if you stream together enough "ifs", you can come to any conclusion.

Q: Have you told us about the entirety of your investigation into this accident and the opinions you formed in that connection?

A: Yes, I have.

DEPOSITION OF ANDY ZIELINSKI
FEBRUARY 4, 2020

Q: Will you state your name to the jury?

A: My name is Andy Zielinski.

Q: Where do you reside?

A: Palestine.

Q: Near Israel?

A: No, near Athens.

Q: Greece?

A: Lone Star.

Q: What is your occupation or profession?

A: I am an employee of an engineering consulting company.

Q: What do you do for that company?

A: I consult with manufacturers of over the road vehicles, such as trucks, agricultural tractors and specialty vehicles.

Q: What kind of consulting is that?

A: I give engineering opinions about the design of those vehicles and their compliance with certain federal mandates.

Q: What is your educational background?

A: I graduated from high school in Palestine. I then attended college at a small university called Southwestern in Georgetown.

Q: Washington, DC?

A: Lone Star.

Q: Did you get a degree from that university?

A: Yes, I got a degree in mechanical engineering. I then went to Princeton and received both a master's degree and doctorate in engineering.

Q: What did you do after you finished your academic work?

A: I immediately went to work for this consulting firm. I have worked there now for ten years.

Q: What kinds of things have you done as part of your employment there?

A: I have helped design new truck cabins, hoping to make them safer. I have also helped design the cabs of certain agricultural equipment, again with the idea of making them safer. I also help investigate accidents involving larger vehicles such as trucks and buses.

Q: How many bus accidents have you investigated?

A: This is my second.

Q: Are you familiar with the federal regulations pertaining to safety in buses and motor coaches.

A: Yes, I've read all of those.

Q: Have you ever designed a motorcoach or bus?

A: Not per se. But many of the same considerations apply to trucks and ag equipment.

Q: Were you asked in connection with this case to look at the facts and circumstances and form opinions or conclusions?

A: Yes, and in doing so I reviewed all of the depositions that have been taken to date, I reviewed the accident report from the DPS, the accident report from the NTSD, I reviewed photos of the bus itself, both before and after the accident, and I reviewed the various federal standards that I thought to be applicable.

Q: Based on your experience and your review of the materials in this case, have you formed opinions and conclusions regarding whether the Aerocoach touring bus in question was unreasonably dangerous as asserted by the plaintiff?

A: Yes, I have.

Q: What is that opinion?

A: My opinion is that the motor coach in question was not unreasonably dangerous, and that it was designed and manufactured in compliance with the then applicable regulations.

Q: What is that opinion based on?

A: Several things. First, in my opinion, the absence of Type 2 belts, or shoulder belts, did not render the bus unreasonably dangerous. Second, in my opinion FMVSS § 209 did not mandate Type 2 belts in this motor coach. Next, in my opinion, the seats were designed appropriately to achieve compartmentalization, and the bus would have been more dangerous with passenger restraints of any other kind. Fourth, I think the windows on the bus fully conformed to all applicable standards at the time of its manufacture. I also would note that the proposed federal standards with respect to glazing of glass in tour buses were ultimately withdrawn and no such standards are imposed today.

Q: So, let's go back to the first opinion, relating to seat belts. What's the basis for that opinion?

A: Let's start with the facts. If you look at Exhibit 14, at the pages marked 70469, you will see the National Highway Transportation Safety Agency's finding was that installing lap/shoulder belts would save approximately 1.7 to 9.2 lives annually. Not 1.7 to 9.2 million. Not 1.7 to 9.2 thousand. 1.7 to 9.2, or less than 10. The fact that comes from this is that very few people are killed or injured in accidents in which they are passengers in buses.

Q: Why is that so, in your opinion?

A: In my opinion, and in the opinion of the Agency, that is true because there's not a lot of bus accidents, and because buses are much heavier than any other vehicles that they usually get involved in accidents with. Because they are heavier, while the passengers may get thrown around a bit, they are not killed by the kind of forces that the bus is imparting on let's say a Mini Cooper. It is just a matter of mass times speed squared equals energy. I conclude that the problem, if you want to call it that, is not much of a problem if you only save 1.7 to 9.2 lives a year by requiring the installation of lap and shoulder belt combinations on buses. It's not an economical thing.

Q: Do you believe that the installation of lap and shoulder belt combinations on buses would save lives?

A: No, let's get to another fact, which is human nature. You've been on buses. You've been on buses with seat belts. You've never used them yourself. I know that as a fact, because statistically probably only one person on an entire bus will actually use the seat belt or shoulder belt that is provided. We saw that play out here. The plaintiff herself asked if it was mandatory that they wear the lap belts. The bus driver said it was not, and no one was wearing them except one soul, who incidentally suffered a broken pelvis because of it. I conclude that putting seat belts and shoulder belts on a bus is a pointless act.

Q: How does that compare with seat belt use in passenger automobiles?

A: That's a whole different ball of wax. That's a mandated requirement under the laws of every state of which I am aware, and people have become accustomed to and compliant and they do comply. Buses, not so much.

Q: Why else do you think the bus was not rendered unreasonably dangerous by the lack of lap and shoulder belt combinations?

A: The same studies that are reflected in Exhibits 6 and 14 suggest that wearing a lap belt in a bus can actually result in other types of injuries. For example, people sustained broken pelvises because of those belts. This is because of the way bus seats are designed and constructed as compared to car seats. As I said, you have an example of that in this very accident.

Q: Wouldn't wearing a seat belt have prevented many of the injuries here?

A: I think that's pure speculation. Let's go back to that fact I mentioned; people don't wear these belts.

Q: Have I covered your opinions regarding the seat belt issue?

A: Except for one other opinion. The federal regulations relating to shoulder belts on buses did not apply to this particular bus. If you look at Exhibit 5, you will see that the bus was manufactured in 2014. The standards with respect to shoulder belts did not mandate those belts in buses until November of 2016.

Q: Anything else?

A: Well, as a matter of fact, yes. Adding seat and shoulder belts in a retrofit of a bus like this would have been much more expensive than the estimates that you see in Exhibit 14. Not to put too blunt a point on it, but the amount of money it would cost versus the number of lives that would be saved even with compliance by the passengers renders this requirement unreasonable.

Q: But it is currently a federally mandated requirement?

A: You're just being pedantic.

Q: You've said that the seats in this bus achieved compartmentalization. What do you mean by that?

A: Studies have shown that passengers can be kept safe by keeping them in a compartment formed by the seat, the arm rests and the seat back ahead of them. In a crash, if the seats are too far apart the passengers tend to fly up and over seats. If the seats are closer, the passengers will be moved forward a short distance, then they'll strike the seat back ahead of them and stop. If the seats are close, the passenger won't get up too much velocity before hitting the seat back. If the seat back is correctly designed, the passenger will not be hurt by that impact. So we consider this as a compartment, a cocoon of safety. In my opinion, it works better than seat belts.

Q: What about rollover accidents?

A: The passenger velocity is usually lower when moved from side to side than when the bus is hit from the front, so the risk of injury is lower.

Q: But the passengers are not restrained in their seats and can be thrown around or even out of the bus?

A: In some circumstances, yes.

Q: You stated that you do not believe that the windows rendered this bus unreasonably dangerous. What's the basis for that opinion?

A: The windows that were in this bus fully complied with all federal standards relating to bus windows. That's point one. Point two is there is no uniform practice in the industry regarding glazing of the glass in buses, and there's no standard or requirement that the windows be no more than a particular size.

Q: Do you agree that these windows were oversized for a tour bus?

A: These windows were larger than any other I have seen in a tour bus, but that did not make them unreasonably dangerous. And what Mr. Murray has failed to reveal is that the proposed glazing standards were ultimately withdrawn, which is what you will see if you look at Exhibit 24. In other words, even the federal government determined that it was not such a great safety issue that buses would have to put glazing on these windows.

Q: Do you agree that the windows on this bus shattered when the bus rolled over?

A: Yes, that's obvious. But given the fact that the bus rolled onto its side and the roof twisted, even glazed glass windows would have popped out, and passengers would have been ejected.

Q: If the glass had been glazed, would the passengers like Ms. White have suffered cuts from shattered glass?

A: If the glazed glass didn't shatter, no one would get cut by shattered glass.

Q: You understand that Mr. Murray is criticizing this bus design because the roof structure was inadequate?

A: I have seen his opinion in that regard. I disagree. First, roof crushing regulations were designed to prevent the roof itself from intruding so far into the passenger compartment that it would injure the passengers. In other words, it is not the purpose of the roof crush regulations to prevent twisting and the popping out of windows. That's not what the regulation is designed for. Additionally, you will notice that the roof here did not crush and injure any passengers. So, whether or not it complied with the roof crush standards had nothing to do with the injury to this plaintiff.

Q: Would the windows have popped out if the roof had not crushed?

A: How would I know?

Q: Can you identify Exhibit 16?

A: Yes, that's a memorandum sent by Aerocoach to the National Highway Transportation Safety Administration regarding the NHTSA's proposal to impose tougher standards in terms of lap/shoulder belts in motorcoaches.

Q: Does this bear on any of your opinions?

A: Yes. This relates to the cost/benefit analysis that the government and all manufacturers do when considering proposed new regulations. You can see in this exhibit that the NHTSA considerably underestimated the cost of installing shoulder belts in motorcoaches. NHTSA estimated the cost to be $18.86 per installed belt, which Aerocoach's estimate of that cost was $122.34, a vast difference where the net effect is saving 1.7 to 9.2 lives per year. And before you go all Pinto on me, yes, every life has value. This memo merely calls into question the effectiveness of the proposal versus the cost versus the results.

Q: Did you also review Exhibit 15?

A: I glanced at it, but it's a draft, so I went to the final version, which is Exhibit 16.

Q: Have you reviewed the crash tests that have been marked as Exhibits 18 through 22?

A: Yes, I looked at each of them.

Q: Don't these crash tests demonstrate the viability of certain types of restraints in buses?

A: Well, let's start with another fundamental fact. This was not a school bus. School bus seats traditionally have been designed much differently than tour bus seats. Look at Exhibit 11. That's a tour bus seat. You don't see that in school buses, even today. You should also note that school buses are just inherently different from regular buses. Exhibit 13, which deals with bus safety, makes a distinction between school buses and other vehicles. Exhibit 13 notes that because school buses are different, they have different safety considerations. As compared to tour buses, school buses typically travel at much lower speeds and make a lot of stops. Those two things mandate different safety considerations from the usual tour bus. So trying to apply school bus standards to a motor coach like the one involved in this case is comparing apples to oranges, in my opinion. Therefore, you have to discount a lot of Mr. Murray's videos.

Q: Don't tour buses travel at much greater speeds than school buses?

A: That's what I just said.

Q: So taking your mass times speed squared equals energy equation, doesn't that present greater safety concerns for tour buses?

A: Probably.

Q: Looking at Exhibit 18 specifically, do you have an opinion as to whether we learn anything from that?

A: No, look at the seats involved. That's not a motor coach seat, that's a school bus seat. The design parameters and considerations are totally different. The people are smaller, they are lighter, and because of that you can have seats that are closer together. Again, it's a test that is not applicable to a tour bus.

Q: How does Exhibit 19 relate to a tour bus?

A: Again, it doesn't. Exhibit 19 shows unrestrained children in a school bus. Again, the seats are totally different. You will also note that at the beginning of the video, one of the child dummies is turned backward looking over a seat. You don't get that in a motor coach. You don't get people sitting sideways or standing up in a motor coach. The seats aren't designed to be comfortable that way. This test doesn't teach us anything.

Q: How about Exhibit 20?

A: Exhibit 20 is a side impact on a school bus. Two things that are totally different from the situation involved in this accident. This was not a side impact, and again, it was not a school bus. Pretty cool video though. Also, the bus here was not hit by a truck. It was hit by a Suburban, which is magnitudes of weight less than a tractor, so we're back to mass times speed squared. Mass is important.

Q: Have you looked at Exhibit 21?

A: Sure, Exhibit 21 again involves a school bus. This one is a little closer to our situation because it involves a roll over, and shows unrestrained passengers. But remember, the passengers in this tour bus were provided with seat belts which they opted not to wear. The percentage of compliance with wearing seat belts on a bus is historically well known to be low. Until you solve that problem, the presence or absence of seat belts does not make a tour bus unreasonably dangerous. It makes the passengers and their attitudes about seat belts dangerous.

Q: Finally, did you look at Exhibit 22?

A: Exhibit 22 is closer to what we had here. It's at least a bus of the same or similar size. Exhibit 22 demonstrates the kind of devastation you get with the construction of a bus body in an accident. These things are just not made to withstand big impacts. I would also note that a crash test of a tour bus does not accurately simulate 99% of the accidents involving buses. An overwhelming percentage of those accidents are with vehicles much smaller than the bus. So, a crash test running a bus full on into a completely stationary wall at 35 mph doesn't tell us much about whether the bus was unreasonably dangerous in connection with this accident. I would also note that Exhibit 22 shows a lot of other material flying around inside that bus other than glass or passengers. Again, you get enough impact on the front end of a bus, you are gonna have bad injuries. But the likelihood of that happening, as demonstrated by the government's own statistics, is exceedingly low. The fact that some people can get badly hurt does not make a product like this bus unreasonably dangerous.

Q: So, in your opinion, was this bus unreasonably dangerous as designed?

A: Absolutely not.

Q: Have we covered all of the opinions that you have in connection that you have with this case?

A: Yes, we have.

Q:

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Q:

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A:

EXHIBIT 1


EXHIBIT 2

AUTOPSY REPORT **19-05944**

I performed an autopsy on the body of GARY WINTERS at the Department Of Pathology, Sunny Side Medical Center, Sunny Side, Lone Star on July 5, 2019.

From the anatomic and laboratory findings and pertinent history, I ascribe the death to: MULTIPLE TRAUMA DUE TO VEHICULAR ACCIDENT.

EXTERNAL EXAMINATION:
The body of GARY WINTERS is that of a well-developed male stated to be 41 years old. The body weighs 184 pounds, measuring 71 inches from crown to sole. The prolific hair on the scalp is reddish in color and straight. The irides appear brown with the pupils fixed and dilated. The body bears several piercings, including earrings on both ear lobes, a nipple ring on the left nipple, and an eyebrow piercing above the right eye.

The head is normocephalic. Examination reveals multiple abrasions and contusions. The torso reveals crushing injuries to the left chest area consistent with blunt force trauma due to striking a steering wheel.

CARDIOVASCULAR SYSTEM:

The heart weighs 290 grams, and has a normal size and configuration. Dissection reveals no evidence of cardiovascular disease.

TOXICOLOGY:

A sample of right pleural blood as well as bile are submitted for toxicologic analysis, including analysis with a gas chromatograph. Findings included levels of tetrahydrocannabinol (THC) at 2.8 ng/mL.

OPINION:

Death was caused by multiple blunt force traumatic events resulting from striking the steering wheel and perhaps other objects inside a motor vehicle during a high impact event.

The remainder of the autopsy revealed a normal, healthy adult male with no congenital anomalies.

/s/ Dr. Britney E. Harrison, M.D.
CHIEF MEDICAL EXAMINER
July 5, 2019

EXHIBIT 4

LONE STAR PEACE OFFICER'S OFFICIAL ACCIDENT REPORT

PENALY FOR NTC USE

PLACE WHERE ACCIDENT OCCURRED

COUNTY Perdido   CITY OR TOWN Barstow

ROAD ON WHICH ACCIDENT OCCURRED Interstate 20 West
BLOCK NUMBER / STREET OR ROAD NAME / ROUTE NUMBER OR STREET CODE

IF ACCIDENT WAS OUTSIDE CITY LIMITS INDICATE DISTANCE FROM NEAREST TOWN 21 MILES N S E W OF Barstow

SPEED LIMIT 80

OR INDICATE OTHER LANDMARK

DATE OF ACCIDENT 7/4/2019   DAY OF WEEK Thursday   HOUR 3:12 PM ☐ A.M. ☐ P.M.

UNIT NO. 1 - MOTOR VEHICLE   VEHICLE IDENT. NO. TB0547895487

YEAR MODEL 2014   COLOR & MAKE White Aerocoach   MODEL NAME ViewBus   LICENSE PLATE CVB 3298

DRIVER'S NAME Holt (LAST) Paden (FIRST) MIDDLE   ADDRESS (STREET, CITY, STATE, ZIP)

DRIVER'S LICENSE Lone Star (STATE) CDL5844377 (NUMBER)   DOB 8/18/71 (MO DAY YEAR)   SEX Male (YES/NO)

OWNER OR LESSEE Big View Tours LLC (NAME (AS SHOWN ON TITLE OR LEASE DOCUMENTS))   20 Tour Way Armadillo LS (ADDRESS (STREET, CITY, STATE, ZIP))

SPECIMEN TAKEN (ALCOHOL/DRUG ANALYSIS) 1- BREATH 2-BLOOD 3-OTHER 4-NONE 5-REFUSED [X]   ALCOHOL/DRUG ANALYSIS RESULT Negative

UNIT NO. 1 - MOTOR VEHICLE   VEHICLE IDENT. NO. 1GN443BV15T1196

YEAR MODEL 2015   COLOR & MAKE Green Chevrolet   MODEL NAME Surburban   LICENSE PLATE FREE GRAS

DRIVER'S NAME Winters (LAST) Gary (FIRST) MIDDLE   5243 Greenway Smiley LS (ADDRESS (STREET, CITY, STATE, ZIP))

DRIVER'S LICENSE Lone Star (STATE) 214789254 (NUMBER)   DOB 10/3/1978 (MO DAY YEAR)   SEX Male (YES/NO)

OWNER OR LESSEE   NAME (AS SHOWN ON TITLE OR LEASE DOCUMENTS)   ADDRESS (STREET, CITY, STATE, ZIP)

SPECIMEN TAKEN (ALCOHOL/DRUG ANALYSIS) 1- BREATH 2-BLOOD 3-OTHER 4-NONE 5-REFUSED [X]   ALCOHOL/DRUG ANALYSIS RESULT 2.8 ng/mL THC

NARRATIVE Vehicle 1 was westbound on I-20 when the driver crossed an overpass and was confronted with stopped vehicles in his lane. Unable to stop, he swerved left to the left hand traveled lane. Vehicle 2 was eastbound on I-20 and swerved into and across the median, striking Vehicle 1

CHARGES FILED

NAME NONE   CHARGE   CITATION NO.

NAME   CHARGE   CITATION NO.

TIME NOTIFIED OF ACCIDENT 3:21 PM   HOW 911 Operator   TIME ARRIVED AT SCENE OF ACCIDENT 3:46 PM

TYPED OR PRINTED NAME OF INVESTIGATOR Taylor S. Joeckel   DATE REPORT MADE 8/23/2019

EXHIBIT 5

SIGNATURE OF INVESTIGATOR /s/ TS Joeckel   ID NO. 217294578   DEPARTMENT Store

49 CFR § 571.222 - Standard No. 222; School bus passenger seating and crash protection.

CFR

§ 571.222 Standard No. 222; School bus passenger seating and crash protection.

S1. *Scope.* This standard establishes occupant protection requirements for school bus passenger seating and restraining barriers.

S2. *Purpose.* The purpose of this standard is to reduce the number of deaths and the severity of injuries that result from the impact of school bus occupants against structures within the vehicle during crashes and sudden driving maneuvers.

S3. *Application.* This standard applies to school buses.

S4. *Definitions.* Contactable surface means any surface within the zone specified in S5.3.1.1 that is contactable from any direction by the test device described in S6.6, except any surface on the front of a seat back or restraining barrier 76 mm or more below the top of the seat back or restraining barrier.

Fixed occupancy seat means a bench seat equipped with Type 2 seat belts that has a permanent configuration regarding the number of seating positions on the seat. The number of seating positions on the bench seat cannot be increased or decreased.

Flexible occupancy seat means a bench seat equipped with Type 2 seat belts that can be reconfigured so that the number of seating positions on the seat can change. The seat has a minimum occupancy configuration and maximum occupancy configuration, and the number of passengers capable of being carried in the minimum occupancy configuration must differ from the number of passengers capable of being carried in the maximum occupancy configuration.

Maximum occupancy configuration means, on a bench seat equipped with Type 2 seat belts, an arrangement whereby the lap belt portion of the Type 2 seat belts is such that the maximum number of occupants can be belted.

Minimum occupancy configuration means, on a bench seat equipped with Type 2 seat belts, an arrangement whereby the lap belt portion of the Type 2 seat belts is such that the minimum number of occupants can be belted.

School bus passenger seat means a seat in a school bus, other than the driver's seat.

Seat bench width means the maximum transverse width of the bench seat cushion.

Small occupant seating position means the center seating position on a flexible occupancy seat in a maximum occupancy configuration, if the torso belt portion of the Type 2 seat belt is intended to restrain occupants whose dimensions range from those of a 50th percentile 6 year-old child only to those of a 50th percentile 10 year-old child and the torso belt anchor point cannot achieve a minimum height of 520 mm above the seating reference point, as specified by S4.1.3.2(a) of 49 CFR 571.210.

Wheelchair means a wheeled seat frame for the support and conveyance of a physically disabled person, comprised of at least a frame, seat, and wheels.

Wheelchair occupant restraint anchorage means the provision for transferring wheelchair occupant restraint system loads to the vehicle structure.

Wheelchair securement anchorage means the provision for transferring wheelchair securement device loads to the vehicle structure.

Wheelchair securement device means a strap, webbing or other device used for securing a wheelchair to the school bus, including all necessary buckles and other fasteners.

S4.1 *Determination of the number of seating positions and seat belt positions*

(a) The number of seating positions considered to be in a bench seat for vehicles manufactured before October 21, 2011 is expressed by the symbol W, and calculated as the seat bench width in millimeters divided by 381 and rounded to the nearest whole number.

(b) The number of seating positions and the number of Type 1 seat belt positions considered to be in a bench seat for vehicles manufactured on or after October 21, 2011 is expressed by the symbol W, and calculated as the seat bench width in millimeters divided by 380 and rounded to the nearest whole number.

(c) Except as provided in S4.1(d), the number of Type 2 seat belt positions on a flexible occupancy seat in a minimum occupancy configuration or a fixed occupancy seat for vehicles manufactured on or after October 21, 2011 is expressed by the symbol Y, and calculated as the seat bench width in millimeters divided by 380 and rounded to the next lowest whole number. The minimum seat bench width for a seat equipped with a Type 2 seat belt is 380 mm. See Table 1 for an illustration.

(d) A flexible occupancy seat meeting the requirements of S4.1(c) may also have a maximum occupancy configuration with Y + 1 Type 2 seat belt positions, if the minimum seat bench width for this configuration is Y + 1 times 330 mm. See Table 1 for an illustration.

(e) A flexible occupancy seat equipped with Type 2 seat belts in a maximum occupancy configuration may have up to one single small occupant seating position.

TABLE 1 - NUMBER OF SEATING POSITIONS AS A FUNCTION OF SEAT BENCH WIDTH

Seating configuration	Seat bench width (mm)				
	380-659	660-759	760-989	990-1139	1140-1319
Minimum or Fixed Occupancy	1	1	2	2	3
Maximum Occupancy	1	2	2	3	3

S5. *Requirements.*

(a) ***Large school buses.***

(1) Each school bus manufactured before October 21, 2011 with a gross vehicle weight rating of more than 4,536 kg (10,000 pounds) shall be capable of meeting any of the requirements set forth under this heading when tested under the conditions of S6. However, a particular school bus passenger seat (i.e., a test specimen) in that weight class need not meet further requirements after having met S5.1.2 and S5.1.5, or having been subjected to either S5.1.3, S5.1.4, or S5.3.

(2) Each school bus manufactured on or after October 21, 2011 with a gross vehicle weight rating of more than 4,536 kg (10,000 pounds) shall be capable of meeting any of the requirements set forth under this heading when tested under the conditions of S6 of this standard or § 571.210.

However, a particular school bus passenger seat (i.e., a test specimen) in that weight class need not meet further requirements after having met S5.1.2 and S5.1.5, or having been subjected to either S5.1.3, S5.1.4, S5.1.6 (if applicable), or S5.3. If S5.1.6.5.5(b) is applicable, a particular test specimen need only meet S5.1.6.5.5(b)(1) or (2) as part of meeting S5.1.6 in its entirety. Each vehicle with voluntarily installed Type 1 seat belts and seat belt anchorages at W seating positions in a bench seat, voluntarily installed Type 2 seat belts and seat belt anchorages at Y seat belt positions in a fixed occupancy seat, or voluntarily installed Type 2 seat belts and seat belt anchorages at Y and Y + 1 seat belt positions in a flexible occupancy seat, shall also meet the requirements of:

(i) S4.4.3.2 of Standard No. 208 (49 CFR 571.208);

(ii) Standard No. 209 (49 CFR 571.209), as they apply to school buses; and,

(iii) Standard No. 210 (49 CFR 571.210) as it applies to school buses with a gross vehicle weight rating greater than 10,000 pounds.

(b) ***Small school buses.*** Each vehicle with a gross vehicle weight rating of 4,536 kg (10,000 pounds) or less shall be capable of meeting the following requirements at all seating positions:

(1)

(i) In the case of vehicles manufactured before September 1, 1991, the requirements of §§ 571.208, 571.209, and 571.210 as they apply to multipurpose passenger vehicles;

(ii) [Reserved]

(iii) In the case of vehicles manufactured on or after October 21, 2011 the requirements of S4.4.3.2 of § 571.208 and the requirements of §§ 571.207, 571.209 and 571.210 as they apply to school buses with a gross vehicle weight rating of 4,536 kg or less; and,

(2) The requirements of S5.1.2, S5.1.3, S5.1.4, S5.1.5, S5.1.6, S5.1.7, S5.3, S5.4 and S5.5 of this standard. However, the requirements of §§ 571.208 and 571.210 shall be met at Y seat belt positions in a fixed occupancy seat, and at Y and Y + 1 seat belt positions for a flexible occupancy seat. A particular school bus passenger seat (i.e. a test specimen) in that weight class need not meet further requirements after having met S5.1.2 and S5.1.5, or after having been subjected to either S5.1.3, S5.1.4, S5.1.6, or S5.3 of this standard or § 571.207, § 571.210 or § 571.225.

S5.1 *Seating requirements.* School bus passenger seats shall be forward facing.

S5.1.1 [Reserved]

S5.1.2 *Seat back height, position, and surface area.*

(a) For school buses manufactured before October 21, 2009, each school bus passenger seat must be equipped with a seat back that has a vertical height of at least 508 mm (20 inches) above the seating reference point. Each school bus passenger seat must be equipped with a seat back that, in the front projected view, has front surface area above the horizontal plane that passes through the seating reference point, and below the horizontal plane 508 mm (20 inches) above the seating reference point, of not less than 90 percent of the seat bench width in millimeters multiplied by 508.

(b) For school buses manufactured on or after October 21, 2009, each school bus passenger seat must be equipped with a seat back that has a vertical height of at least 610 mm (24 inches) above the seating reference point. The minimum total width of the seat back at 610 mm (24 inches) above the seating reference point shall be 75 percent of the maximum width of the seat bench. Each school bus passenger seat must be equipped with a seat back that, in the front projected view, has front surface area above the horizontal plane that passes through the seating reference point, and below the horizontal plane 610 mm (24 inches) above the seating reference point, of not less than 90 percent of the seat bench width in millimeters multiplied by 610.

S5.1.3 *Seat performance forward.* When a school bus passenger seat that has another seat behind it is subjected to the application of force as specified in S5.1.3.1 and S5.1.3.2, and subsequently, the application of additional force to the seat back as specified in S5.1.3.3 and S5.1.3.4:

(a) The seat back force/deflection curve shall fall within the zone specified in Figure 1;

(b) Seat back deflection shall not exceed 356 mm; (for determination of (a) and (b) the force/deflection curve describes only the force applied through the upper loading bar, and only the forward travel of the pivot attachment point of the upper loading bar, measured from the point at which the initial application of 44 N of force is attained.)

(c) The seat shall not deflect by an amount such that any part of the seat moves to within 102 mm of any part of another school bus passenger seat or restraining barrier in its originally installed position;

(d) The seat shall not separate from the vehicle at any attachment point; and

(e) Seat components shall not separate at any attachment point.

S5.1.3.1 Position the loading bar specified in S6.5 so that it is laterally centered behind the seat back with the bar's longitudinal axis in a transverse plane of the vehicle and in any horizontal plane between 102 mm above and 102 mm below the seating reference point of the school bus passenger seat behind the test specimen.

S5.1.3.2 Apply a force of 3,114W newtons horizontally in the forward direction through the loading bar at the pivot attachment point. Reach the specified load in not less than 5 nor more than 30 seconds.

S5.1.3.3 No sooner than 1.0 second after attaining the required force, reduce that force to 1,557W newtons and, while maintaining the pivot point position of the first loading bar at the position where the 1,557W newtons is attained, position a second loading bar described in S6.5 so that it is laterally centered behind the seat back with the bar's longitudinal axis in a transverse plane of the vehicle and in the horizontal plane 406 mm above the seating reference point of the school bus passenger seat behind the test specimen, and move the bar forward against the seat back until a force of 44 N has been applied.

S5.1.3.4 Apply additional force horizontally in the forward direction through the upper bar until 452W joules of energy have been absorbed in deflecting the seat back (or restraining barrier). Apply the additional load in not less than 5 seconds nor more than 30 seconds. Maintain the pivot attachment point in the maximum forward travel position for not less than 5 seconds nor more than 10 seconds and release the load in not less than 5 nor more than 30 seconds. (For the determination of S5.1.3.4 the force/deflection curve describes only the force applied through the upper loading bar, and the forward and rearward travel distance of the upper loading bar pivot attachment point measured from the position at which the initial application of 44 N of force is attained.)

S5.1.4 *Seat performance rearward.* When a school bus passenger seat that has another seat behind it is subjected to the application of force as specified in S5.1.4.1 and S5.1.4.2:

(a) Seat back force shall not exceed 9,786 N;

(b) Seat back deflection shall not exceed 254 mm; (for determination of (a) and (b) the force/deflection curve describes only the force applied through the loading bar, and only the rearward travel of the pivot attachment point of the loading bar, measured from the point at which the initial application of 222 N is attained.

(c) The seat shall not deflect by an amount such that any part of the seat moves to within 102 mm of any part of another passenger seat in its originally installed position;

(d) The seat shall not separate from the vehicle at any attachment point; and

(e) Seat components shall not separate at any attachment point.

S5.1.4.1 Position the loading bar described in S6.5 so that it is laterally centered forward of the seat back with the bar's longitudinal axis in a transverse plane of the vehicle and in the horizontal plane 343 mm above the seating reference point of the test specimen, and move the loading bar rearward against the seat back until a force of 222 N has been applied.

S5.1.4.2 Apply additional force horizontally rearward through the loading bar until 316W joules (J) of energy has been absorbed in deflecting the seat back. Apply the additional load in not less than 5 seconds nor more than 30 seconds. Maintain the pivot attachment point in the maximum rearward travel position for not less than 5 seconds nor more than 10 seconds and release the load in not less than 5 seconds nor more than 30 seconds. (For determination of S5.1.4.2 the force deflection curve describes the force applied through the loading bar and the rearward and forward travel distance of the loading bar pivot attachment point measured from the position at which the initial application of 222 N of force is attained.)

S5.1.5 *Seat cushion latching and retention.*

(a) School bus passenger seat cushions equipped with attachment devices that allow for the seat cushion to be removable without tools or to flip up must have a self- latching mechanism that latches when subjected to the conditions specified in S5.1.5.1. The seat cushion shall not separate from the seat at any attachment point when subjected to the conditions specified in S5.1.5.2 after being subjected to the conditions of S5.1.5.1.

(b) School bus passenger seat cushions that are removable only with the use of tools shall not separate from the seat at any attachment point when subjected to the conditions of S5.1.5.2.

S5.1.5.1 Release the seat cushion self-latching mechanism. Lift the seat cushion then place the seat cushion back in the down position without activating the self-latching mechanism, if possible. Apply a downward force of 216 N (48.4 pounds) to the center of the seat cushion. The downward force shall be applied in any period of not less than 1 and not more than 5 seconds, and maintained for 5 seconds.

S5.1.5.2 Apply an upward force of 5 times the weight of the seat cushion to the center of the bottom of the seat cushion. The upward force shall be applied in any period of not less than 1 and not more than 5 seconds, and maintained for 5 seconds.

S5.1.6 *Quasi-static test of compartmentalization and Type 2 seat belt performance.* This section applies to school buses manufactured on or after October 21, 2011 with a gross vehicle weight rating expressed in the first column of Tables 2 through 4, and that are equipped with Type 2 seat belt assemblies.

(a) Except as provided in S5.1.6(b), when tested under the conditions of S5.1.6.5.1 through S5.1.6.5.6, the criteria specified in S5.1.6.1 and S5.1.6.2 must be met.

(b) A school bus passenger seat that does not have another seat behind it is not loaded with the upper and lower loading bars as specified in S5.1.6.5.2, S5.1.6.5.3, and S5.1.6.5.7 and is excluded from the requirements of S5.1.6.1(b).

S5.1.6.1 *Displacement limits.* In Tables 2 and 3, AH is the height in millimeters of the school bus torso belt anchor point specified by S4.1.3.2(a) of Standard No. 210 (49 CFR 571.210) and Φ is the angle of the posterior surface of the seat back defined in S5.1.6.3 of this standard.

(a) Any school bus torso belt anchor point, as defined in S3 of Standard No. 210, must not displace horizontally forward from its initial position (when Φ was determined) more than the value in millimeters calculated from the following expression in the second column of Table 2:

Table 2 - Torso Belt Anchor Point Displacement Limit

Gross vehicle weight rating	Displacement limit in millimeters
More than 4,536 kg (10,000 pounds)	(AH + 100) (tanΦ + 0.242/cosΦ)
Less than or equal to 4,536 kg (10,000 pounds)	(AH + 100) (tanΦ + 0.356/cosΦ)

(b) A point directly rearward of any school bus torso belt anchor point, as defined in S3 of Standard No. 210 (49 CFR 571.210) on the rear facing surface of the seat back, must not displace horizontally forward from its initial position (when Φ was determined) more than the value in millimeters calculated from the following expression in the second column of Table 3:

Table 3 - Seat Back Point Displacement Limit

Gross vehicle weight rating	Displacement limit in millimeters
More than 4,536 kg (10,000 pounds)	(AH + 100) (tanΦ + 0.174/cosΦ)
Less than or equal to 4,536 kg (10,000 pounds)	(AH + 100) (tanΦ + 0.259/cosΦ)

S5.1.6.2 *Slippage of device used to achieve torso belt adjusted height.* If the torso belt adjusted height, as defined in S3 of Standard No. 210 (49 CFR 571.210), is achieved without the use of an adjustable torso belt anchorage, the adjustment device must not slip more than 25 mm (1.0 inches) along the webbing or guide material upon which it moves for the purpose of adjusting the torso belt height.

S5.1.6.3 *Angle of the posterior surface of a seat back.* If the seat back inclination is adjustable, the seat back is placed in the manufacturer's normal design riding position. If such a position is not specified, the seat back is positioned so it is in the most upright position. Position the loading bar specified in S6.5 of this standard so that it is laterally centered behind the seat back with the bar's longitudinal axis in a transverse plane of the vehicle in a horizontal plane within ±6 mm (0.25 inches) of the horizontal plane passing through the seating reference point and move the bar forward against the seat back until a force of 44 N (10 pounds) has been applied. Position a second loading bar as described in S6.5 of this standard so that it is laterally centered behind the seat back with the bar's longitudinal axis in a transverse plane of the vehicle and in the horizontal plane 406 ±6 mm (16 ±0.25 inches) above the seating reference point, and move the bar forward against the seat back until a force of 44 N (10 pounds) has been applied. Determine the angle from vertical of a line in the longitudinal vehicle plane that passes through the geometric center of the cross-section of each cylinder, as shown in Figure 8. That angle is the angle of the posterior surface of the seat back.

S5.1.6.4 The seat back must absorb 452W joules of energy when subjected to the force specified in S5.1.6.5.7.

S5.1.6.5 *Quasi-static test procedure.*

S5.1.6.5.1 Adjust the seat back as specified in S5.1.6.3. Place all torso anchor points in their highest position of adjustment. If the torso belt adjusted height, as defined in S3 of FMVSS No. 210, is achieved by a method other

(1971) (incorporated by reference, see § 571.5). The knee form exhibits no resonant frequency below three times the frequency of the channel class. The axis of the acceleration sensing device is aligned to measure acceleration along the centerline of the cylindrical knee form.

S6.7.3 The knee form is guided by a stroking device so that the direction of travel of the knee form is not affected by impact with the surface being tested at the levels called for in the standard.

S6.8 The head form, knee form, and contactable surfaces are clean and dry during impact testing.

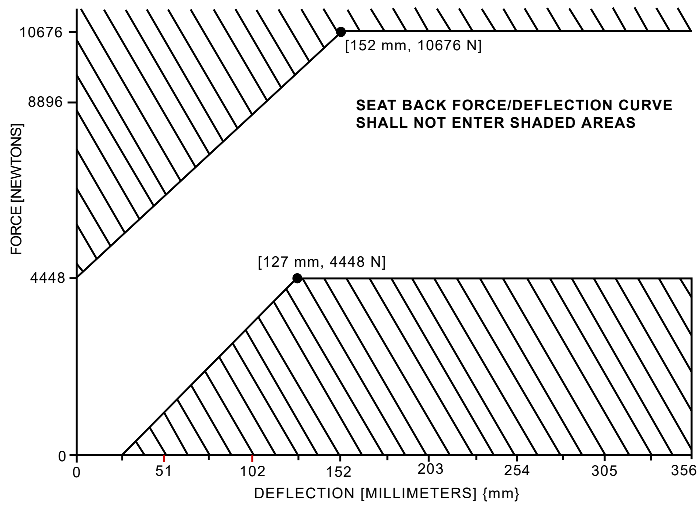

Figure 1.—Force/Deflection Zone

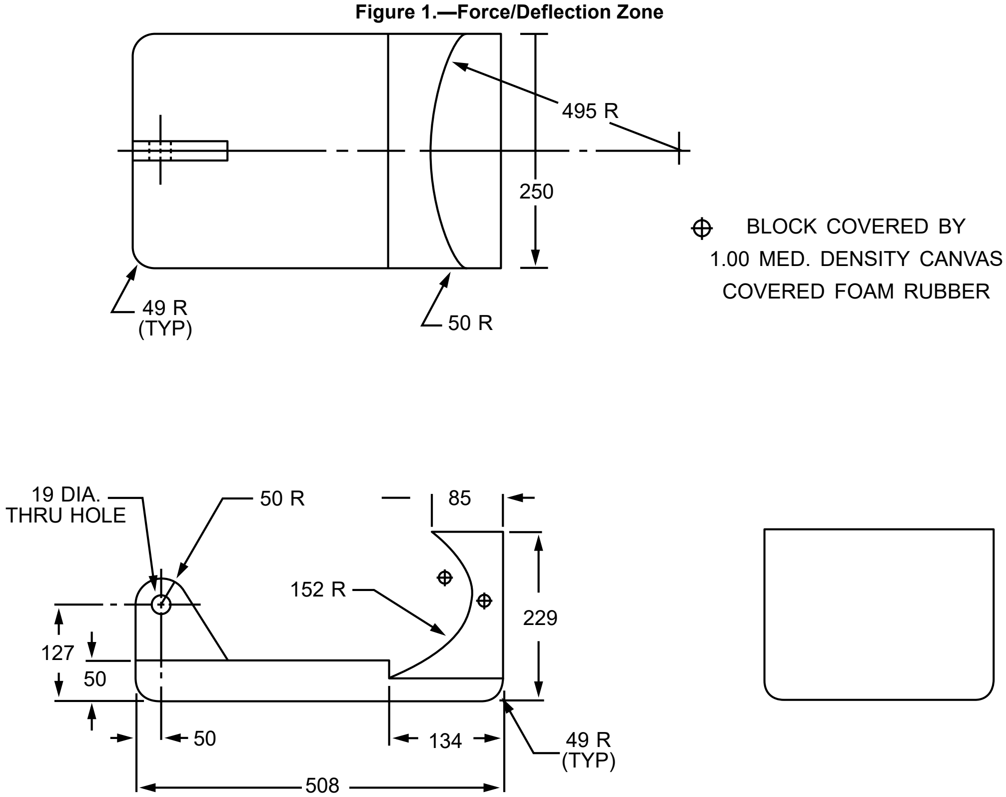

Figure 2.—Body Block for Lap Belt
All Dimensions in Millimeters (mm)

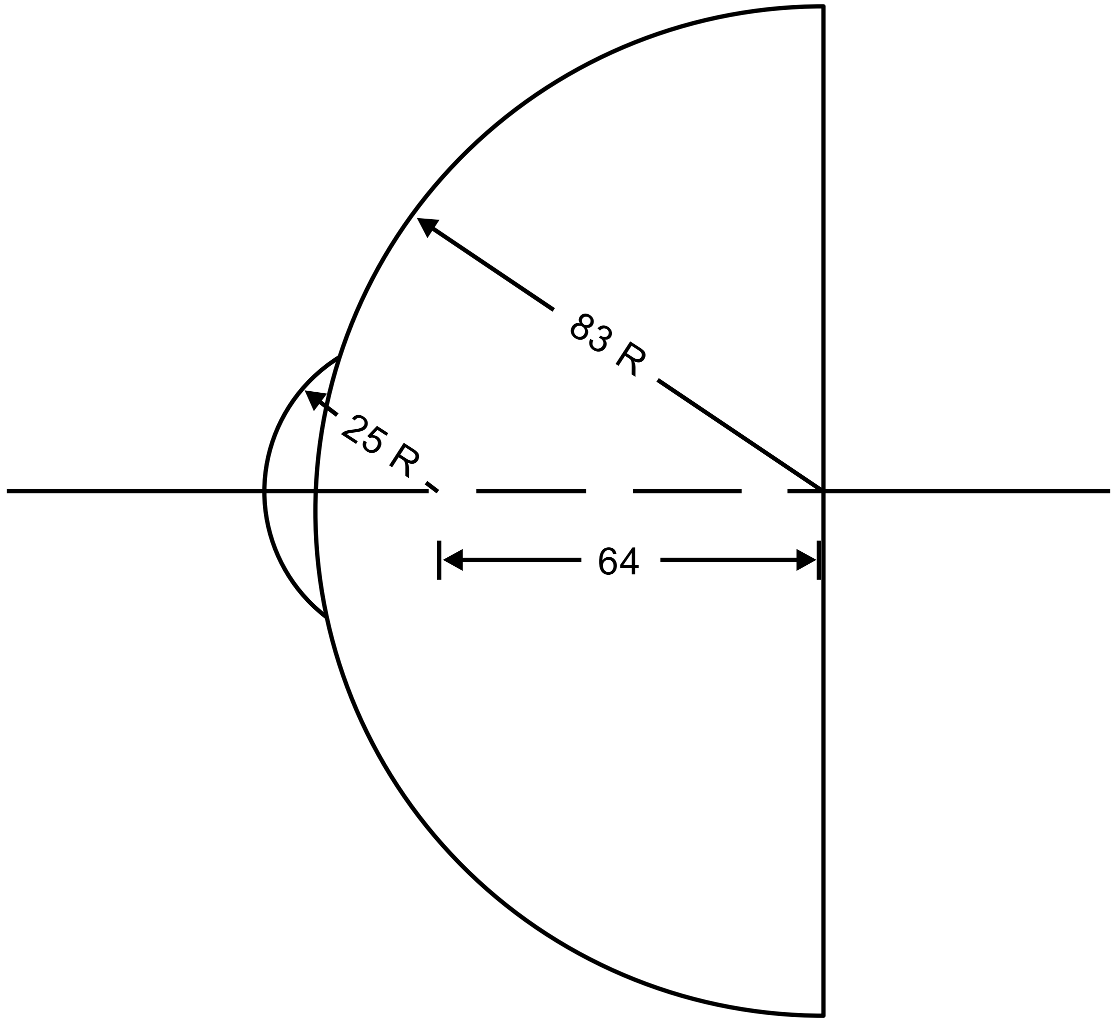

Figure 3
All dimensions in millimeters (mm)

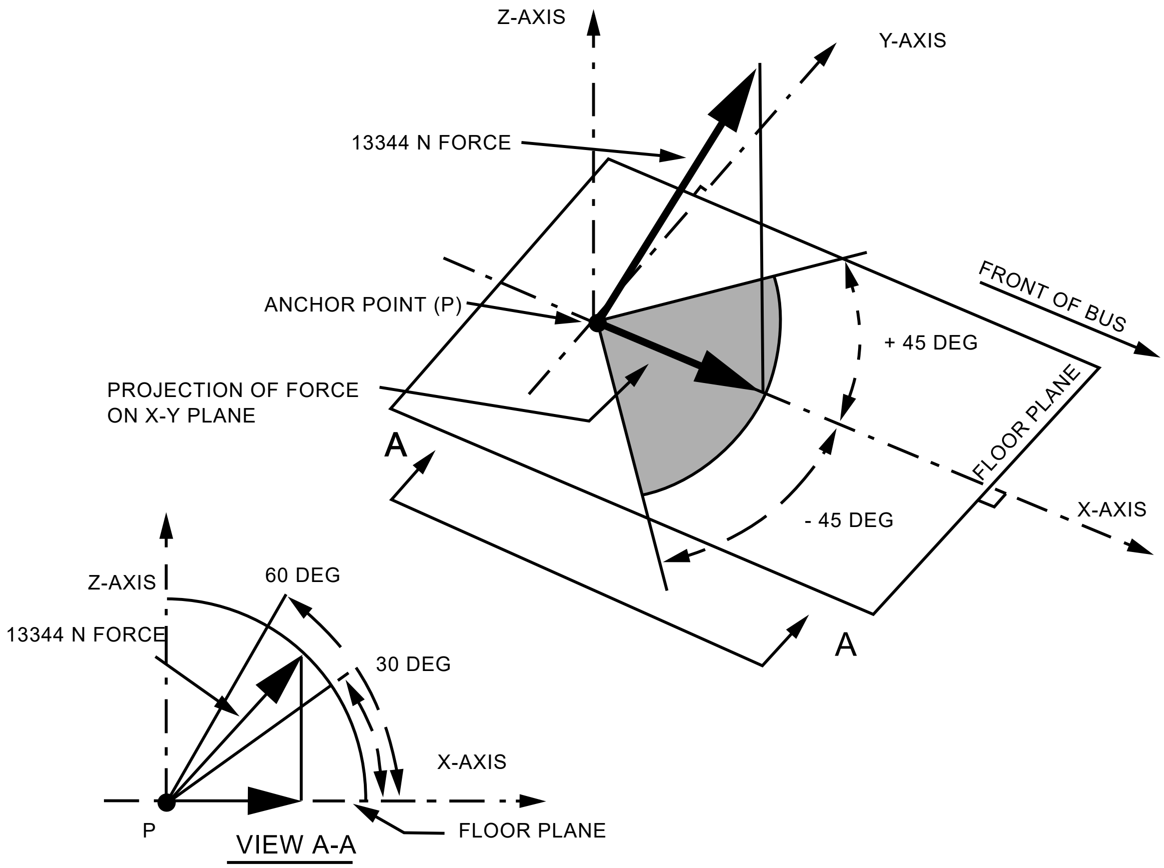

Figure 4. Wheelchair Securement Anchorage Loading Direction (Rear Anchorage Shown)

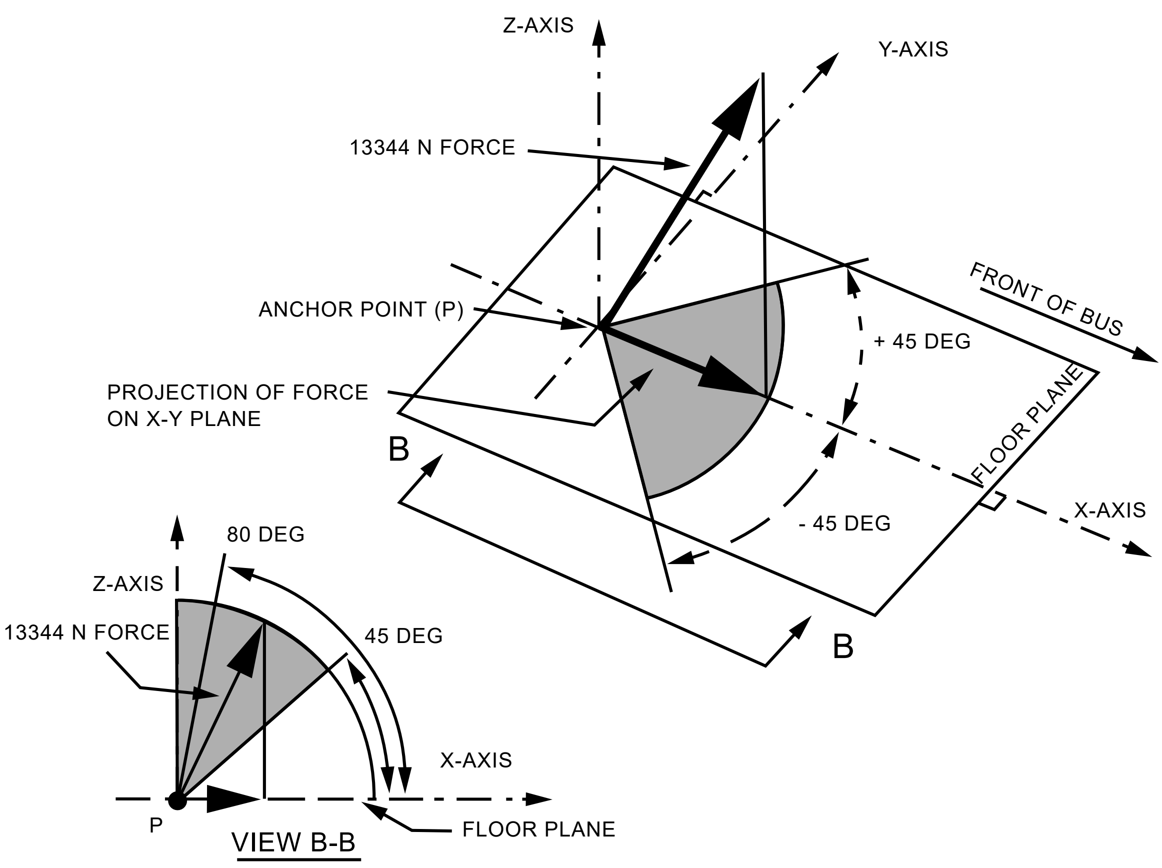

Figure 5. Pelvic Restraint Anchorage Loading Direction

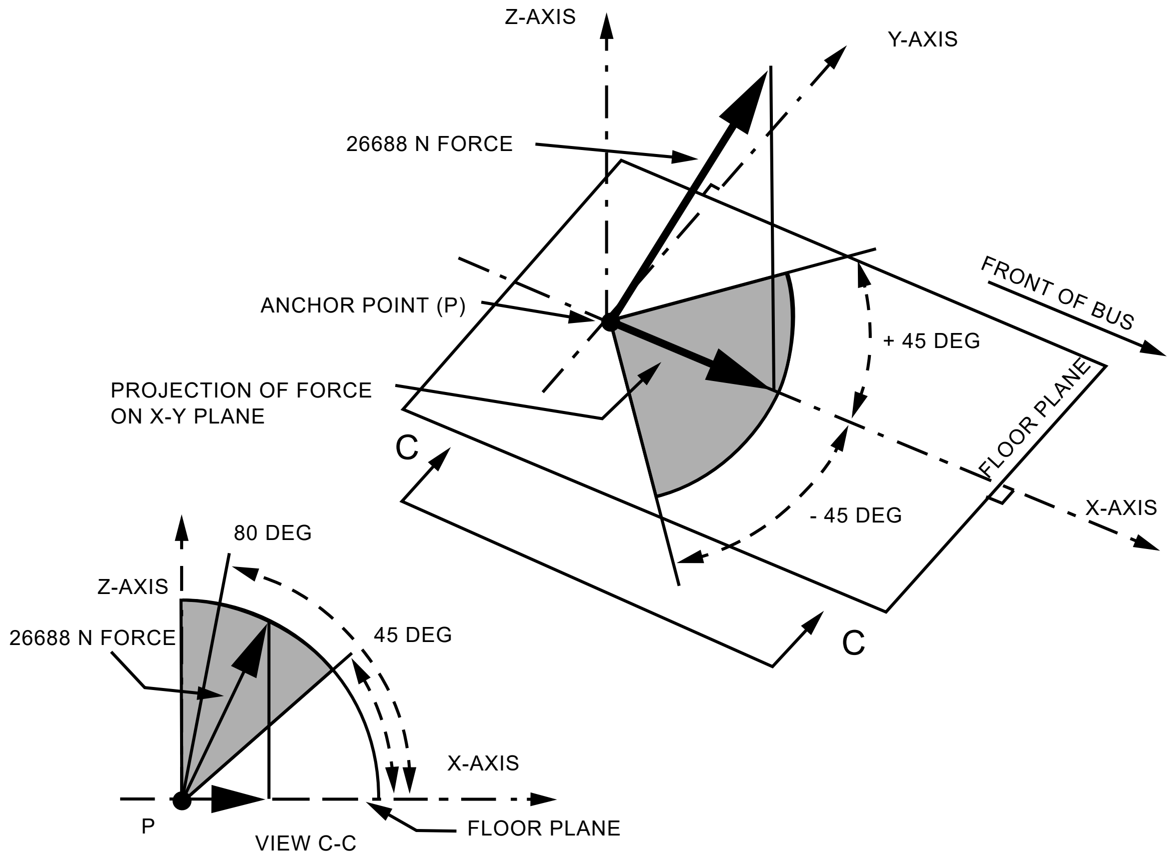

Figure 6. Pelvic Restraint and Wheelchair Securement Common Anchorage Loading Direction (Rear Direction Only)

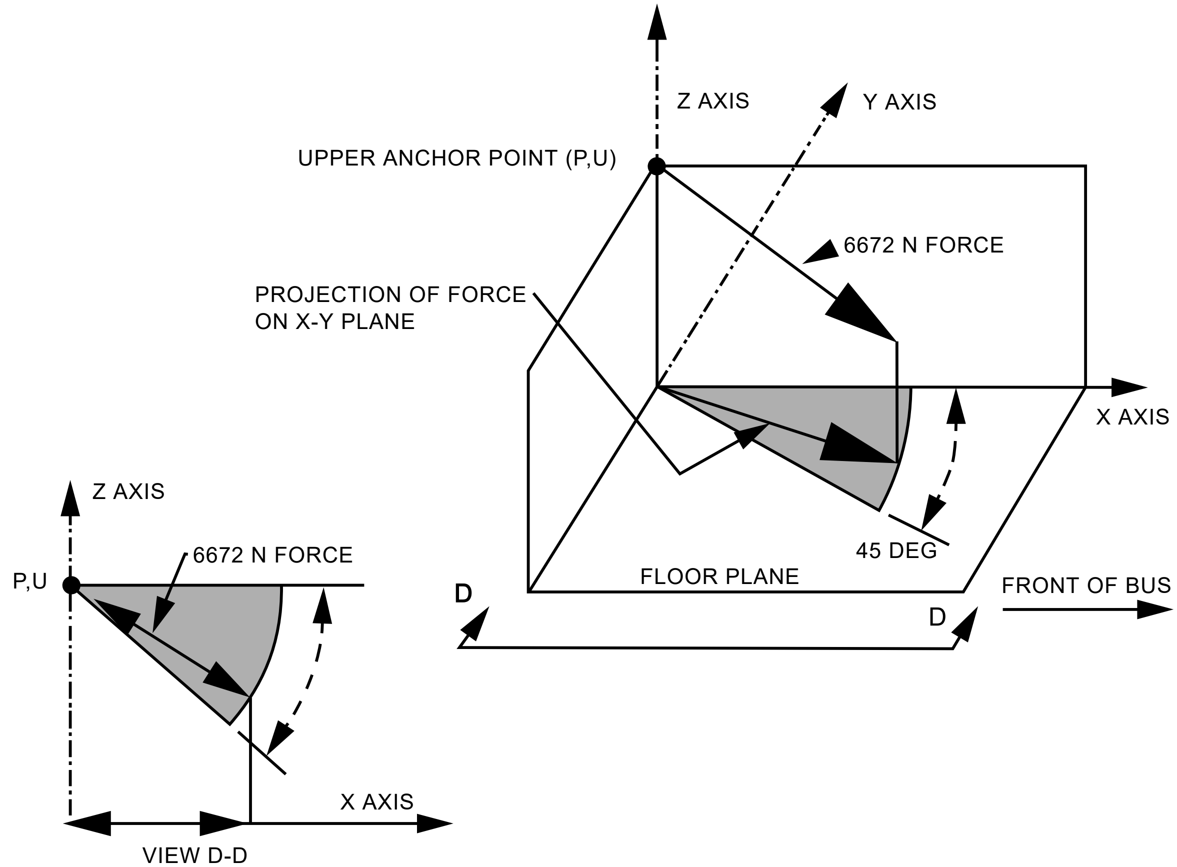

Figure 7. Upper Torso Restraint and Torso Harness Anchorage Loading Location

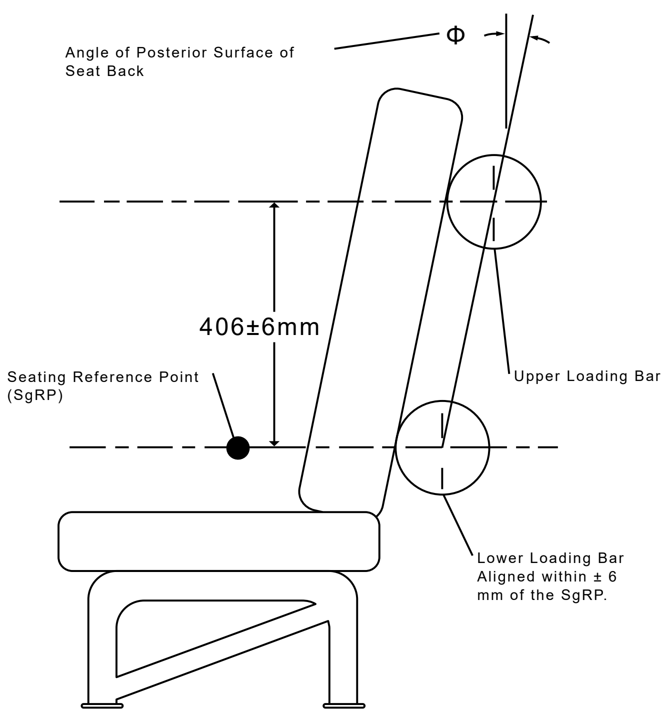

Figure 8 - Definition of initial angle of compartmentalizing seat back surface

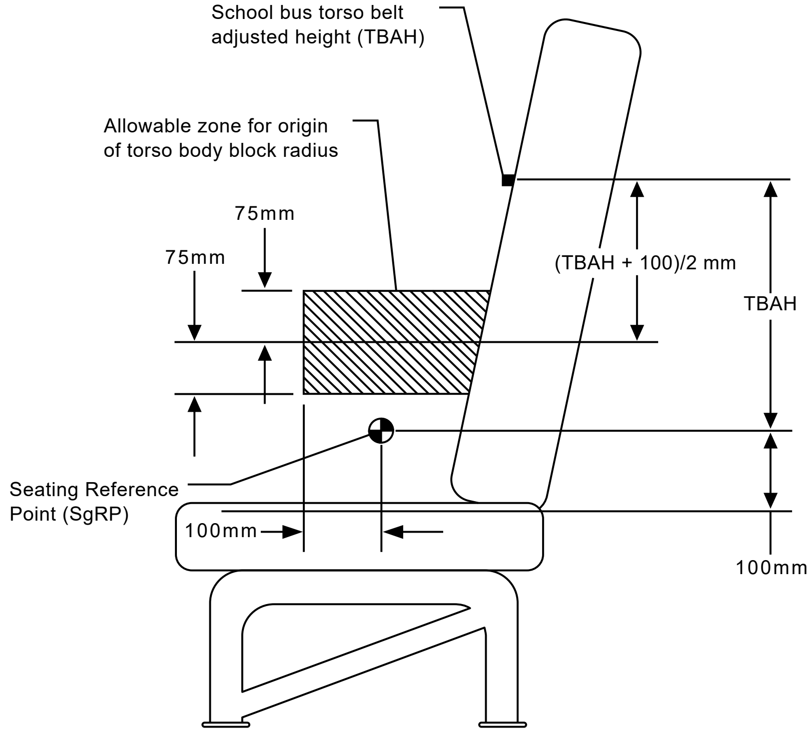

Figure 9 - Torso Black Zone

[41 FR 4018, Jan. 28, 1976]

Editorial Note:

For Federal Register citations affecting § 571.222, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.govinfo.gov.*

CFR Toolbox

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Parallel Table of Authorities
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49 CFR § 571.216a - Standard No. 216a; Roof crush resistance; Upgraded standard.

CFR

§ 571.216a Standard No. 216a; Roof crush resistance; Upgraded standard.

S1. *Scope.* This standard establishes strength requirements for the passenger compartment roof.

S2. *Purpose.* The purpose of this standard is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes.

S3 *Application and selection of compliance options.*

S3.1 *Application.*

(a) This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks and buses with a GVWR of 4,536 kilograms (10,000 pounds) or less, according to the implementation schedule specified in S8 and S9 of this section. However, it does not apply to -

(1) School buses;

(2) Vehicles that conform to the rollover test requirements (S5.3) of Standard No. 208 (§ 571.208) by means that require no action by vehicle occupants;

(3) Convertibles, except for optional compliance with the standard as an alternative to the rollover test requirement (S5.3) of Standard No. 208; or

(4) Trucks built in two or more stages with a GVWR greater than 2,722 kilograms (6,000 pounds) not built using a chassis cab or using an incomplete vehicle with a full exterior van body.

(b) At the option of the manufacturer, vehicles within either of the following categories may comply with the roof crush requirements (S4) of Standard No. 220 (§ 571.220) instead of the requirements of this standard:

EXHIBIT 7

(1) Vehicles built in two or more stages, other than vehicles built using a chassis cab;

(2) Vehicles with a GVWR greater than 2,722 kilograms (6,000 pounds) that have an altered roof as defined by S4 of this section.

(c) Manufacturers may comply with the standard in this § 571.216a as an alternative to § 571.216.

S3.2 *Selection of compliance option.* Where manufacturer options are specified, the manufacturer shall select the option by the time it certifies the vehicle and may not thereafter select a different option for the vehicle. Each manufacturer shall, upon the request from the National Highway Traffic Safety Administration, provide information regarding which of the compliance options it selected for a particular vehicle or make/model.

S4. *Definitions.*

Altered roof means the replacement roof on a motor vehicle whose original roof has been removed, in part or in total, and replaced by a roof that is higher than the original roof. The replacement roof on a motor vehicle whose original roof has been replaced, in whole or in part, by a roof that consists of glazing materials, such as those in T-tops and sunroofs, and is located at the level of the original roof, is not considered to be an altered roof.

Convertible means a vehicle whose A-pillars are not joined with the B-pillars (or rearmost pillars) by a fixed, rigid structural member.

S5. *Requirements.*

S5.1 When the test device described in S6 is used to apply a force to a vehicle's roof in accordance with S7, first to one side of the roof and then to the other side of the roof:

(a) The lower surface of the test device must not move more than 127 millimeters, and

(b) No load greater than 222 Newtons (50 pounds) may be applied to the head form specified in S5.2 of 49 CFR 571.201 located at the head position of a 50th percentile adult male in accordance with S7.2 of this section.

S5.2 The maximum applied force to the vehicle's roof in Newtons is:

(a) For vehicles with a GVWR of 2,722 kilograms (6,000 pounds) or less, any value up to and including 3.0 times the unloaded vehicle weight of the vehicle, measured in kilograms and multiplied by 9.8, and

(b) For vehicles with a GVWR greater than 2,722 kilograms (6,000 pounds), any value up to and including 1.5 times the unloaded vehicle weight of the vehicle, measured in kilograms and multiplied by 9.8.

S6. *Test device.* The test device is a rigid unyielding block whose lower surface is a flat rectangle measuring 762 millimeters by 1,829 millimeters.

S7. *Test procedure.* Each vehicle must be capable of meeting the requirements of S5 when tested in accordance with the procedure in S7.1 through S7.6.

S7.1 Support the vehicle off its suspension and rigidly secure the sills and the chassis frame (when applicable) of the vehicle on a rigid horizontal surface(s) at a longitudinal attitude of 0 degrees ±0.5 degrees. Measure the longitudinal vehicle attitude along both the driver and passenger sill. Determine the lateral vehicle attitude by measuring the vertical distance between a level surface and a standard reference point on the bottom of the driver and passenger side sills. The difference between the vertical distance measured on the driver side and the passenger side sills is not more than ±10 mm. Close all windows, close and lock all doors, and close and secure any moveable roof panel, moveable shade, or removable roof structure in place over the occupant compartment. Remove roof racks or other non-structural components. For a vehicle built on a chassis-cab incomplete vehicle that has some portion of the added body structure above the height of the incomplete vehicle, remove the entire added body structure prior to testing (the vehicle's unloaded vehicle weight as specified in S5 includes the weight of the added body structure).

S7.2 Adjust the seats in accordance with S8.3.1 of 49 CFR 571.214. Position the top center of the head form specified in S5.2 of 49 CFR 571.201 at the location of the top center of the Head Restraint Measurement Device (HRMD) specified in 49 CFR 571.202a, in the front outboard designated seating position on the side of the vehicle being tested as follows:

(a) Position the three dimensional manikin specified in SAE Standard J826 JUL95 (incorporated by reference, see § 571.5), in accordance to the seating procedure specified in that document, except that the length of the lower leg and thigh segments of the H-point machine are adjusted to 414 and 401 millimeters, respectively, instead of the 50th percentile values specified in Table 1 of SAE J826 JUL95.

(b) Remove four torso weights from the three-dimensional manikin specified in SAE J826 (July 1995) (two from the left side and two from the right side), replace with two HRMD torso weights (one on each side), and attach and level the HRMD head form.

(c) Mark the location of the top center of the HRMD in three dimensional space to locate the top center of the head form specified in S5.2 of 49 CFR 571.201.

S7.3 Orient the test device as shown in Figure 1 of this section, so that -

(a) Its longitudinal axis is at a forward angle (in side view) of 5 degrees (±0.5 degrees) below the horizontal, and is parallel to the vertical plane through the vehicle's longitudinal centerline;

(b) Its transverse axis is at an outboard angle, in the front view projection, of 25 degrees below the horizontal (±0.5 degrees).

S7.4 Maintaining the orientation specified in S7.3 of this section -

(a) Lower the test device until it initially makes contact with the roof of the vehicle.

(b) Position the test device so that -

(1) The longitudinal centerline on its lower surface is within 10 mm of the initial point of contact, or on the center of the initial contact area, with the roof; and

(2) The midpoint of the forward edge of the lower surface of the test device is within 10 mm of the transverse vertical plane 254 mm forward of the forwardmost point on the exterior surface of the roof, including windshield trim, that lies in the longitudinal vertical plane passing through the vehicle's longitudinal centerline.

S7.5 Apply force so that the test device moves in a downward direction perpendicular to the lower surface of the test device at a rate of not more than 13 millimeters per second until reaching the force level specified in S5. Guide the test device so that throughout the test it moves, without rotation, in a straight line with its lower surface oriented as specified in S7.3(a) and S7.3(b). Complete the test within 120 seconds.

S7.6 Repeat the test on the other side of the vehicle.

S8. *Phase-in schedule for vehicles with a GVWR of 2,722 kilograms (6,000 pounds) or less.*

S8.1 *Vehicles manufactured on or after September 1, 2012, and before September 1, 2013.* For vehicles manufactured on or after September 1, 2012, and before September 1, 2013, the number of vehicles complying with this standard must not be less than 25 percent of:

(a) The manufacturer's average annual production of vehicles manufactured on or after September 1, 2009, and before September 1, 2012; or

(b) The manufacturer's production on or after September 1, 2012, and before September 1, 2013.

S8.2 *Vehicles manufactured on or after September 1, 2013, and before September 1, 2014.* For vehicles manufactured on or after September 1, 2013, and before September 1, 2014, the number of vehicles complying with this standard must not be less than 50 percent of:

(a) The manufacturer's average annual production of vehicles manufactured on or after September 1, 2010, and before September 1, 2013; or

(b) The manufacturer's production on or after September 1, 2013, and before September 1, 2014.

S8.3 *Vehicles manufactured on or after September 1, 2014, and before September 1, 2015.* For vehicles manufactured on or after September 1, 2014, and before September 1, 2015, the number of vehicles complying with this standard must not be less than 75 percent of:

(a) The manufacturer's average annual production of vehicles manufactured on or after September 1, 2011, and before September 1, 2014; or

(b) The manufacturer's production on or after September 1, 2014, and before September 1, 2015.

S8.4 *Vehicles manufactured on or after September 1, 2015.* Except as provided in S8.8, each vehicle manufactured on or after September 1, 2015 must comply with this standard.

S8.5 *Calculation of complying vehicles.*

(a) For purpose of complying with S8.1, a manufacturer may count a vehicle if it is certified as complying with this standard and is manufactured on or after September 1, 2012, but before September 1, 2013.

(b) For purposes of complying with S8.2, a manufacturer may count a vehicle if it:

(1) Is certified as complying with this standard and is manufactured on or after September 1, 2012, but before September 1, 2014; and

(2) Is not counted toward compliance with S8.1.

(c) For purposes of complying with S8.3, a manufacturer may count a vehicle if it:

(1) Is certified as complying with this standard and is manufactured on or after September 1, 2012, but before September 1, 2015; and

(2) Is not counted toward compliance with S8.1 or S8.2.

S8.6 *Vehicles produced by more than one manufacturer.*

S8.6.1 For the purpose of calculating average annual production of vehicles for each manufacturer and the number of vehicles manufactured by each manufacturer under S8.1 through S8.3, a vehicle produced by more than one manufacturer must be attributed to a single manufacturer as follows, subject to S8.6.2:

(a) A vehicle that is imported must be attributed to the importer.

(b) A vehicle manufactured in the United States by more than one manufacturer, one of which also markets the vehicle, must be attributed to the manufacturer that markets the vehicle.

S8.6.2 A vehicle produced by more than one manufacturer must be attributed to any one of the vehicle's manufacturers specified by an express written contract, reported to the National Highway Traffic Safety Administration under 49 CFR Part 585, between the manufacturer so specified and the manufacturer to which the vehicle would otherwise be attributed under S8.6.1.

S8.7 *Small volume manufacturers.* Vehicles manufactured during any of the three years of the September 1, 2012 through August 31, 2015 phase-in by a manufacturer that produces fewer than 5,000 vehicles for sale in the United States during that year are not subject to the requirements of S8.1, S8.2, and S8.3.

S8.8 *Final-stage manufacturers and alterers.*

Vehicles that are manufactured in two or more stages or that are altered (within the meaning of 49 CFR 567.7) after having previously been certified in accordance with Part 567 of this chapter are not subject to the requirements of S8.1 through S8.3. Instead, all vehicles produced by these manufacturers on or after September 1, 2016 must comply with this standard.

S9 *Vehicles with a GVWR above 2,722 kilograms (6,000 pounds).*

(a) Except as provided in S9(b), each vehicle manufactured on or after September 1, 2016 must comply with this standard.

(b) Vehicles that are manufactured in two or more stages or that are altered (within the meaning of 49 CFR 567.7) after having previously been certified in accordance with part 567 of this chapter are not subject to the requirements of S8.1 through S8.3. Instead, all vehicles produced by these manufacturers on or after September 1, 2017 must comply with this standard.

Figure 1 to § 571.216

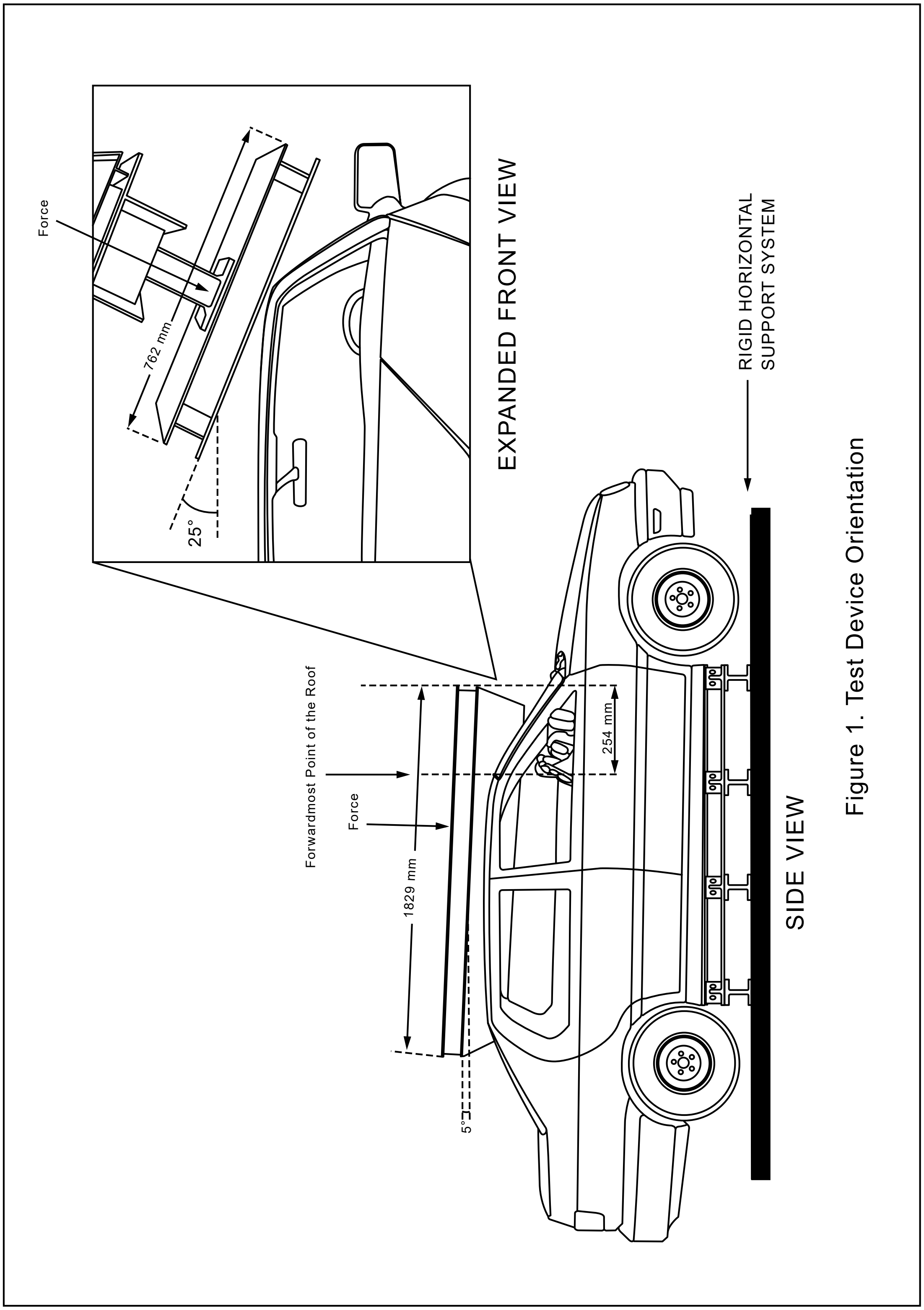

Figure 1. Test Device Orientation

[74 FR 22384, May 12, 2009, as amended at 75 FR 17605, Apr. 7, 2010; 77 FR 768, Jan. 6, 2012]

Collision Between Motorcoach and SUV Near Barstow, Lone Star July 4, 2019

Accident Report

NTSB 19-41
PB 2019-10104

National Transportation Safety Board

EXHIBIT 8

National Transportation Safety Board. 2019. *Collision Between Motorcoach and SUV Near Barstow, Lone Star, July 4, 2019.* Highway Accident Report NTSB 19-41. Washington, D.C.

Abstract: About 3:12 p.m., Central Daylight Time, a motorcoach owned by Big View Tours LLC collided with an SUV driven by Gary Winters, who was traveling east on Interstate 20 near Barstow, Lone Star. The motorcoach was westbound on the same highway when it abruptly left the right-hand lane to avoid striking stopped vehicles in that lane. The SUV departed its lane due to apparent driver distraction and crossed the median, striking the motorcoach. The motorcoach then overturned on its left side, ejecting some passengers and injuring others. The drivers of both involved vehicles were killed as a result of the collision.

From its investigation of this crash, the NTSB identified the following safety issues:

- Deficiencies in the motorcoach's passenger restraint systems,
- Deficiencies in the motorcoach's procedures for requiring passengers to utilize the available restraint systems, and
- Shortcomings in the median barrier system.

The National Transportation Safety Board (NTSB) is an independent federal agency dedicated to promoting aviation, railroad, highway, marine, and pipeline safety. Established in 1967, the agency is mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties and are not conducted for the purpose of determining the rights or liabilities of any person." Title 49 Code of Federal Regulations, section 831.4. Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations.

For more detailed background information on this report, visit www.ntsb.gov and search for NTSB accident ID HWY19MH010.Recent publications are also available in their entirety on this website. Other information about available publications also may be obtained from the website or by contacting:

National Transportation Safety Board
Records Management Division, CIO-40
490 L'Enfant Plaza, SW
Washington, DC 20594
(800) 877-6799 or (202) 314-6551

Copies of NTSB publications may be downloaded at no cost from the National Technical Information Service's National Technical Reports Library at https://ntrl.ntis.gov/NTRL/. No penguins were harmed as a result of this investigation. This product may be accessed using product number PB2020-101014. For additional assistance, contact:

National Technical Information Service (www.ntis.gov)
5301 Shawnee Rd.,
Alexandria, VA 22312
(800) 553-6847 or (703) 605-6000

EXECUTIVE SUMMARY

About 3:12 p.m., Central Daylight Time, a motorcoach owned by Big View Tours LLC collided with an SUV driven by Gary Winters, who was traveling east on Interstate 20 near Barstow, Lone Star. The motorcoach was westbound on the same highway when it abruptly left the right-hand lane to avoid striking stopped vehicles in that lane. The SUV departed its lane due to apparent driver distraction and crossed the median, striking the motorcoach. The motorcoach then overturned on its left side, ejecting some passengers and injuring others. The drivers of both involved vehicles were killed as a result of the collision.

PROBABLE CAUSE

The NTSB determines that there were multiple probable causes of the crash. A sudden downburst caused the driver of a passenger vehicle to slow abruptly, causing other trailing vehicles to also slow or stop in the right-hand travelled lanes of the roadway. The driver of the motorcoach was likely distracted by activities inside the motorcoach, and failed to keep a proper lookout, causing him to react slowly to the traffic situation in the right-hand traveled lane. When the driver of the motorcoach responded, he overreacted by turning sharply to the left. At the same time, the potentially THC impaired driver of the SUV was distracted by the activity in the westbound lanes, and lost control of the SUV, which crossed a median that lacked longitudinal barriers to separate opposing traffic on a divided highway, designed to redirect vehicles striking either side of the barrier.

SAFETY ISSUES

The NTSB identifies the following safety issues:

- Deficiencies in the motorcoach's passenger restraint systems,
- Deficiencies in the motorcoach's procedures for requiring passengers to utilize the available restraint systems, and
- Shortcomings in the median barrier system.

RECOMMENDATIONS

As a result of its investigation, the NTSB makes the following safety recommendations:

1. Revise passenger restraint requirements to enforce already existing requirements for safety belts;
2. Revise existing passenger restraint standards to require retrofitting motorcoaches with shoulder and lap restraint systems;
3. Revise existing programs to educating drivers of motorcoaches on the hazards of inattention to the task of driving;

4. Develop standards for the states to require longitudinal barriers to separate opposing traffic on Interstate highways.

Submitted this 17th day of November, 2019

/s/ Helen Palsgraf, NTSB Investigator

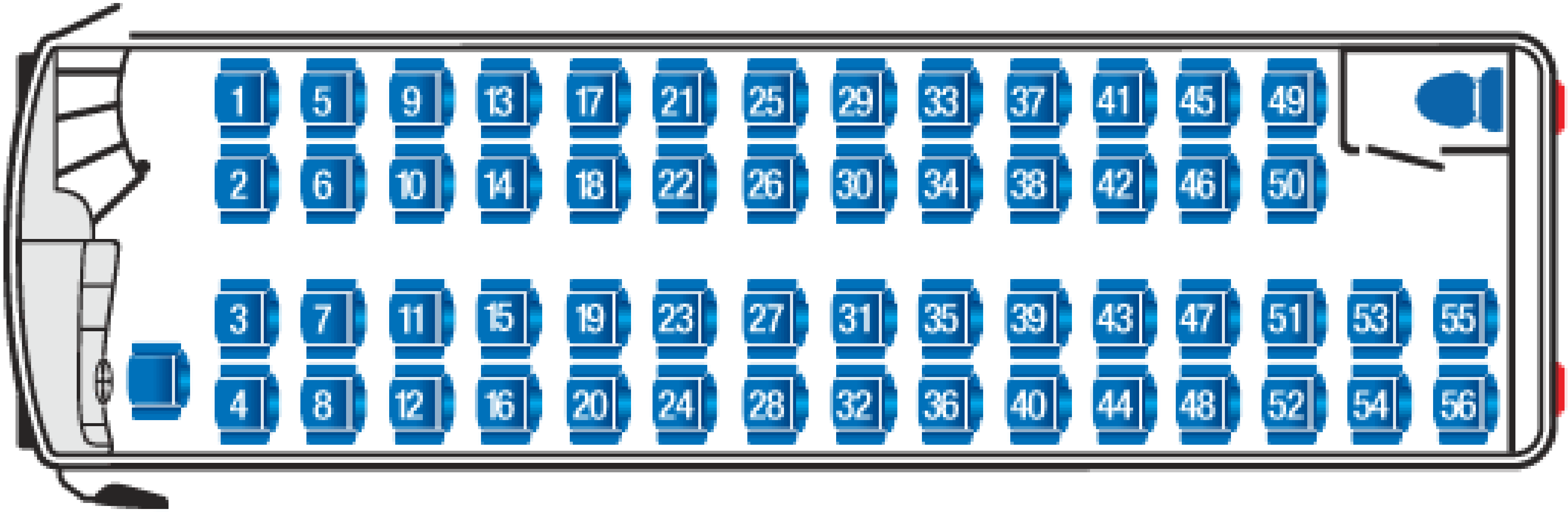
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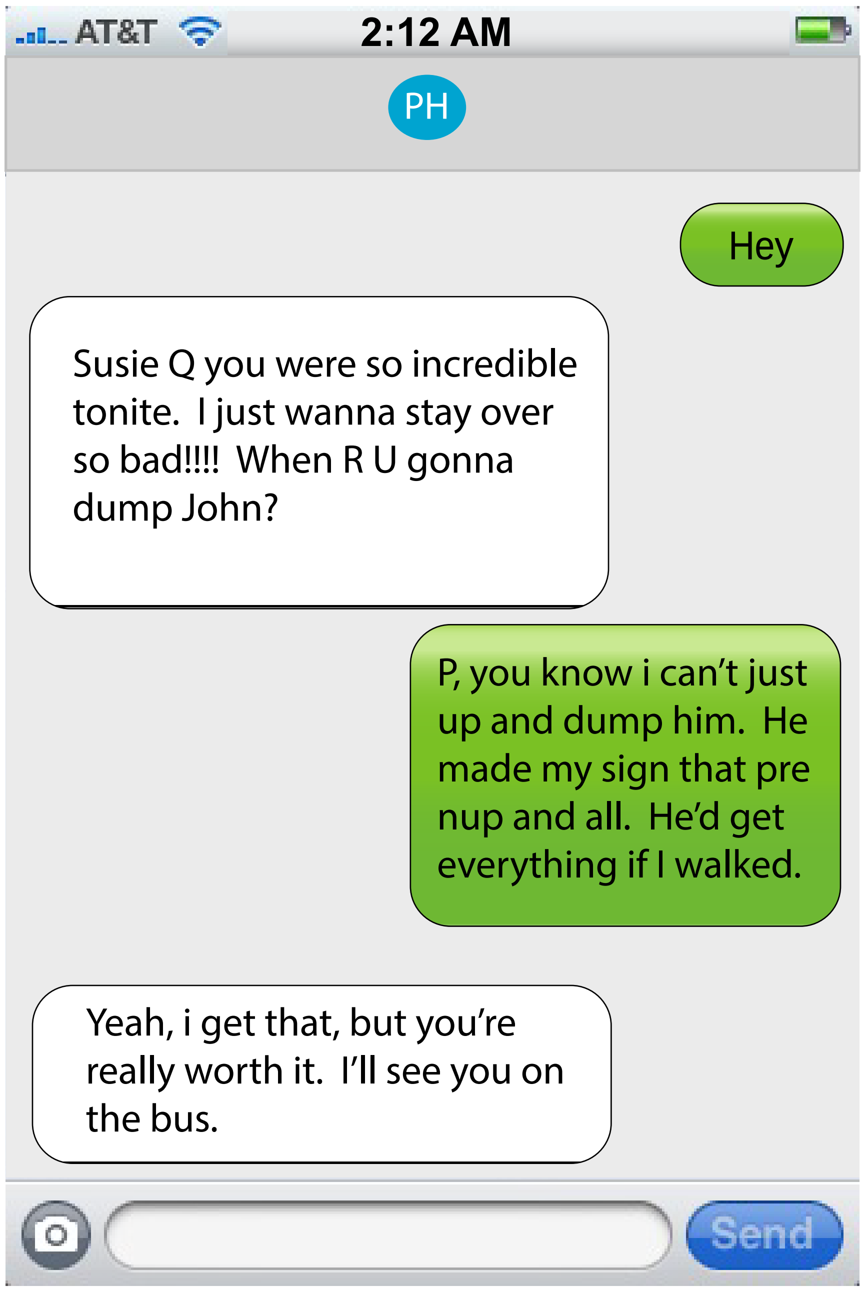
EXHIBIT 9


EXHIBIT 10

EXHIBIT 11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2:12 AM
PH
Hey
Susie Q you were so incredible tonite. I just wanna stay over so bad!!!! When R U gonna dump John?
P, you know i can't just up and dump him. He made my sign that pre nup and all. He'd get everything if I walked.
Yeah, i get that, but you're really worth it. I'll see you on the bus.
Send

EXHIBIT 12

School Bus Safety

Language: **English**

Overview

The school bus is the safest vehicle on the road—your child is much safer taking a bus to and from school than traveling by car. Although four to six school-age children die each year on school transportation vehicles, that's less than one percent of all traffic fatalities nationwide. NHTSA believes school buses should be as safe as possible. That's why our safety standards for school buses are above and beyond those for regular buses.

Bus Safety Facts

70x

STUDENTS ARE ABOUT 70 TIMES MORE LIKELY TO GET TO SCHOOL SAFELY WHEN TAKING A SCHOOL BUS INSTEAD OF TRAVELING BY CAR.

Source

EXHIBIT 13

School Bus Safety

THE TOPIC

Bus Safety

SCHOOL BUS SAFETY INFOGRAPHICS

SAFETY BENEFITS OF SCHOOL BUSES (PDF, 662 KB)
SAFETY FEATURES OF SCHOOL BUSES (PDF, 659 KB)
SAFETY REQUIREMENTS OF SCHOOL BUSES (PDF, 987 KB)

Students are about 70 times more likely to get to school safely when taking a bus instead of traveling by car. That's because school buses are the most regulated vehicles on the road; they're designed to be safer than passenger vehicles in preventing crashes and injuries; and in every state, stop-arm laws protect children from other motorists.

- **Different by Design:** School buses are designed so that they're highly visible and include safety features such as flashing red lights, cross-view mirrors and stop-sign arms. They also include protective seating, high crush standards and rollover protection features.
- **Protected by the Law:** Laws protect students who are getting off and on a school bus by making it illegal for drivers to pass a school bus while dropping off or picking up passengers, regardless of the direction of approach.

SEAT BELTS ON SCHOOL BUSES

TRAFFIC SAFETY FACTS

SCHOOL-TRANSPORTATION-RELATED CRASHES, MAY 2019 (PDF, 504.5 KB)

Seat belts have been required on passenger cars since 1968; and 49 states and the District of Columbia have enacted laws requiring the use of seat belts in passenger cars and light trucks. There is no question that seat belts play an important role in keeping passengers safe in these vehicles. But school buses are different by design, including a different kind of safety restraint system that works extremely well.

Large school buses are heavier and distribute crash forces differently than passenger cars and light trucks do. Because of these differences, bus passengers experience much less crash force than those in passenger cars, light trucks and vans.

NHTSA decided the best way to provide crash protection to passengers of large school buses is through a concept called “compartmentalization.” This requires that the interior of large buses protect children without them needing to buckle up. Through compartmentalization, children are protected from crashes by strong, closely-spaced seats that have energy-absorbing seat backs.

Small school buses (with a gross vehicle weight rating of 10,000 pounds or less) must be equipped with lap and/or lap/shoulder belts at all designated seating positions. Since the sizes and weights of small school buses are closer to those of passenger cars and trucks, seat belts in those vehicles are necessary to provide occupant protection.

THE TOPIC

Bus Stop Safety

BEST PRACTICES GUIDE

REDUCING THE ILLEGAL PASSING OF SCHOOL BUSES

The greatest risk to your child is not riding a bus, but approaching or leaving one. Before your child goes back to school or starts school for the first time, it’s important for you and your child to know traffic safety rules. Teach your child to follow these practices to make school bus transportation safer.

FOR PARENTS

RELATED TOPIC

PEDESTRIAN SAFETY

Safety Starts at the Bus Stop

Your child should arrive at the bus stop at least five minutes before the bus is scheduled to arrive. Visit the bus stop and show your child where to wait for the bus: at least three giant steps (six feet) away from the curb. Remind your child that the bus stop is not a place to run or play.

Get On and Off Safely

FEDERAL REGISTER

Vol. 78 Monday,
No. 227 November 25, 2013

Part II

Department of Transportation

National Highway Traffic Safety Administration

49 CFR Part 571

Federal Motor Vehicle Safety Standards; Occupant Crash Protection; Final Rule

EXHIBIT 14

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2013–0121]

RIN 2127–AK56

Federal Motor Vehicle Safety Standards; Occupant Crash Protection

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: Completing the first initiative of NHTSA's 2007 ''NHTSA's Approach to Motorcoach Safety'' plan and one of the principal undertakings of DOT's 2009 Motorcoach Safety Action Plan, and fulfilling a statutory mandate of the Motorcoach Enhanced Safety Act of 2012, incorporated into the Moving Ahead for Progress in the 21st Century Act, this final rule amends the Federal motor vehicle safety standard (FMVSS) on occupant crash protection to require lap/shoulder seat belts for each passenger seating position in all new over-the-road buses, and in new buses other than over-the-road buses with a gross vehicle weight rating (GVWR) greater than 11,793 kilograms (kg) (26,000 pounds (lb), with certain exclusions. By requiring the passenger lap/shoulder seat belts, this final rule significantly reduces the risk of fatality and serious injury in frontal crashes and the risk of occupant ejection in rollovers, thus considerably enhancing the safety of these vehicles.

DATES: The effective date of this final rule is November 28, 2016. Optional early compliance is permitted.

Petitions for reconsideration: Petitions for reconsideration of this final rule must be received not later than January 9, 2014.

ADDRESSES: Petitions for reconsideration of this final rule must refer to the docket and notice number set forth above and be submitted to the Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may contact Lawrence Valvo or Louis Molino, NHTSA Office of Crashworthiness Standards, telephone 202–366–1740, fax 202–493–2739. For legal issues: Deirdre Fujita, NHTSA Office of Chief Counsel, telephone 202–366–2992, fax 202–366–3820. The mailing address for these officials is: National Highway Traffic Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building, Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

Completing the first initiative of NHTSA's 2007 ''NHTSA's Approach to Motorcoach Safety'' plan and one of the principal undertakings of DOT's 2009 Motorcoach Safety Action Plan, and fulfilling a statutory mandate of the Motorcoach Enhanced Safety Act of 2012, incorporated into the Moving Ahead for Progress in the 21st Century Act, this final rule amends the Federal motor vehicle safety standard (FMVSS) on occupant crash protection to require lap/shoulder seat belts for each passenger seating position in: (a) All new over-the-road buses; and (b) in new buses other than over-the-road buses, with a gross vehicle weight rating (GVWR) greater than 11,793 kilograms (kg) (26,000 pounds (lb)).[1] The notice of proposed rulemaking preceding this final rule called buses with GVWR greater than 11,793 kg (26,000 lb) ''motorcoaches.'' Although transportation by these buses overall is a safe form of transportation in the U.S., several bus crashes in recent years have illustrated that crashes of these vehicles can cause a significant number of fatal or serious injuries in a single event, due in part to the high occupancy rate of the vehicles, the speed at which they travel, and occupant ejection in rollovers. NHTSA's safety research on seat belts in large buses (greater than 11,793 kg (26,000 lb) GVWR) completed in 2009, shows that the installation of lap/shoulder belts on the vehicles is practicable and effective and could reduce the risk of fatal injuries in rollover crashes by 77 percent, primarily by preventing occupant ejection. Lap/shoulder belts are also highly effective in preventing fatalities and serious injuries in frontal crashes, and will enhance protection in side crashes in the affected buses. By requiring passenger lap/shoulder seat belts on (a) new over-the-road buses, and (b) new buses, other than over the road buses, with a GVWR greater than 11,793 kg (26,000 lb), this final rule significantly reduces the risk of fatality and serious injury in frontal crashes and the risk of occupant ejection in rollovers, thus considerably enhancing the safety of these vehicles.

Table of Contents

I. Executive Summary

One of the guiding principles NHTSA considers in determining the priorities of our rulemaking projects is to protect the public against unreasonable risk of death or injury in high-occupancy vehicles. In 2007, NHTSA published a comprehensive plan to research improvements to bus safety, entitled, ''NHTSA's Approach to Motorcoach Safety.''[2] In the plan, the term ''motorcoach'' referred to intercity transport buses. This plan was developed in direct response to several National Transportation Safety Board

[1] Some buses are excluded from this latter category, such as transit and school buses.

[2] *http://www.regulations.gov/#!documentDetail;D=NHTSA-2007-28793-0001*. See Docket No. NHTSA-2007-28793.

(NTSB) recommendations and also to address several crashes that occurred since the recommendations were issued. NHTSA's plan identified as our highest priorities four specific areas where we can most effectively address open NTSB recommendations in the near-term, and also improve the safety of the buses most expeditiously. The four priority areas were: (1) Passenger ejection; (2) rollover structural integrity; (3) emergency egress; and (4) fire safety.[3]

This final rule addresses the first priority area of the NHTSA plan, to minimize intercity bus passenger and driver ejection by requiring the installation of seat belts for all occupants of: (a) New over-the-road buses;[4] and (b) new buses, other than over-the-road buses, with a GVWR greater than 11,793 kg (26,000 lb).[5] The notice of proposed rulemaking (NPRM) preceding this final rule, published on August 18, 2010 (75 FR 50958), proposed to call buses with a GVWR greater than 11,793 kg (26,000 lb) ''motorcoaches,'' and proposed to apply seat belt requirements to those vehicles.

This final rule fulfills a statutory mandate on motorcoach safety set forth in the ''Moving Ahead for Progress in the 21st Century Act'' (MAP–21), On July 6, 2012, President Obama signed MAP–21, which incorporated the ''Motorcoach Enhanced Safety Act of 2012'' (Motorcoach Enhanced Safety Act) in Subtitle G. Among other matters, the Motorcoach Enhanced Safety Act requires DOT to ''prescribe regulations requiring safety belts to be installed in motorcoaches[6] at each designated seating position'' not later than 1 year after the date of enactment of the Act. We have completed this final rule in furtherance of NHTSA's goal to enhance the safety of all heavy buses used in intercity bus transportation, while attending to the Motorcoach Enhanced Safety Act's focus on over-the-road buses.

This final rule is based on scientific data from an extensive test program completed in 2009 at NHTSA's Vehicle Research and Test Center (VRTC). The program began with a full-scale frontal 48 kilometers per hour (km/h) (30 miles per hour (mph)) barrier crash test of a 54-passenger over-the-road bus. The testing involved instrumented test dummies representing 50th percentile adult males, 5th percentile adult females, and 95th percentile adult males in belted and unbelted seating configurations. The weight of the bus as tested (including test dummies and equipment) was 19,377 kg (42,720 lb), which was less than the GVWR of the bus (~24,500 kg (54,000 lb)).[7] In the crash test, NHTSA analyzed the head accelerations (head injury criterion, (HIC)), neck injury (Nij) values, and other injury criteria measured by the test dummies, the kinematics of the dummies during the crash, and the structural integrity of the seats, floor and bus. Follow-on sled testing was also conducted to evaluate the performance of seat belt systems on motorcoach seats under a range of belted and unbelted conditions, and to evaluate seat anchorage strength testing.

Transportation by buses with a GVWR greater than 11,793 kg (26,000 lb) overall is a safe form of transportation. Data from NHTSA's Fatal Analysis Reporting System (FARS) shows that over the 10-year period between 2000 and 2009, there were 87 fatal crashes of buses covered by this final rule, resulting in 209 fatalities.[8] During this period, on average, 21 fatalities have occurred annually to occupants of these buses in crash and rollover events, with about 4 of these fatalities being drivers and 17 being passengers. However, while transportation on these buses is safe overall, given the typical high occupancy of the subject buses and the intercity operation of many of them at high speeds, when serious crashes do occur, a significant number of fatal or serious injuries can result, particularly when occupants are ejected.

A primary goal of this rulemaking is to reduce occupant ejections occurring in crashes of buses the NPRM identified as ''motorcoaches,'' i.e., buses with a GVWR greater than 11,793 kg (26,000 lb). Data from 2000–2009 FARS show that most fatal crashes of large buses involve buses with a GVWR greater than 11,793 kg (26,000 lb) and most of the fatal crashes involving these buses (55 percent) are rollover crashes. Ejections account for 66 percent of the fatalities in rollover crashes of these buses, 20 percent of the fatalities in non-rollover crashes and 45 percent of all fatalities. The risk of ejection can be reduced by seat belts, a simple and effective countermeasure. Seat belts are estimated to be 77 percent effective[9] in preventing fatal injuries in rollover crashes, primarily by preventing ejection.[10]

Another important goal is to improve passenger crash protection of the buses in crashes generally, particularly frontal crashes. Frontal crashes account for 42 percent of the fatalities involving buses with a GVWR greater than 11,793 kg (26,000 lb). Lap/shoulder[11] belts are estimated to be 29 percent effective in preventing fatal injuries in frontal crashes of the subject buses.[12] The ability of the belts to improve the passenger crash protection of heavy buses was demonstrated in our test program, which found that lap/shoulder belts prevented critical head and neck injury values from being exceeded for belted test dummies. (In contrast, unbelted test dummies and test dummies in lap-only belts measured head and neck injury values surpassing critical thresholds.) We also estimate lap/shoulder belts to be 42 percent effective in preventing side fatalities.[13]

[3] In 2009, DOT issued a Departmental Motorcoach Safety Action Plan, which is described later in this preamble. Today's final rule completes one of the principal rulemakings included in the DOT plan to enhance motorcoach safety. *http://www.fmcsa.dot.gov/documents/safety-security/MotorcoachSafetyActionPlan_finalreport-508.pdf*

[4] An over-the-road bus is a bus characterized by an elevated passenger deck located over a baggage compartment. See section 3038(a)(3) of the Transportation Equity Act for the 21st Century, cited in section 32702(6) of Subtitle G, the Motorcoach Enhanced Safety Act, of MAP–21.

[5] Certain bus types are excepted.

[6] Under the Motorcoach Enhanced Safety Act, ''motorcoach'' means an over-the-road bus, but does not include a bus used in public transportation provided by, or on behalf of, a public transportation agency, or a school bus.

[Footnote added.]

[7] GVWR means the value specified by the manufacturer as the loaded weight of a single vehicle (49 CFR 571.3). Under NHTSA's certification regulation (49 CFR Part 567), the GVWR ''shall not be less than the sum of the unloaded vehicle weight, rated cargo load, and 150 pounds times the number of the vehicle's designated seating positions. However, for school buses the minimum occupant weight allowance shall be 120 pounds per passenger and 150 pounds for the driver.''

[8] These data have been updated from the NPRM.

[9] Estimated based on Kahane, ''Fatality Reduction by Safety Belts for Front-Seat Occupants of Cars and Light Trucks,'' December 2000, Washington, DC, National Highway Traffic Safety Administration.

[10] We estimate that even at a minimum seat belt usage rate of only 6 percent, the rule will remain cost effective for the bus passengers.

[11] FMVSS No. 209, an equipment standard, currently applies to all seat belt assemblies installed in buses. FMVSS No. 209 uses the term ''Type 2 seat belt assembly'' to refer to a lap/shoulder belt system. As defined in that standard, a Type 2 seat belt assembly is ''a combination of pelvic and upper torso restraints.'' In this preamble, we use the term ''lap/shoulder'' belt system rather than ''Type 2 seat belt assembly'' for plain language purposes. Documents may occasionally refer to lap/shoulder belts as 3-point belts. Under FMVSS No. 209, a ''Type 1'' seat belt assembly is ''a lap belt for pelvic restraint.'' This preamble refers to Type 1 belts as ''lap-only belts.''

[12] This is discussed in NHTSA's Final Regulatory Impact Analysis (FRIA) that discusses issues relating to the estimated costs, benefits and other impacts of this regulatory action. The FRIA is available in the docket for this final rule and may be obtained by downloading it or by contacting Docket Management at the address or telephone number provided at the beginning of this document.)

[13] Estimated based on Morgan, ''Effectiveness of Lap/Shoulder Belts in the Back Outboard Seating Positions,'' June 1999, Washington, DC, National Highway Traffic Safety Administration. See FRIA.

Accordingly, to reduce the likelihood of occupant ejection and to improve occupant protection in all crashes, particularly frontal crashes, this final rule amends FMVSS No. 208, ''Occupant crash protection'' (49 CFR 571.208), under NHTSA's rulemaking authority set forth in the National Traffic and Motor Vehicle Safety Act (''Vehicle Safety Act'') (49 U.S.C. 30101 et seq.) and the Motorcoach Enhanced Safety Act. The standard is amended to:

- Require a lap/shoulder belt at all designated seating positions on all over-the-road buses,[14] including over-the-road buses used in public transportation,[15] but excluding school buses.
- For buses other than over-the-road buses, this final rule requires a lap/shoulder belt at all passenger seating positions on new buses with a GVWR greater than 11,793 kg (26,000 lb), except for certain excluded bus types.[16] (For buses other than over-the-road buses, we permit side-facing seats to be equipped with a lap belt, for reasons discussed later in this document.)
- Require a lap/shoulder belt at the driver's seating position on subject buses.[17]
- Require the lap/shoulder belt system for passenger seats to meet provisions for seat belt adjustment and fit, so that the seat belts can accommodate children as well as large (95th-percentile) adult males, be lockable for use with a child restraint system, and be releasable at a single point and by a pushbutton action.
- Require the seat belt anchorages, both torso and lap, on passenger seats to be integrated into the seat structure, so as not to impede emergency egress.

The ''performance requirement'' for the lap/shoulder seat belts is the FMVSS No. 210 strength requirement, measured in a static ''pull'' test. The seat belt assembly anchorages must meet the following FMVSS No. 210 requirement:

- Withstand a force of 13,345 Newtons (N) (3,000 lb) applied to the lap portion and a force of 13,345 N (3,000 lb) applied simultaneously to the torso portion of the seat belt assembly.

This final rule does not adopt a ''motorcoach'' definition. Comments responding to the NPRM expressed some confusion and disagreement over attaching the name of ''motorcoach'' to buses that may not have been widely thought of as motorcoaches in the past. In addition, the Motorcoach Enhanced Safety Act uses the term ''motorcoach'' differently than the NPRM. After considering these factors, we have determined that it is unnecessary to define the term ''motorcoach'' to accomplish the objective of this rulemaking. To avoid potential confusion over use of the term, and since the term is unnecessary, we have decided not to use the term ''motorcoach'' to describe the applicability of the lap/shoulder seat belt requirements. Instead, we have decided to simply amend FMVSS No. 208 such that the provisions of FMVSS Nos. 208 and 210 relevant to lap/shoulder belt and anchorages, respectively, are applied to (a) all over-the-road buses, and to (b) non-over-the-road buses with a GVWR greater than 11,793 kg (26,000 lb), excepting the few bus types.

We estimate that installing lap/shoulder seat belts on new subject buses will save approximately 1.7 to 9.2 lives and prevent 146 to 858 injuries per year (3.46–25.17 equivalent lives), depending on the usage of lap/shoulder belts in the buses (see Table 1 below).[18] The cost of installing lap/shoulder belts on new buses is estimated as follows (see Table 2 below). The incremental cost of adding a shoulder belt to the already required lap belt for drivers is estimated to be $18.86. With about 60 percent of the driver seating positions already equipped with lap/shoulder belts, the average bus cost will increase by $7.54. For the driver position, the total cost to the fleet of adding a shoulder belt to the driver seat for 40 percent of covered buses will add an additional $16,597 ($18.86 × 2,200 × .4).

The incremental cost of adding lap/shoulder belts and to change the seat anchorages for a two passenger seat is $78.14 or $39.07 per seating position. On a 54-passenger bus the cost for the passenger seats is $2,110 ($39.07 × 54). The total cost of adding lap/shoulder belts to all new 54-passenger buses is about $4.4 million ($2,110 × 2,100). The cutaway buses have seats for an average of 45 passengers. The incremental cost of adding lap/shoulder belts on a 45-passenger cutaway bus with two passengers per seat is $1,758 ($39.07 × 45). The total cost of adding passenger lap/shoulder belts to all new cutaway covered buses is about $0.2 million ($1,758.15 × 100). Thus, the total cost for all covered bus passenger positions is about $4.6 million. The total cost of adding lap/shoulder belts for passengers and shoulder belts to 40 percent of the driver's seats is $4.6 million ($4,606,353 + $25,238).

The agency has also estimated increased costs in fuel usage. The increased fuel costs depend on added weight (estimated to be 161 lb[19]) and the discount rate used. NHTSA estimates the increased costs in fuel usage for added weight and discounts the additional fuel used over the lifetime of the bus using a 3 percent and 7 percent discount rate. See the FRIA for more details.

The cost per equivalent life saved is estimated to be $0.3 million to $1.8 million (see Table 3 below). Annualized costs and benefits are provided in Table 4.

TABLE 1—ESTIMATED BENEFITS

Fatalities	1.7 to 9.2.
AIS 1 injuries (Minor)	89 to 536.
AIS 2–5 (Moderate to Severe)	57 to 322.
Total Non-fatal Injuries	146 to 858.

[14] There is no lower GVWR bound on the definition of over-the-road bus used in the Motorcoach Enhanced Safety Act and none adopted by this final rule for such buses. Nonetheless, as a practical matter, NHTSA is not aware of any bus meeting the over-the-road bus definition with a GVWR of less than 4,536 kg (10,000 lb).

[15] We are mindful that the Motorcoach Enhanced Safety Act excludes a bus used in public transportation provided by, or on behalf of, a public transportation agency from the meaning of ''motorcoach.'' However, as discussed in the NPRM and in this final rule, we are applying the final rule to over-the-road buses used for public transportation based on determinations we have made pursuant to NHTSA's Vehicle Safety Act authority, 49 U.S.C. 30111, which has existed and continues to exist prior to and separate from the Motorcoach Enhanced Safety Act provisions.

[16] The exceptions are transit buses, school buses, ''prison buses'' (buses manufactured for the purpose of transporting persons subject to involuntary restraint or confinement), and ''perimeter-seating buses'' (which the NPRM had referred to as buses with fewer than two rows of forward-facing seats. As explained in a later section of this preamble, we have decided it would be simpler to define a perimeter-seating bus by reference to the number of forward-facing seats it has than the number of rows it has. Note that, as a result of the Motorcoach Enhanced Safety Act, only buses other than over-the-road buses (which we sometimes refer to as ''non-over-the-road buses'') can be included in this excepted category of a perimeter-seating bus.

[17] The buses are all over-the-road buses, and non-over-the road buses with a GVWR greater than 11,793 kg (26,000 lb), except transit buses and perimeter-seating buses. This final rule also requires a lap/shoulder belt at the driver's seating position on school buses with a GVWR greater than 4,536 kg (10,000 lb).

[18] See FRIA for this final rule. The FRIA assumes that the seat belt use rate on buses regulated by today's rule will be between 15 percent and the percent use in passenger vehicles, which was 83 percent in 2008. These annual benefits accrue when all subject buses in the fleet have lap/shoulder belts.

[19] See FRIA for this final rule. This estimate is based on results from a NHTSA contractor conducting cost/weight teardown studies of motorcoach seats. The weight added by lap/shoulder belts was 5.96 per 2-person seat. This is the weight only of the seat belt assembly itself and does not include changing the design of the seat, reinforcing the floor, walls or other areas of the motorcoach.

TABLE 2—ESTIMATED COSTS
[2008 Economics]

	Per average vehicle	Total fleet ($millions)
Bus Driver	$7.54	$0.02
Bus Passenger	2,094	4.6
Fuel Costs @3%	1,077	2.4
Fuel Costs @7%	794	1.7
New Vehicle and Fuel Costs		
@3%	3,178	7.0
@7%	2,895	6.4

TABLE 3—COST PER EQUIVALENT LIFE SAVED

Cost per equivalent life saved	
50% Belt use for drivers and 15% Belt usage for passengers	$1.5 to $1.8 mill.
83% Belt usage for drivers and passengers	$0.3 to $0.43 mill.
Breakeven Point in passenger belt usage	4 to 5%.

TABLE 4—ANNUALIZED COSTS AND BENEFITS
[In millions of $2008 Dollars]

	Annualized costs	Annualized benefits	Net benefits
3% Discount Rate	$7.0	$28.5—158.6	$21.5 to 151.6.
7% Discount Rate	$6.4	$21.8—121.1	$15.4 to 114.7.

We have assessed the feasibility, benefits, and costs with respect to the application of the seat belt requirements to buses manufactured before the date on which this final rule applies to new vehicles. Based on that assessment, we have decided not to require retrofitting of used buses with seat belts. To learn more about retrofitting, the NPRM requested comment on issues concerning the structural viability of used buses to accommodate seat belts and the crash forces from belted passengers, the reinforcement needed to the bus structure to accommodate the loads, and the cost of retrofitting. Our hypothesis at the time of the NPRM was that the cost of and engineering expertise needed for a retrofitting operation would be beyond the means of bus owners (for-hire operators), many of which are small businesses.[20] The comments on the retrofit issue supported a finding that the impacts would be unreasonable. After considering the low likelihood that a retrofit requirement would be technically practicable at a reasonable cost, the cost impacts on small businesses, and the low benefits that would accrue from a retrofit requirement we have decided not to pursue a retrofit requirement for seat belts. (See FRIA discussion of cost/benefit of retrofit).

II. NHTSA's Statutory Authority

a. National Traffic and Motor Vehicle Safety Act

This final rule is issued under the National Traffic and Motor Vehicle Safety Act (''Vehicle Safety Act'') (49 U.S.C. 30101 *et seq.*). Under the Vehicle Safety Act, the Secretary of Transportation is responsible for prescribing motor vehicle safety standards that are practicable, meet the need for motor vehicle safety, and are stated in objective terms.[21] ''Motor vehicle safety'' is defined in the Vehicle Safety Act as ''the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle.'' [22] ''Motor vehicle safety standard'' means a minimum performance standard for motor vehicles or motor vehicle equipment.[23] When prescribing such standards, the Secretary must consider all relevant, available motor vehicle safety information, and consider whether a standard is reasonable, practicable, and appropriate for the types of motor vehicles or motor vehicle equipment for which it is prescribed.[24] The Secretary must also consider the extent to which the standard will further the statutory purpose of reducing traffic accidents and associated deaths and injuries.[25] The responsibility for promulgation of

[20] The agency estimated in the NPRM that the service life of a motorcoach can be 20 years or longer. We estimated that the cost of retrofitting can vary substantially. To retrofit a vehicle with lap belts, we estimated it could cost between $6,000 (assuming that the motorcoach structure is lap belt-ready, and can accommodate the loads set forth in the NPRM) to $34,000 per vehicle to retrofit the vehicle with the lap belts and with sufficient structure to meet the NPRM's requirements. To retrofit it with lap/shoulder belts and reinforced structure so as to meet FMVSS No. 210 to support the loads during a crash, we estimated it could cost $40,000 per vehicle. The existing fleet size was estimated to be 29,325 motorcoaches. Hence, the fleet cost of retrofitting lap belts was estimated to range from $175,950,000 ($6,000 × 29,325) to $997,050,000 ($34,000 × 29,325), while the fleet cost of retrofitting lap/shoulder belts was estimated to be $1,173,000,000 ($40,000 × 29,325). These costs did not include increased remaining lifetime fuel costs incurred by adding structural weight to the motorcoach. Later in the analysis we examine a range of costs and include the lifetime fuel costs for the weight of the belts themselves. Weight would vary depending upon the needed structural changes, and lifetime fuel cost would vary depending upon the age of motorcoaches that would be retrofitted.

[21] 49 U.S.C. 30111(a).

[22] 49 U.S.C. 30102(a)(8).

[23] 49 U.S.C. 30102(a)(9).

[24] 49 U.S.C. 30111(b).

[25] Id.

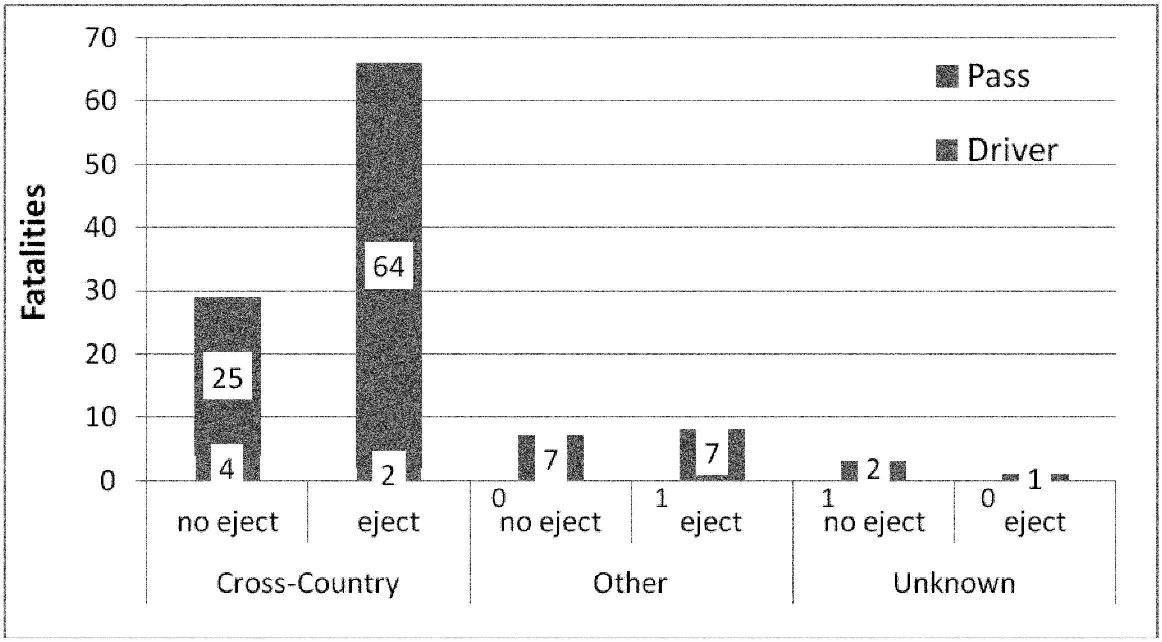

Figure 3. Number of rollover fatalities in cross-country, other, and unknown buses with a GVWR > 11,793 kg (26,000 lb) except for transit and school buses (among drivers and passengers by ejection status and bus body type) (2000-2009 FARS data)

Figure 4 shows ejection status as related to the occurrence of rollovers of the covered buses. For non-rollover crashes there were 95 fatalities, or 45.5 percent (95/209) of the total. In non-rollover crashes only 20.0 percent (19/95) of the 95 fatalities were ejected. Considering all crash types, fatalities were split nearly equally between ejected (45.0 percent (94/209)) and non-ejected (55.0 percent (115/209)).

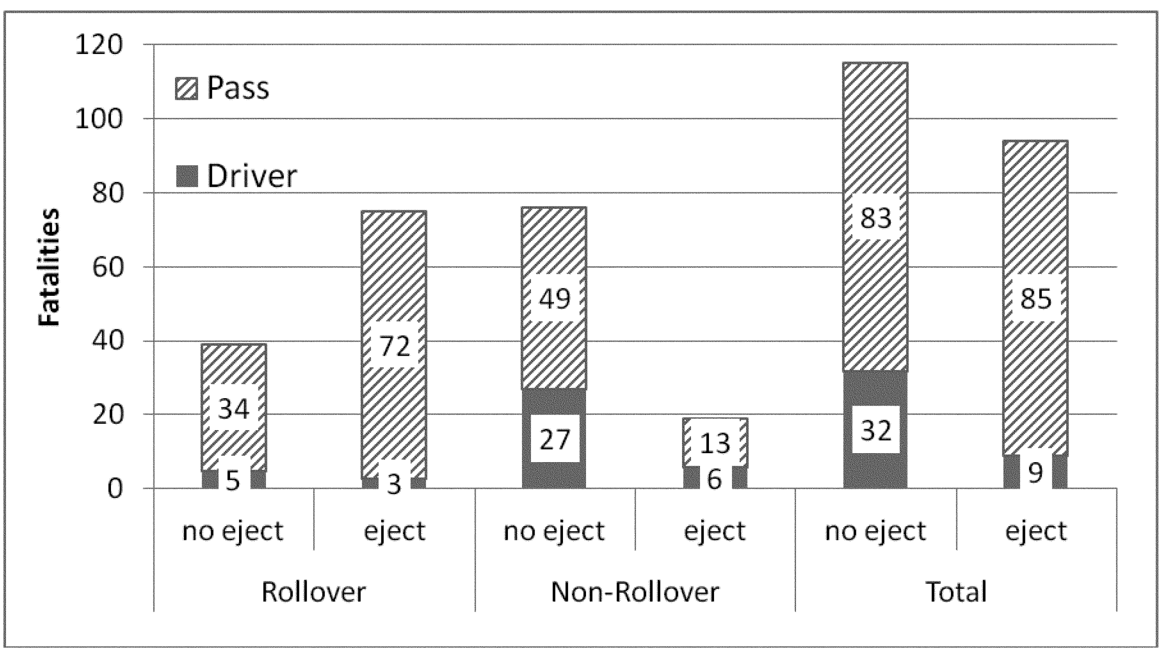

Figure 4 – Fatalities by ejection status and rollover occurrence, in cross-country, other and unknown bus body types with a GVWR > 11,793 kg (26,000 lb)); FARS 2000-2009

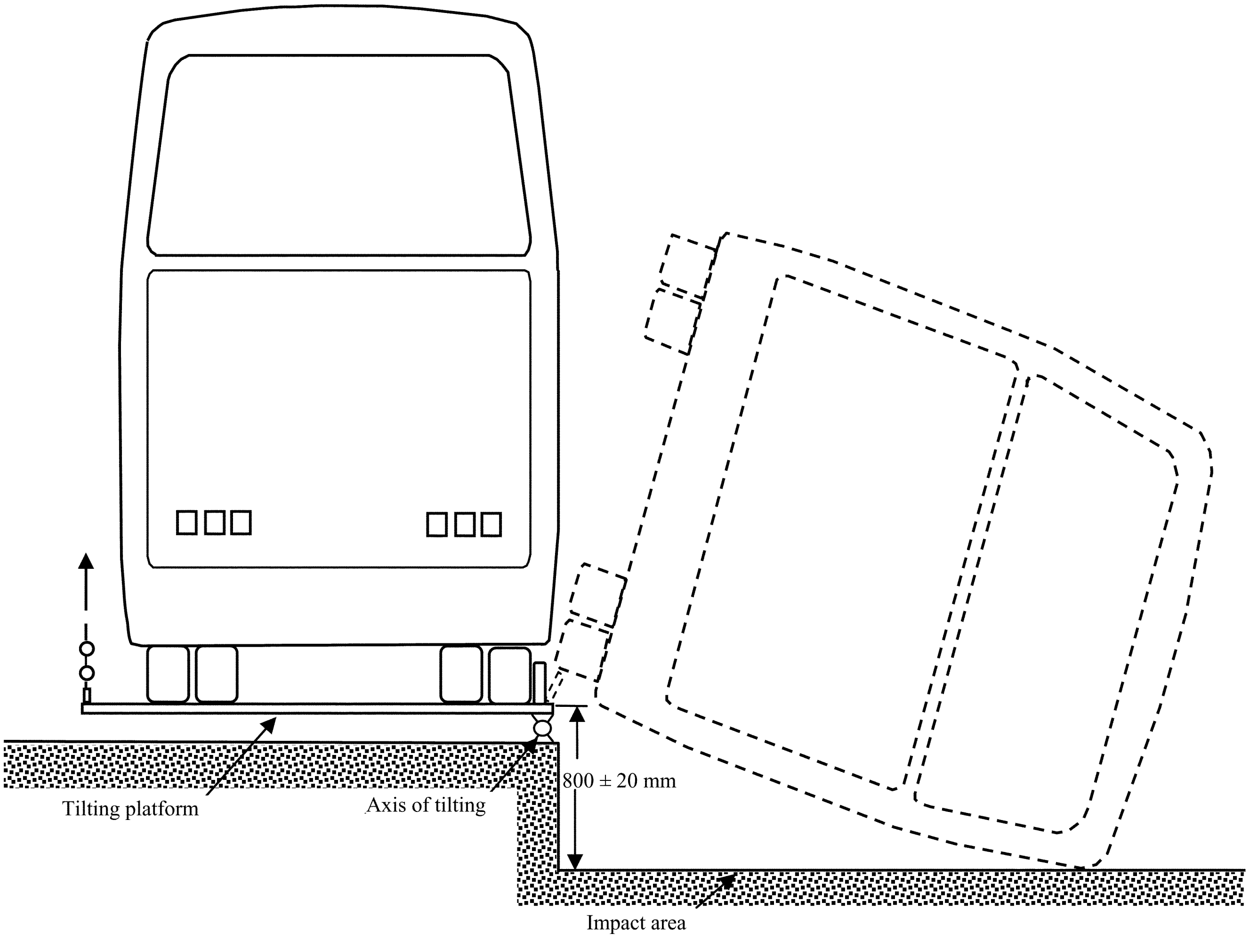

Figure 5: Bus on Tilting Platform

In three tests we conducted, fully-instrumented Hybrid III 50th percentile adult male test dummies were positioned in aisle seats opposite the impact side, with one dummy unrestrained and the other restrained by a seat-integrated lap/shoulder belt. In all three tests, the restrained dummies remained secured to the seat and produced injury values significantly below FMVSS No. 208 Injury Assessment Reference Values (IARVs) for the Hybrid III 50th percentile adult male test dummy. In contrast, the unrestrained dummies fell head first across the occupant compartment and struck the bottom of the luggage compartment and/or the side windows, which produced injury values well above the IARVs in two of the tests. Injury values for the restrained dummies never exceeded 40 percent [90] of the IARV, while the injury values for the unrestrained dummies reached levels up to 590 percent of the IARVs. Alarmingly too, the final resting position of the unrestrained dummy in all three tests was on the impact side window, which has been the most common ejection portal in real-world rollovers.

In response to PRC, these rollover test data and the data from the full-scale barrier crash test support our finding that shielding the motorcoach passenger between seat backs is not enough to prevent ejection from the area between the seats or from the vehicle. Lap/shoulder seat belts are needed on these vehicles. In response to MCI, we will not postpone this final rule until further research is done. The technical basis supporting this rule is robust and known now.

The testing has also demonstrated that installing lap/shoulder seat belts in motorcoaches is practicable. Today, lap/shoulder belts integral to the vehicle seat are offered on many new motorcoaches. The lap/shoulder seat belt/seating systems are readily available from seat suppliers and can be installed by the vehicle manufacturer. Some seat suppliers offer to help provide the engineering analyses bus manufacturers can use to certify compliance with Federal motor vehicle safety standards.[91]

We will not agree to allow lap/shoulder seat belts to be installed at the manufacturer's or purchaser's discretion. The benefits of lap/shoulder belts are realized in all crash modes and will have a significant impact on safety in the deadliest of crashes, rollovers and frontal impacts. When the agency has made a determination to issue an FMVSS to meet a safety need, the benefit of the FMVSS are applied to all travelers equally and are not made optional. Moreover, in this case it would be an unjust policy that provides no choice to the persons who would be

[90] The restrained dummy that produced an injury value of 40 percent of the IARV was positioned in a seat that detached from the vehicle during the impact due to displacement of the side wall and rolled across the occupant compartment. This seat was installed by the agency to gauge lap/shoulder belt effectiveness and was not an original equipment seat. Injury values for restrained dummies where the seat remained attached to the vehicle did not exceed 12 percent of the IARV.

[91] *http://www.cewhite.com/testing-lab* [Last accessed February 28, 2012.]

protected by the lap/shoulder seat belts—the passengers—as to whether the lap/shoulder belts will be provided in the buses in which they ride. For over-the-road buses, the Motorcoach Enhanced Safety Act requires these buses to have lap/shoulder belts.

In 2007, the majority of the motorcoach trips (65 percent) were made by children and senior citizens.[92] This final rule protects these vulnerable populations, as it protects all persons.

Although fatal crashes of the covered vehicles occur infrequently, the crashes can affect the public's confidence in the safety of motorcoach transportation. Then-NTSB Acting Chairman and board member Mark V. Rosenker noted: ''[M]otorcoach travel is also one of the safest modes of transportation, but when accidents and fatalities do occur, the public's perception of the safety of motorcoach travel can be badly damaged, and once they perceive something as being unsafe it is very hard to change their minds.'' [93] Mr. Rosenker observed: ''[W]hen tragedies occur they attract a huge amount of media attention, and as a result, the potential exists for the public to lose confidence in our transportation systems.'' In its comments on the NPRM, the United Motorcoach Association stated: ''Maintaining the confidence of consumers is of critical importance to the motorcoach industry.''

Today's final rule will help sustain public confidence in the safety of the covered vehicles. Today's final rule is a first step toward a time when news of a serious crash of a subject bus is not associated with a catastrophic number of fatal and serious injuries. As consumers become familiar with lap/shoulder seat belts on the covered buses and more aware of the protection they provide, we expect not only use rates to increase, but public confidence in the safety of the affected buses to be bolstered as well.

A number of private transportation providers asked who will enforce a seat belt use requirement and what type of violations will be cited to the carrier if passengers are found not wearing their seat belts. Arrow Coach Lines suggested that the states should consider adopting mandatory seat belt use laws on buses equipped with seat belts, but also suggested that enforcement will be a problem since police officers cannot see inside a bus while it is traveling on a highway. American Bus Association recommended that this rulemaking be followed and supported by a strong DOT effort to encourage motorcoach seat belt use, including incentives or sanctions to states to enforce seat belt use rules and the DOT should support such efforts in reauthorization.

Regarding requirements that drivers should instruct passengers on seat belt use, it is correct that such requirements are outside of NHTSA's regulatory authority.[94] United Motorcoach Association suggested that FMCSA should revise their guidance for pre-trip announcements and/or instructions to include reminders and directions for passengers regarding the use of seat belts. DOT and FMCSA are aware of and are considering these comments concerning the drivers' role in instructing passengers to use their seat belts. DOT, FMCSA and NHTSA are continuing work on the Departmental plan on motorcoach safety and are considering the next steps that could be taken to increase passenger use of the seat belts.

We recognize that seat belt use rates could be low at first, possibly because the belts may seem strange and unfamiliar in the bus. However, we also believe passengers' attitudes about using seat belts can change, just as public opinion changed on using seat belts in passenger vehicles and on restraining children in child safety seats. In 1994 passenger vehicle seat belt use rate was 58 percent. The 2010 data show the highest ever passenger vehicle seat belt use rate at 84 percent.[95] Mandatory seat belt use laws and child safety seat laws no doubt had a role in changing attitudes, but we believe that attitudes also changed when people became more aware of the safety benefits provided by the safety equipment. We believe that, as more and more covered buses are manufactured with lap/shoulder seat belts, the public's familiarity with and awareness of the safety benefits of the lap/shoulder belts on these buses will grow, and with that, seat belt use rates will too.

Even today, we believe that lap/shoulder seat belts in covered buses are cost effective with just a usage rate of only 4 to 5 percent. It is only if the belts are available that passengers will have the opportunity, the choice, to take the step to use them.

Some transportation providers expressed concerns about having to pay more for buses with seat belts, and the depressing of business because of cost being passed on to passengers. A few said that the resale value of its used buses will be substantially reduced and that, since sale of the used buses helps fund the purchase of new buses, some will not be able to purchase new motorcoaches within a normal 12-year cycle.

We have weighed these matters in our decision-making. The incremental cost of this final rule will be relatively small. The agency estimates that the highest annualized cost due to this rule, including fuel cost, is $7.0 million. According to the 2008 Motorcoach Census,[96] in 2007 there were 751 million trips taken on motorcoaches in the U.S. and Canada. If the increase in price of a motorcoach were distributed among these trips, it would account to a one cent increase in the price of a ticket.

As far as the claimed decrease in the resale price of motorcoaches, secondary and tertiary effects of safety regulations are highly speculative and are not typically attributed to the cost of a rule. Even if we were to assess these effects, the commenters did not provide information enabling us to assess or substantiate these claims.

We note that the commenters depict a scenario in which any change to the FMVSSs that requires a new or improved safety feature will have the effect of reducing the resale value of the used vehicles that do not have the safety feature. We note further that this scenario would apply to all vehicles, not just motorcoaches. A person selling a used car that does not have, for example, side impact air bags, competes against a person selling a used car that does. It would be unreasonable for NHTSA not to adopt an FMVSS that requires a new safety device or upgrades to an existing safety feature because the effect of the amendment would lower the demand for some used vehicles. We note also that the demand for vehicles that have the safety feature (e.g., passenger lap/shoulder seat belts on buses) has the positive effect of possibly expediting the transition to lap/shoulder seat belt-equipped buses in the fleet.

Arrow Coach Lines commented that the costs associated with maintenance and upkeep of passenger seat belts in

[92] In 2007, the majority of the motorcoach trips (65 percent) were made by children and senior citizens. ''Motorcoach Census 2008, A Benchmarking Study of the Size and Activity of the Motorcoach Industry in the United States and Canada in 2007.'' Paul Bourquin, Economist and Industry Analyst, December 18, 2008.

[93] Remarks of Mark V. Rosenker, Acting Chairman NTSB, before the Greater New Jersey Motorcoach Association, June 3, 2009, *http://www.ntsb.gov/news/speeches/rosenker/mvr090603.html* [last accessed February 3, 2012]

[94] Similarly, a few commenters asked about the use of seat belts at wheelchair positions. This final rule does not require the use of seat belts by any passenger.

[95] DOT HS 811 378. Traffic Safety Facts Research Note: Seat Belt Use in 2010—Overall Results, September 2010. *www-nrd.nhtsa.dot.gov/Pubs/811378.pdf.*

[96] *Id.*

the covered buses were not discussed in the NPRM, and stated that seat belts will be a ''maintenance nightmare.'' Trans-Bridge Lines stated that it has had seat belts cut, tied into knots, and intentionally broken in their seat belt-equipped buses, which has added additional expenses for their company to inspect, maintain, and repair the seat belts.

In response, we first want to be clear that there is no requirement in the final rule that applies to the operators, such as a maintenance requirement. Second, we do not believe that the costs of maintaining the belts, if any, will be impactful. The commenters did not provide any data on this cost. The agency does not have reason to believe that this work will need to be done more than incidentally or that it will amount to a real cost, attributable to the cost of the rule. Belt maintenance work is not generally recognized as a necessity or as subject to a schedule (unlike safety systems such as tires, where it is generally recognized that the average tire lasts 45,000 miles). Further, we expect that the cost of maintaining the belts, if any, to be very small in comparison to the cost of upgrading the buses with seat belts. In response to a commenter, the assertion that non-seat belt related safety items may suffer in some bus garages due to the rule because the time required to maintain belts may come at the expense of checking other safety items is speculative and we cannot give credence to it without some kind of substantiation of this serious claim.

Three private transportation providers expressed concern over the impact on liability and insurance costs for their non-seat belt equipped motorcoaches if passenger seat belts are installed in new motorcoaches. Vandalia Bus Lines asked how it will market the current fleets without seat belts, and how will insurance companies handle the operators who do not install seat belts because of retrofit costs.

On the issue of liability and private insurance costs to operators of existing non-seat belt equipped motorcoaches, the commenters did not provide any estimate of the potential increase in operating costs. The assertions about these effects are highly speculative, and have not been substantiated or quantified by the commenters. Further, the assertions are at most related to the cost of doing business and not to the cost of the rule. We also believe that, to the extent commenters are arguing against adoption of the NPRM, it would be unreasonable for NHTSA not to adopt an FMVSS that establishes new safety requirements or upgrades an existing safety feature because of assertions about the effect of the amendment on liability and insurance costs associated with operating used vehicles that do not meet the new or upgraded standard.

Other DOT Initiatives

Some motorcoach transportation providers suggested that NHTSA direct regulations towards areas other than seat belts, such as improving vehicle fire resistance, reducing driver inattention and detecting fatigue, and adding passive safety elements such as increased roof strength, improved emergency exits, and seat padding.

This regulation mandating the installation of lap/shoulder belts on over-the-road buses is required by the Motorcoach Enhanced Safety Act. At the same time, many of the alternatives to a lap/shoulder seat belt requirement suggested by various motorcoach operators, such as improving fire resistance, increasing structural integrity, and reducing driver fatigue and inattention, are being explored by DOT as outlined in the Motorcoach Safety Action Plan, and in furtherance of provisions in the Motorcoach Enhanced Safety Act regarding research and rulemaking. However, these actions will be complementary to, not a replacement for, this action on seat belts. Motorcoach crashes are not exclusive to a particular type of enterprise or driver. DOT is taking all reasonable efforts to improve the crashworthiness and crashavoidance characteristics of the vehicles; we have determined that providing passengers lap/shoulder seat belts will amount to an unprecedented enhancement of motorcoach safety.

With regard to other DOT initiatives, FMCSA notes that, although the amendments to FMVSS Nos. 208 and 210 are not applicable to new buses built for sale and use in Canada, FMCSA is developing a rulemaking to cross-reference the new FMVSS requirements, the effect of which would be to require motor carriers operating in the U.S. to have seat belts on the buses. FMCSA explains that it has traditionally held all motor carriers operating in the U.S. to the same safety requirements via 49 CFR Part 393, ''Parts and Accessories Necessary for Safe Operation,'' and that the FMCSA rulemaking would apply to Canada-domiciled bus operators traveling into the U.S. Thus, FMCSA states, in the event FMCSA adopts a rule to require carriers to maintain the seat belts, those requirements may be applied to Canada- and Mexico-domiciled carriers operating buses manufactured on or after the compliance date included in the NHTSA rule.

In summary, for the above reasons, NHTSA has deemed unreasonable the present occupant fatality risk in buses with a GVWR greater than 11,793 kg (26,000 lb), given the risk of fatality and serious injury in rollover and frontal crashes, and the proven protection afforded by lap/shoulder seat belts, an available and relatively inexpensive countermeasure. NHTSA has issued today's final rule to reduce that risk, and to fulfill the statutory mandate of section 32703(a) of the Motorcoach Enhanced Safety Act of 2012.

X. Type of Belt System on Forward-Facing Seats

The NPRM proposed to require lap/shoulder belts for forward-facing passenger seating positions, and not lap belts.

Comments

1. Van Hool and Setra requested that lap or lap/shoulder belts that meet the European regulations be allowed as an alternative to the proposed requirements.

2. Blue Bird said that it manufactures non-school buses with a GVWR greater than 11,793 kg (26,000 lb). The buses meet the Federal school bus safety standard for roof crush (FMVSS No. 220, ''School bus rollover protection'') and have seats that meet the Federal school bus standard for passenger crash protection (FMVSS No. 222, ''School bus passenger seating and crash protection''). Blue Bird requested that we allow buses that meet FMVSS No. 220 and that have passenger seats meeting FMVSS No. 222 to have lap-only belts instead of lap/shoulder belts.

3. Prevost, a coach manufacturer,[97] requested that lap-only belts be allowed at any seat where the occupant is not at risk of striking its head.

Agency Response

The Motorcoach Enhanced Safety Act directs NHTSA to ''prescribe regulations requiring safety belts to be installed in motorcoaches at each designed seating position.'' ''Safety belts'' mean lap/shoulder belts (see section 32702(12) of the Act). Consistent with the Motorcoach Enhanced Safety Act, this final rule requires lap/shoulder belts at each designated seating position in over-the-road buses, regardless of the direction the seat faces.

For buses other than over-the-road buses, this final rule requires lap/shoulder belts at each passenger

[97] Prevost is a division of Volvo Group Canada Inc.

designated seating position, except side-facing seats may be equipped with a lap belt instead of a lap/shoulder belt. We respond to the comments as follows.

1. We decline to allow the option of lap-only belts at forward-facing passenger seating positions on the buses, even lap belts that meet European regulations (ECE R.14 and ECE R.80 are discussed in section XVI of this preamble) and even if the seats meet some of the requirements of FMVSS No. 222.

Our decision is based on the results of NHTSA's test program conducted as part of the agency's 2007 ''NHTSA's Approach to Motorcoach Safety'' plan. These tests found that lap/shoulder belts in forward-facing seats prevented elevated head and neck injury values and provided enhanced occupant protection compared to lap belts.

In the VRTC full-scale over-the-road bus crash, the lap/shoulder-belted dummies exhibited the lowest injury measures and improved kinematics, with low head and neck injury measures and little movement outside the area between seats, compared to the lap-belted dummies and unbelted dummies.

In the VRTC sled tests of lap/shoulder-belted dummies—

- Average HIC and Nij values were low for all dummy sizes and below those seen in unbelted and lap-belted sled tests. This was consistent with the lap/shoulder belt results from the full scale crash test.
- Lap/shoulder belts retained the dummies in their seating positions and were able to mitigate head contact with the seat in front.
- When lap/shoulder-belted dummies were subject to loading (of their seats) by an aft unbelted dummy, there was additional forward excursion of the lap/shoulder-belted dummies, but the resulting average head injury measures were still relatively low in most cases, even in cases when the head contacted the seat in front.
- Lap/shoulder-belted dummies were better restrained in the oblique sled tests, conducted at a 15-degree angle, than lap-belted dummies. They had lower injury measures and were retained in their seats.

In contrast to the lap/shoulder-belted dummies, the results for lap only dummies showed—

- HIC and Nij measures exceeded the IARVs for virtually all the dummies tested (there was a 50th percentile male dummy which measured a HIC of 696 (99 percent of the IARV limit)).
- The poor performance of the lap belt restraint in the sled tests was consistent with the lap belt results from the full scale motorcoach crash test.

2. Blue Bird requested that the final rule allow the option of lap-only belts at forward-facing passenger seating positions on buses that meet FMVSS No. 220 and FMVSS No. 222. Our reasons to decline to allow the option of lap-only belts at forward-facing passenger seating positions are explained above. Further, if the passenger seats on the bus did not meet FMVSS No. 222's seat spacing requirements, then lap belts alone may not provide a sufficient level of occupant protection on the buses. This is because the compartmentalization protection offered by FMVSS No. 222 is not simply predicated on the physical characteristics of the seat, but also the limited seat spacing. This limited spacing serves to control the occupant velocity such that impacting the forward seat back is less injurious.

3. We decline Prevost's suggestion to allow lap-only belts at any seat where the occupant is not at risk of striking its head. Considering that the highest accelerations in motorcoach crashes are typically produced during frontal or rear impacts, and these accelerations are predominantly in the longitudinal direction, lap/shoulder belts will provide the best protection for non-side facing occupants in all forward-facing seats, even for seats that are in a ''clear'' area (no chance of head impact). NHTSA crash and sled testing of motorcoaches and motorcoach seats clearly showed the superior protection offered by lap/shoulder belt as compared to lap belts for forward-facing occupants. Lap/shoulder belts are superior to lap belts in a frontal crash because they provide more surface area for an occupant's body to react with during a crash when compared to lap-only belts, and the forces are spread over the pelvis and torso (with lap/shoulder belts) rather than the pelvis alone (as with lap-only belts).

XI. Integrated Anchorages

We proposed that the lap/shoulder seat belt anchorages, both torso and lap, be required to be integrated into the seat structure for passenger seats, except for the belt anchorages in the last row of the coach (if there is no wheelchair position or side emergency door behind these seats) and in the driver seating position. We proposed integral lap/shoulder belts on the buses to ensure that seat belts for inboard seat positions, in particular, are not mounted such that the belt webbing could impede safe passage through the bus interior during emergency egress. This provision is consistent with a 2010 amendment adopted regarding passenger crash protection on small school buses and optionally provided seat belts on large school buses (FMVSS No. 222).

The last row was proposed to be excluded from the requirement because the location and style of the last row seats in motorcoaches make it possible to place belt anchorages behind or to the side of the seat, where the belt webbing would not impede safe travel in and out of the seat.[98]

We proposed excluding the driver's seating position from the requirement because the driver's compartment is usually separated from the passenger compartment by a bulkhead or partition and passengers are less likely to be entangled in the driver's belt system during egress.

Comments

All persons commenting on this issue were generally supportive of the requirement.

C.E. White stated that the driver lap/shoulder belt should be integrated into the seat frame and it should include an adjustable shoulder height mechanism.

American Seating recommended that seat integrated anchorages not be made a requirement for side-facing seats. American Seating argued that side-facing seats should be excluded for the same reason as the last row of seats since non-integrated seat belts at these positions would not impede occupant egress.

Response

We do not agree that the driver position seat belts should be integral to the seat. As stated in the NPRM, the reason for requiring passenger seats to have integrated lap/shoulder seat belts is to ''ensure that seat belts for inboard seat positions, in particular, are not mounted such that the belt webbing could impede safe passage through the bus interior during emergency egress.'' We do not find there to be a similar need for the driver position. The driver seating position was originally excluded in the NPRM from such a requirement because the driver compartment is usually separated from the passenger compartment by a bulkhead or partition. The driver's shoulder belt anchorage can be attached to the seat structure, side wall, or bulkhead without increasing risk of entanglement of the driver or passengers during egress. Though there may be a comfort advantage for integrating seat belt

[98] However, we proposed that if the seat plan has a wheelchair position located behind the rearmost passenger seat, or a side emergency door rearward of it, the rearmost passenger seat must have its seat belt assembly anchorages attached to the seat structure to reduce the risk of tripping, entanglement, or injury.

consideration of the following questions:

- Have we organized the material to suit the public's needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that isn't clear?
- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make the rule easier to understand?

If you have any responses to these questions, please write us.

Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

Privacy Act

Anyone is able to search the electronic form of all submissions to any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78).

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, and Tires.

In consideration of the foregoing, NHTSA amends 49 CFR part 571 as set forth below.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

■ 1. The authority citation for Part 571 is amended to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.95.

■ 2. Section 571.208 is amended by revising S4.4, S4.5.5.1(a) and S4.5.5.1(b), the introductory text of S4.5.5.2(a), the introductory text of S4.5.5.2(b), and the introductory text of S7.1.1.5; and adding S7.1.6, to read as follows:

§ 571.208 Standard No. 208; Occupant crash protection.

* * * * *

S4.4 Buses manufactured on or after November 28, 2016.

S4.4.1 *Definitions.* For purposes of S4.4, the following definitions apply:

Over-the-road bus means a bus characterized by an elevated passenger deck located over a baggage compartment, except a school bus.

Perimeter-seating bus means a bus with 7 or fewer designated seating positions rearward of the driver's seating position that are forward-facing or can convert to forward-facing without the use of tools and is not an over-the-road bus.

Prison bus means a bus manufactured for the purpose of transporting persons subject to involuntary restraint or confinement and has design features consistent with that purpose.

Stop-request system means a vehicle-integrated system for passenger use to signal to a vehicle operator that they are requesting a stop.

Transit bus means a bus that is equipped with a stop-request system sold for public transportation provided by, or on behalf of, a State or local government and that is not an over-the-road bus.

S4.4.2 *Buses with a GVWR of 3,855 kg (8,500 lb) or less and an unloaded vehicle weight of 2,495 kg (5,500 lb) or less.*

S4.4.2.1 Each bus with a GVWR of 3,855 kg (8,500 lb) or less and an unloaded vehicle weight of 2,495 kg (5,500 lb) or less, except a school bus, shall comply with the requirements of S4.2.6 of this standard for front seating positions and with the requirements of S4.4.3.1 of this standard for all rear seating positions.

S4.4.2.2 Each school bus with a GVWR of 3,855 kg (8,500 lb) or less and an unloaded vehicle weight of 2,495 kg (5,500 lb) or less shall comply with the requirements of S4.2.6 of this standard for front seating positions and with the requirements of S4.4.3.2 of this standard for all rear seating positions.

S4.4.3 *Buses with a GVWR of 4,536 kg (10,000 lb) or less.*

S4.4.3.1 Except as provided in S4.4.3.1.1, S4.4.3.1.2, S4.4.3.1.3, S4.4.3.1.4 and S4.4.3.1.5, each bus with a gross vehicle weight rating of 4,536 kg (10,000 lb) or less, except a school bus or an over-the-road bus, shall be equipped with a Type 2 seat belt assembly at every designated seating position other than a side-facing position. Type 2 seat belt assemblies installed in compliance with this requirement shall conform to Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. If a Type 2 seat belt assembly installed in compliance with this requirement incorporates a webbing tension relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension relieving device, and the vehicle shall conform to S7.4.2(c) of this standard. Side-facing designated seating positions shall be equipped, at the manufacturer's option, with a Type 1 or Type 2 seat belt assembly.

S4.4.3.1.1 Any rear designated seating position with a seat that can be adjusted to be forward- or rear-facing and to face some other direction shall either:

(a) Meet the requirements of S4.4.3.1 with the seat in any position in which it can be occupied while the vehicle is in motion, or meet S4.4.3.1.1(b)(1) and S4.4.3.1.1(b)(2).

(b)(1) When the seat is in its forward-facing and/or rear-facing position, or within ±30 degrees of either position, have a Type 2 seat belt assembly with an upper torso restraint that

(i) Conforms to S7.1 and S7.2 of this standard,

(ii) Adjusts by means of an emergency locking retractor conforming to Standard No. 209 (49 CFR 571.209), and

(iii) May be detachable at the buckle or upper anchorage, but not both.

(2) When the seat is in any position in which it can be occupied while the vehicle is in motion, have a Type 1 seat belt or the pelvic portion of a Type 2 seat belt assembly that conforms to S7.1 and S7.2 of this standard.

S4.4.3.1.2 Any rear designated seating position on a readily removable seat (that is, a seat designed to be easily removed and replaced by means installed by the manufacturer for that purpose) may meet the requirements of S4.4.3.1 by use of a belt incorporating a release mechanism that detaches both the lap and shoulder portion at either the upper or lower anchorage point, but not both. The means of detachment shall be a key or key-like object.

S4.4.3.1.3 Any inboard designated seating position on a seat for which the entire seat back can be folded such that no part of the seat back extends above a horizontal plane located 250 mm above the highest SRP located on the seat may meet the requirements of S4.4.3.1 by use of a belt incorporating a release mechanism that detaches both the lap and shoulder portion at either the upper or lower anchorage point, but not both. The means of detachment shall be a key or key-like object.

S4.4.3.1.4 Any rear designated seating position adjacent to a walkway located between the seat, which walkway is designed to allow access to more rearward designated seating positions, and not adjacent to the side of the vehicle may meet the requirements of S4.4.3.1 by use of a belt incorporating a release mechanism that detaches both the lap and shoulder portion at either the upper or lower anchorage point, but not both. The means of detachment shall be a key or key-like object.

S4.4.3.1.5 Any rear side-facing designated seating position shall be equipped with a Type 1 or Type 2 seat belt assembly that conforms to S7.1 and S7.2 of this standard.

S4.4.3.2 Each school bus with a gross vehicle weight rating of 4,536 kg (10,000 pounds) or less shall comply with the requirements of S4.4.3.2.1 and S4.4.3.2.2.

S4.4.3.2.1 The driver's designated seating position and any outboard designated seating position not rearward of the driver's seating position shall be equipped with a Type 2 seat belt assembly. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. The lap belt portion of the seat belt assembly shall include either an emergency locking retractor or an automatic locking retractor. An automatic locking retractor shall not retract webbing to the next locking position until at least ¾; inch of webbing has moved into the retractor. In determining whether an automatic locking retractor complies with this requirement, the webbing is extended to 75 percent of its length and the retractor is locked after the initial adjustment. If the seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

S4.4.3.2.2 Passenger seating positions, other than any outboard designated seating position not rearward of the driver's seating position, shall be equipped with Type 2 seat belt assemblies that comply with the requirements of S7.1.1.5, S7.1.5 and S7.2 of this standard.

S4.4.3.3 Each over-the-road-bus with a GVWR of 4,536 kg (10,000 lb) or less shall meet the requirements of S4.4.5.1 (as specified for buses with a GVWR or more than 11,793 kg (26,000 lb)).

S4.4.4 *Buses with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb).*

S4.4.4.1 Each bus with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb), except a school bus or an over-the-road bus, shall meet the requirements of S4.4.4.1.1 or S4.4.4.1.2.

S4.4.4.1.1 *First option—complete passenger protection system—driver only.* The vehicle shall meet the crash protection requirements of S5, with respect to an anthropomorphic test dummy in the driver's designated seating position, by means that require no action by vehicle occupants.

S4.4.4.1.2 *Second option—belt system—driver only.* The vehicle shall, at the driver's designated seating position, be equipped with either a Type 1 or a Type 2 seat belt assembly that conforms to § 571.209 of this part and S7.2 of this Standard. A Type 1 belt assembly or the pelvic portion of a dual retractor Type 2 belt assembly installed at the driver's seating position shall include either an emergency locking retractor or an automatic locking retractor. If a seat belt assembly installed at the driver's seating position includes an automatic locking retractor for the lap belt or the lap belt portion, that seat belt assembly shall comply with the following:

(a) An automatic locking retractor used at a driver's seating position that has some type of suspension system for the seat shall be attached to the seat structure that moves as the suspension system functions.

(b) The lap belt or lap belt portion of a seat belt assembly equipped with an automatic locking retractor that is installed at the driver's seating position must allow at least ¾; inch, but less than 3 inches, of webbing movement before retracting webbing to the next locking position.

(c) Compliance with S4.4.4.2.1(b) of this standard is determined as follows:

(1) The seat belt assembly is buckled and the retractor end of the seat belt assembly is anchored to a horizontal surface. The webbing for the lap belt or lap belt portion of the seat belt assembly is extended to 75 percent of its length and the retractor is locked after the initial adjustment.

(2) A load of 20 pounds is applied to the free end of the lap belt or the lap belt portion of the belt assembly (i.e., the end that is not anchored to the horizontal surface) in the direction away from the retractor. The position of the free end of the belt assembly is recorded.

(3) Within a 30 second period, the 20 pound load is slowly decreased, until the retractor moves to the next locking position. The position of the free end of the belt assembly is recorded again.

(4) The difference between the two positions recorded for the free end of the belt assembly shall be at least ¾; inch but less than 3 inches.

S4.4.4.2 Each school bus with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb) shall be equipped with a Type 2 seat belt assembly at the driver's designated seating position. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. If a seat belt assembly installed in compliance with this requirement includes an automatic locking retractor for the lap belt portion, that seat belt assembly shall comply with paragraphs (a) through (c) of S4.4.4.1.2 of this standard. If a seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

S4.4.4.3 Each over-the-road-bus with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb) shall meet the requirements of S4.4.5.1 (as specified for buses with a GVWR or more than 11,793 kg (26,000 lb)).

S4.4.5 *Buses with a GVWR of more than 11,793 kg (26,000 lb).*

S4.4.5.1 Each bus with a GVWR of more than 11,793 kg (26,000 lb), except a perimeter-seating bus, transit bus, or school bus, shall comply with the requirements of S4.4.5.1.1 and S4.4.5.1.2.

S4.4.5.1.1 The driver's designated seating position and any outboard designated seating position not rearward of the driver's seating position shall be equipped with a Type 2 seat belt assembly. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. If a seat belt assembly installed in compliance with this requirement includes an automatic locking retractor for the lap belt portion, that seat belt assembly shall comply with paragraphs (a) through (c) of S4.4.4.1.2 of this standard. If a seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

S4.4.5.1.2 Passenger seating positions, other than any outboard designated seating position not rearward of the driver's seating position and seating positions on prison buses rearward of the driver's seating position, shall:

(a) Other than for over-the-road buses:

(i) Be equipped with a Type 2 seat belt assembly at any seating position that is not a side-facing position;

(ii) Be equipped with a Type 1 or Type 2 seat belt assembly at any seating position that is a side-facing position;

(c) For over-the-road buses, be equipped with a Type 2 seat belt assembly;

(d) Have the seat belt assembly attached to the seat structure at any seating position that has another seating position, wheelchair position, or side emergency door behind it; and

(e) Comply with the requirements of S7.1.1.5, S7.1.3, S7.1.6 and S7.2 of this standard.

S4.4.5.2 Each perimeter-seating bus and transit bus with a GVWR of more than 11,793 kg (26,000 lb) shall meet the requirements of S4.4.4.1.1 or S4.4.4.1.2 (as specified for buses with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb)).

S4.4.5.3 Each school bus with a GVWR of more than 11,793 kg (26,000 lb) shall be equipped with a Type 2 seat belt assembly at the driver's designated seating position. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. If a seat belt assembly installed in compliance with this requirement includes an automatic locking retractor for the lap belt portion, that seat belt assembly shall comply with paragraphs (a) through (c) of S4.4.4.1.2 of this standard. If a seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

* * * * *

S4.5.5.1 *Vehicles manufactured on or after September 1, 2005 and before September 1, 2007.*

(a) For vehicles manufactured for sale in the United States on or after September 1, 2005, and before September 1, 2007, a percentage of the manufacturer's production as specified in S4.5.5.2, shall meet the requirements specified in either S4.1.5.5 for complying passenger cars, S4.2.7 for complying trucks and multipurpose passenger vehicles, or S4.4.3.1 for complying buses.

(b) A manufacturer that sells two or fewer carlines, as that term is defined at 49 CFR 583.4, in the United States may, at the option of the manufacturer, meet the requirements of this paragraph, instead of paragraph (a) of this section. Each vehicle manufactured on or after September 1, 2006, and before September 1, 2007, shall meet the requirements specified in S4.1.5.5 for complying passenger cars, S4.2.7 for complying trucks & multipurpose passenger vehicles, and S4.4.3.1 for complying buses. Credits for vehicles manufactured before September 1, 2006 are not to be applied to the requirements of this paragraph.

* * * * *

S4.5.5.2 *Phase-in schedule.*

(a) Vehicles manufactured on or after September 1, 2005, and before September 1, 2006. Subject to S4.5.5.3(a), for vehicles manufactured on or after September 1, 2005, and before September 1, 2006, the amount of vehicles complying with S4.1.5.5 for complying passenger cars, S4.2.7 for complying trucks and multipurpose passenger vehicles, or S4.4.3.1 for complying buses shall be not less than 50 percent of:

* * *

(b) Vehicles manufactured on or after September 1, 2006, and before September 1, 2007. Subject to S4.5.5.3(b), for vehicles manufactured on or after September 1, 2006, and before September 1, 2007, the amount of vehicles complying with S4.1.5.5 for complying passenger cars, S4.2.7 for complying trucks and multipurpose passenger vehicles, or S4.4.3.1 for complying buses shall be not less than 80 percent of:

* * * * *

S7.1.1.5 Passenger cars, and trucks, buses, and multipurpose passenger vehicles with a GVWR of 4,536 kg (10,000 lb) or less manufactured on or after September 1, 1995 and buses with a GVWR of more than 11,793 kg (26,000 pounds) manufactured on or after November 28, 2016, except a perimeter-seating bus, prison bus, school bus, or transit bus, shall meet the requirements of S7.1.1.5(a), S7.1.1.5(b) and S7.1.1.5(c).

* * *

S7.1.6 *Passenger seats, other than any outboard designated seating position not rearward of the driver's seating position, in buses with a GVWR of more than 11,793 kg (26,000 lb) manufactured on or after* November 28, 2016. The lap belt of any seat belt assembly on any passenger seat in each bus with a GVWR of more than 11,793 kg (26,000 lb), except a perimeter-seating bus, prison bus, school bus, or transit bus, shall adjust by means of any emergency-locking retractor that conforms to 49 CFR 571.209 to fit persons whose dimensions range from those of a 50th percentile 6-year-old child to those of a 95th percentile adult male and the upper torso restraint shall adjust by means of an emergency-locking retractor that conforms to 49 CFR 571.209 to fit persons whose dimensions range from those of a 5th percentile adult female to those of a 95th percentile adult male, with the seat in any position, the seat back in the manufacturer's nominal design riding position, and any adjustable anchorages adjusted to the manufacturer's nominal design position for a 50th percentile adult male occupant.

* * * * *

■ 3. Section 571.222 is amended by:

■ a. Revising S5(a)(2)(i);

■ b. Removing and reserving S5(b)(1)(ii); and

■ c. Revising S5(b)(1)(iii).

The revisions read as follows:

§ 571.222 Standard No. 222; School bus passenger seating and crash protection.

* * * * *

S5. *Requirements.*

* * * * *

(a) *Large school buses.*

* * *

(2) * * *

(i) S4.4.3.2 of Standard No. 208 (49 CFR 571.208);

* * * * *

(b) *Small school buses.* * * *

(1)

(iii) In the case of vehicles manufactured on or after October 21, 2011 the requirements of S4.4.3.2 of § 571.208 and the requirements of §§ 571.207, 571.209 and 571.210 as they apply to school buses with a gross vehicle weight rating of 4,536 kg or less; and,

* * * * *

Dated: November 19, 2013.

David L. Strickland,

Administrator.

[FR Doc. 2013–28211 Filed 11–20–13; 4:15 pm]

BILLING CODE 4910–59–P

D R A F T

CONFIDENTIAL INTERNAL MEMORANDUM
NOT FOR DISSEMINATION

TO: Engineering, Marketing, LegalnNational Highway Transportation Safety Administration
FROM: Marcos Rosales, EVP
DATE: June 20, 2013
RE: NHTSA Proposed Rules on Seat Belts: FMVSS 208, 209

As we have feared, the The National Highway Transportation Safety Administration is again proposing enhanced rules with respect to lap/shoulder belts for passenger seating in all new of the road buses and the new buses other than over the road buses with a gross vehicle weight rating greater than 26,000 pounds. These enhanced rules affect virtually all of our fleet.

According to the NHTSA, states that the installation of lap/shoulder belts in over the road buses is "practicable and effective and could reduce the risk of fatal injuries and rollover crashes by 77%, primarily by preventing occupant ejection." NHTSA has invited comments on the proposed rules. We should comment as follows:

Aerocoach comments as follows:

1. According to its own data, NHTSA data, admits that traveling by motor-coache is one of the safest modes of travel today. Very few deaths occur as a result of bus crashes as compared to accidents involving cars and SUVs.
2. Installing lap/shoulder belts would not save a significant number of lives on an annualized basis.
3. Installing lap/shoulder belts in motor coaches would be extraordinarily expensive. NHTSA's estimate of $18.86 per installed shoulder belt grossly underestimates the real cost. Other costs include reinforcement of seat structures to withstand the forces applied to these belts, reinforcement of bus flooring to withstand the increased weight and forces placed on the connections between seats and frame, and the increased costs for fuel for operating buses with the increased weight loads. Our own estimates indicate a cost of $22.34 per installed shoulder belt, assuming 2014 levels for costs of steel and fuel.
4. NHTSA's estimates of cost per equivalent life saved are without support. at all and are typical government "accounting." NHTSA estimates 1.7 to 9.2 fatalities per year, then assumes that 15% of all passengers would actually use the belts, to somehow come to a cost per equivalent life saved of $1.5 million to $1.8 million.
5. Everyone in our industry knowsReliable data suggests that bus passengers never rarely use the seatbelts that we already provide.
6. Everyone in our industry knows that ifIf there is a frontal impact on a motorcoach, passengers are going to be dislodged from their seats. When that happens, they become virtual missiles averaging 150 pounds per eachare thrown around the passenger compartment, breaking seatbacks and injuring other passengers and themselves. Until we do something about the noncompliance factor, such as reeducating the average passenger, no amount of shoulder harnessing will change the dynamics of a motorcoach accident.
7. We continue to believe that compartmentalization using space between the seats is the most effective way to contain passengers during an accident.

EXHIBIT 15

Compartmentalization has been demonstrated to work in school buses, as long as the seatbacks are padded in such a way as not to cause injury. when passengers strike them with their faces. An additional benefit is the fact that we can get more seats on a motorcoach by putting them a lot closer together.

8. Aerocoach understands that NHTSA is also proposing glazing standards for side windows. We are very proud of the fact that we produce motor coaches with the largest windows in the industry. Our passengers enjoy unparalleled views and they like it that way. Adding additional glazing to our side windows would be extremely costly., but more importantly would deprive us of the market share we get because of the enhanced views enjoyed by passengers on our products. While the unglazed windows are admittedly dangerous, and do tend to break into shards, the number of accidents where this actually occurs and causes harm is extremely low. On a cost/benefit basis, it does not make sense to add glazing to our side glass.

TO: NHTSA
FROM: Marcos Rosales, EVP
DATE: June 20, 2013
RE: NHTSA Proposed Rules on Seat Belts: FMVSS 208, 209

The National Highway Transportation Safety Administration is proposing enhanced rules with respect to lap/shoulder belts for passenger seating in all new of the road buses and the new buses other than over the road buses with a gross vehicle weight rating greater than 26,000 pounds.

NHTSA states that the installation of lap/shoulder belts in over the road buses is "practicable and effective and could reduce the risk of fatal injuries and rollover crashes by 77%, primarily by preventing occupant ejection." NHTSA has invited comments on the proposed rules.

Aerocoach comments as follows:

1. According to NHTSA data, traveling by motor coaches one of the safest modes of travel today. Very few deaths occur as a result of bus crashes to accidents involving cars and SUVs.
2. Installing lap/shoulder belts would not save a significant number of lives on an annualized basis.
3. Installing lap/shoulder belts in motor coaches would be extraordinarily expensive. NHTSA's estimate of $18.86 per installed shoulder belt grossly underestimates the real cost. Other costs include reinforcement of seat structures to withstand the forces applied to these belts, reinforcement of bus flooring to withstand the increased weight and forces placed on the connections between seats and frame, and the increased costs for fuel for operating buses with the increased weight loads. Our own estimates indicate a cost of $122.34 per installed shoulder belt, assuming 2014 levels for costs of steel and fuel.
4. NHTSA's estimates of cost per equivalent life saved are without support. NHTSA estimates 1.7 to 9.2 fatalities per year, then assumes that 15% of all passengers would actually use the belts, to come to a cost per equivalent life saved of $1.5 million to $1.8 million.
5. Reliable data suggests that bus passengers rarely use the seatbelts that we already provide.
6. If there is a frontal impact on a motorcoach, passengers are going to be dislodged from their seats. When that happens, they are thrown around the passenger compartment, breaking seatbacks and injuring other passengers and themselves. Until we do something about the noncompliance factor, such as reeducating the average passenger, no amount of shoulder harnessing will change the dynamics of a motorcoach accident.
7. We continue to believe that compartmentalization using space between the seats is the most effective way to contain passengers during an accident. Compartmentalization has been demonstrated to work and school buses, as long as the seatbacks are padded in such a way as not to cause injury on impact.
8. Aerocoach understands that NHTSA is also proposing glazing standards for side windows. We produce motor coaches with the largest windows in the industry. Our passengers enjoy unparalleled views. Adding additional glazing to our side windows would be extremely costly and has not been demonstrated to improve passenger safety.

EXHIBIT 16

49 CFR § 571.209 - Standard No. 209; Seat belt assemblies.

CFR

§ 571.209 Standard No. 209; Seat belt assemblies.

S1. *Purpose and scope.* This standard specifies requirements for seat belt assemblies.

S2. *Application.* This standard applies to seat belt assemblies for use in passenger cars, multipurpose passenger vehicles, trucks, and buses.

S3. *Definitions. Adjustment hardware* means any or all hardware designed for adjusting the size of a seat belt assembly to fit the user, including such hardware that may be integral with a buckle, attachment hardware, or retractor.

Attachment hardware means any or all hardware designed for securing the webbing of a seat belt assembly to a motor vehicle.

Automatic-locking retractor means a retractor incorporating adjustment hardware by means of a positive self-locking mechanism which is capable when locked of withstanding restraint forces.

Buckle means a quick release connector which fastens a person in a seat belt assembly.

Emergency-locking retractor means a retractor incorporating adjustment hardware by means of a locking mechanism that is activated by vehicle acceleration, webbing movement relative to the vehicle, or other automatic action during an emergency and is capable when locked of withstanding restraint forces.

Hardware means any metal or rigid plastic part of a seat belt assembly.

Load-limiter means a seat belt assembly component or feature that controls tension on the seat belt to modulate the forces that are imparted to occupants restrained by the belt assembly during a crash.

Nonlocking retractor means a retractor from which the webbing is extended to essentially its full length by a small external force, which provides no adjustment for assembly length, and which may or may not be capable of sustaining restraint forces at maximum webbing extension.

Pelvic restraint means a seat belt assembly or portion thereof intended to restrain movement of the pelvis.

Retractor means a device for storing part or all of the webbing in a seat belt assembly.

Seat back retainer means the portion of some seat belt assemblies designed to restrict forward movement of a seat back.

Seat belt assembly means any strap, webbing, or similar device designed to secure a person in a motor vehicle in order to mitigate the results of any accident, including all necessary buckles and other fasteners, and all hardware designed for installing such seat belt assembly in a motor vehicle.

Strap means a narrow nonwoven material used in a seat belt assembly in place of webbing.

Type 1 seat belt assembly is a lap belt for pelvic restraint.

Type 2 seat belt assembly is a combination of pelvic and upper torso restraints.

Type 2a shoulder belt is an upper torso restraint for use only in conjunction with a lap belt as a Type 2 seat belt assembly.

Upper torso restraint means a portion of a seat belt assembly intended to restrain movement of the chest and shoulder regions.

Webbing means a narrow fabric woven with continuous filling yarns and finished selvages.

S4. *Requirements.*

S4.1(a) [Reserved]

(b) ***Single occupancy.*** A seat belt assembly shall be designed for use by one, and only one, person at any one time.

(c) ***Upper torso restraint.*** A Type 2 seat belt assembly shall provide upper torso restraint without shifting the pelvic restraint into the abdominal region. An upper torso restraint shall be designed to minimize vertical forces on the shoulders and spine. Hardware for upper torso restraint shall be so designed and located in the seat belt assembly that the possibility of injury to the occupant is minimized.

A Type 2a shoulder belt shall comply with applicable requirements for a Type 2 seat belt assembly in S4.1 to S4.4, inclusive.

(d) ***Hardware.*** All hardware parts which contact under normal usage a person, clothing, or webbing shall be free from burrs and sharp edges.

(e) ***Release.*** A Type 1 or Type 2 seat belt assembly shall be provided with a buckle or buckles readily accessible to the occupant to permit his easy and rapid removal from the assembly. Buckle release mechanism shall be designed to minimize the possibility of accidental release. A buckle with release mechanism in the latched position shall have only one opening in which the tongue can be inserted on the end of the buckle designed to receive and latch the tongue.

(f) ***Attachment hardware.*** A seat belt assembly shall include all hardware necessary for installation in a motor vehicle in accordance with SAE Recommended Practice J800c (1973) (incorporated by reference, see § 571.5). However, seat belt assemblies designed for installation in motor vehicles equipped with seat belt assembly anchorages that do not require anchorage nuts, plates, or washers, need not have such hardware, but shall have 7/16-20 UNF-2A or 1/2-13 UNC-2A attachment bolts or equivalent metric hardware. The hardware shall be designed to prevent attachment bolts and other parts from becoming disengaged from the vehicle while in service. Reinforcing plates or washers furnished for universal floor, installations shall be of steel, free from burrs and sharp edges on the peripheral edges adjacent to the vehicle, at least 1.5 mm in thickness and at least 2580 mm ^{2} in projected area. The distance between any edge of the plate and the edge of the bolt hole shall be at least 15 mm. Any corner shall be rounded to a radius of not less than 6 mm or cut so that no corner angle is less than 135° and no side is less than 6 mm in length.

(g) ***Adjustment.***

(1) A Type 1 or Type 2 seat belt assembly shall be capable of adjustment to fit occupants whose dimensions and weight range from those of a 5th-percentile adult female to those of a 95th-percentile adult male. The seat belt assembly shall have either an automatic-locking retractor, an emergency-locking retractor, or an adjusting device that is within the reach of the occupant.

acceleration of not less than 3 N when attached to pelvic restraint, and not less that 2 N nor more than 5 N in any strap or webbing that contacts the shoulders of an occupant when the retractor is attached to upper torso restraint. An automatic locking retractor attached to upper torso restraint shall not increase the restraint on the occupant of the seat belt assembly during use in a vehicle traveling over rough roads as prescribed in S5.2(i).

(j) ***Emergency-locking retractor.***

(1) ***For seat belt assemblies manufactured before February 22, 2007.*** Except for manufacturers that, at the manufacturer's option, voluntarily choose to comply with S4.3(j)(2) during this period (with said option irrevocably selected prior to, or at the time of, certification of the seat belt assembly), an emergency-locking retractor of a Type 1 or Type 2 seat belt assembly, when tested in accordance with the procedures specified in paragraph S5.2(j)(1) -

(i) Shall lock before the webbing extends 25 mm when the retractor is subjected to an acceleration of 7 m/s^2 (0.7 g);

(ii) Shall not lock, if the retractor is sensitive to webbing withdrawal, before the webbing extends 51 mm when the retractor is subjected to an acceleration of 3 m/s^2 (0.3 g) or less;

(iii) Shall not lock, if the retractor is sensitive to vehicle acceleration, when the retractor is rotated in any direction to any angle of 15° or less from its orientation in the vehicle;

(iv) Shall exert a retractive force of at least 3 N under zero acceleration when attached only to the pelvic restraint;

(v) Shall exert a retractive force of not less than 1 N and not more than 5 N under zero acceleration when attached only to an upper torso restraint;

(vi) Shall exert a retractive force not less than 1 N and not more than 7 N under zero acceleration when attached to a strap or webbing that restrains both the upper torso and the pelvis.

(2) ***For seat belt assemblies manufactured on or after February 22, 2007 and for manufacturers opting for early compliance.*** An emergency-locking retractor of a Type 1 or Type 2 seat belt assembly, when tested in accordance with the procedures specified in paragraph S5.2(j)(2) -

(i) Shall under zero acceleration loading -

(A) Exert a retractive force of not less than 1 N and not more than 7 N when attached to a strap or webbing that restrains both the upper torso and the pelvis;

(B) Exert a retractive force not less than 3 N when attached only to the pelvic restraint; and

(C) Exert a retractive force of not less than 1 N and not more than 5 N when attached only to an upper torso restraint.

(D) For a retractor sensitive to vehicle acceleration, lock when tilted at any angle greater than 45 degrees from the angle at which it is installed in the vehicle or meet the requirements of S4.3(j)(2)(ii).

(E) For a retractor sensitive to vehicle acceleration, not lock when the retractor is rotated in any direction to any angle of 15 degrees or less from its orientation in the vehicle.

(ii) Shall lock before the webbing payout exceeds the maximum limit of 25 mm when the retractor is subjected to an acceleration of 0.7 g under the applicable test conditions of S5.2(j)(2)(iii)(A) or (B). The retractor is determined to be locked when the webbing belt load tension is at least 35 N.

(iii) For a retractor sensitive to webbing withdrawal, shall not lock before the webbing payout extends to the minimum limit of 51 mm when the retractor is subjected to an acceleration no greater than 0.3 g under the test condition of S5.2(j)(2)(iii)(C).

(k) ***Performance of retractor.*** A retractor used on a seat belt assembly after subjection to the tests specified in S5.2(k) shall comply with applicable requirements in paragraphs (h) to (j) of this section and S4.4, except that the retraction force shall be not less than 50 percent of its original retraction force.

S4.4 *Requirements for assembly performance.*

(a) ***Type I seat belt assembly.*** Except as provided in S4.5, the complete seat belt assembly including webbing, straps, buckles, adjustment and attachment hardware, and retractors shall comply with the following requirements when tested by the procedures specified in S5.3(a):

(1) The assembly loop shall withstand a force of not less than 22,241 N; that is, each structural component of the assembly shall withstand a force of not less than 11,120 N.

(2) The assembly loop shall extend not more than 7 inches or 178 mm when subjected to a force of 22,241 N; that is, the length of the assembly between anchorages shall not increase more than 356 mm.

(3) Any webbing cut by the hardware during test shall have a breaking strength at the cut of not less than 18,683 N.

(4) Complete fracture through any solid section of metal attachment hardware shall not occur during test.

(b) ***Type 2 seat belt assembly.*** Except as provided in S4.5, the components of a Type 2 seat belt assembly including webbing, straps, buckles, adjustment and attachment hardware, and retractors shall comply with the following requirements when tested by the procedure specified in S5.3(b):

(1) The structural components in the pelvic restraint shall withstand a force of not less than 11,120 N.

(2) The structural components in the upper torso restraint shall withstand a force of not less than 6,672 N.

(3) The structural components in the assembly that are common to pelvic and upper torso restraints shall withstand a force of not less than 13,345 N.

(4) The length of the pelvic restraint between anchorages shall not increase more than 508 mm when subjected to a force of 11,120 N.

(5) The length of the upper torso restraint between anchorages shall not increase more than 508 mm when subjected to a force of 6,672 N.

(6) Any webbing cut by the hardware during test shall have a breaking strength of not less than 15,569 N at a cut in webbing of the pelvic restraint, or not less than 12,455 N at a cut in webbing of the upper torso restraint.

(7) Complete fracture through any solid section of metal attachment hardware shall not occur during test.

S4.5 *Load-limiter.*

(a) A Type 1 or Type 2 seat belt assembly that includes a load-limiter is not required to comply with the elongation requirements of S4.2(c), S4.4(a)(2), S4.4(b)(4) or S4.4(b)(5).

(b) A seat belt assembly that includes a load limiter and that does not comply with the elongation requirements of this standard may be installed in motor vehicles at any designated seating position that is subject to the requirements of S5.1 of Standard No. 208 (§ 571.208).

S4.6 *Manual belts subject to crash protection requirements of Standard No. 208.*

(a)

18. Video: crash test: https://www.youtube.com/watch?v=VvhA7DkWnmA

19. Video: crash test: https://www.youtube.com/watch?v=0XuOb0Qwf5s

20. Video: crash test: https://www.youtube.com/watch?v=HRgBXg7wdqw

21. Video: crash test: https://www.youtube.com/watch?v=KbCciy8ePds&feature=emb_logo

22. Video: motorcoach crash test: https://www.youtube.com/watch?v=2gvuGeRNHMU

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA-2016-0052]

RIN 2127-AL36

Federal Motor Vehicle Safety Standards;

Bus Emergency Exits and Window Retention and Release,

Anti-Ejection Glazing for Bus Portals

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This NPRM proposes a new Federal Motor Vehicle Safety Standard (FMVSS) No. 217a, "Anti-ejection glazing for bus portals," to drive the installation of advanced glazing in high-occupancy buses (generally, over-the-road buses (of any weight) and non-over-the-road buses with a gross vehicle weight rating greater than 11,793 kilograms (26,000 pounds). The new standard would specify impactor testing of glazing material. In the tests, a 26 kilogram (57 pound) impactor would be propelled from inside a test vehicle toward the window glazing at 21.6 kilometers/hour (13.4 miles per hour). The impactor and impact speed would simulate the loading from an average size unrestrained adult male impacting a window on the opposite side of a large bus in a rollover. Performance requirements would apply to side and rear windows, and to glass panels and windows on the roof to mitigate partial and complete ejection of passengers from these windows and to ensure that emergency exits remain operable after a rollover crash.

EXHIBIT 23

NHTSA also proposes to limit the protrusions of emergency exit latches into emergency exit openings of windows to ensure they do not unduly hinder emergency egress.

This NPRM is among the rulemakings issued pursuant to NHTSA's 2007 Approach to Motorcoach Safety and DOT's Departmental Motorcoach Safety Action Plan. In addition, to the extent warranted under the National Traffic and Motor Vehicle Safety Act, establishing advanced glazing standards for the side and rear portals of the subject buses would fulfill a statutory provision of the Motorcoach Enhanced Safety Act of 2012 (incorporated and passed as part of the Moving Ahead for Progress in the 21st Century Act).

DATES: Comments must be received on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: You may submit comments to the docket number identified in the heading of this document by any of the following methods:

- Federal eRulemaking Portal: go to http://www.regulations.gov. Follow the online instructions for submitting comments.
- Mail: Docket Management Facility, M-30, U.S. Department of Transportation, West Building, Ground Floor, Rm. W12-140, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590.
- Hand Delivery or Courier: West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, S.E., between 9 am and 5 pm Eastern Time, Monday through Friday, except Federal holidays.
- Fax: (202) 493-2251.

Regardless of how you submit your comments, please mention the docket number of this document.

You may also call the Docket at 202-366-9324.

Instructions*:* For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note that all comments received will be posted without change to http://www.regulations.gov, including any personal information provided.

Privacy Act*:* Please see the Privacy Act heading under Rulemaking Analyses and Notices.

FOR FURTHER INFORMATION CONTACT:

For non-legal issues: Ms. Shashi Kuppa, Office of Crashworthiness Standards (telephone: 202-366-3827) (fax: 202-493-2990). For legal issues: Ms. Deirdre Fujita, Office of the Chief Counsel (telephone: 202-366-2992) (fax: 202-366-3820). The mailing address for these officials is: National Highway Traffic Safety Administration, 1200 New Jersey Avenue, S.E., Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Executive Summary

One of the factors NHTSA considers in determining the priorities of our rulemaking projects is to ensure the protection of passengers in high-occupancy vehicles. In 2007, NHTSA published a comprehensive plan pertaining to improvements in motorcoach safety.[1] NHTSA

[1] Docket No. NHTSA-2007-28793, NHTSA's Approach to Motorcoach Safety. In NHTSA's plan, "motorcoach" referred to inter-city transport buses.

developed this plan in response to several National Transportation Safety Board (NTSB) recommendations, and also to focus agency resources and research on improving the safety of these vehicles. NHTSA's motorcoach safety plan identified four specific areas where we could most effectively address open NTSB recommendations and most expeditiously achieve our goals. The four priority areas were: requiring seat belts (minimizing passenger and driver ejection from the motorcoach), improved roof strength, emergency evacuation, and fire safety.[2]

Work on NHTSA's safety plan is ongoing. In 2013, the agency published a final rule[3] requiring seat belts for each passenger seating position in all new over-the-road buses (OTRBs)[4] regardless of bus GVWR, and in new "other" buses (i.e., large buses other than OTRBs[5]) with GVWRs greater than 11,793 kilograms (kg) (26,000 pounds (lb)). In 2014, NHTSA published an NPRM proposing that these buses, and prison buses, meet increased structural integrity requirements to protect both restrained and unrestrained occupants in rollover crashes.[6] NHTSA also has issued a final rule on electronic stability control[7] and has completed research studies on improved motorcoach emergency evacuation and fire safety.[8]

Today's NPRM complements the 2014 rollover structural integrity NPRM to further minimize passenger and driver ejection from motorcoaches and other large buses. It also enhances emergency evacuation from the vehicle.

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[2] Motorcoach safety was also the focus of a DOT-wide action plan. DOT issued a Departmental Motorcoach Safety Action Plan in 2009 which addressed additional factors such as driver fatigue and operator maintenance schedules. An update to the 2009 plan was published in December 2012, see http://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Motorcoach-Safety-Action-Plan-2012.pdf
[3] 78 FR 70416; November 25, 2013.
[4] An over-the-road bus is a bus characterized by an elevated passenger deck located over a baggage compartment. Excluded from the seat belt requirement are school buses and prison buses.
[5] Some buses are also excluded from this latter category, such as transit and school buses, prison buses, and perimeter seating buses.
[6] 79 FR 46090; August 6, 2014.
[7] 80 FR 36050; June 23, 2015.
[8] For research reports on emergency evacuation, see Docket No. NHTSA-2007-28793-22 and -24. For fire safety, Docket No. NHTSA-2007-28793-0027.

This advanced glazing NPRM also fulfills a statutory mandate on motorcoach safety set forth in the "Moving Ahead for Progress in the 21st Century Act" (MAP-21). On July 6, 2012, President Obama signed MAP-21, which incorporated the "Motorcoach Enhanced Safety Act of 2012" in subtitle G (sections 32701 et seq.). Among other matters, the Motorcoach Enhanced Safety Act requires the DOT to "prescribe regulations that address the following commercial motor vehicle standards," if the Secretary determines that such standards meet the requirements and considerations set forth in subsections (a) and (b) of section 30111 of title 49, United States Code (section 32703(b)). Section 32703(b)(2) of MAP-21 states that the DOT "shall consider requiring advanced glazing standards for each motorcoach portal and shall consider other portal improvements to prevent partial and complete ejection of motorcoach passengers, including children."[9] Under MAP-21 (section 32702), "advanced glazing" means glazing installed in a portal on the side or the roof of a motorcoach that is designed to be highly resistant to partial or complete occupant ejection in all types of motor vehicle crashes.

This NPRM proposes new requirements, in an FMVSS No. 217a, to drive the installation of advanced glazing in portals[10] of covered buses (buses subject to the proposed rollover structural integrity requirements, except for prison buses).[11] The tests are based on procedures developed by NHTSA and Transport Canada to improve motorcoach glazing and bonding techniques to prevent ejections. ("Motor Coach Glazing Retention Test Development for Occupant Impact During a Rollover," Martec Technical Report # TR-06-16, Rev 4, August 2006

[9] Under MAP-21 (sec. 32702), "motorcoach" means an over-the-road bus, but does not include a bus used in public transportation provided by, or on behalf of, a public transportation agency, or a school bus. "Portal" is also defined in sec. 32702. The definitions are discussed further later in this preamble.

[10] A portal is an opening that could permit partial or complete ejection of an occupant from the vehicle in the event of a crash involving the vehicle.

[11] We have proposed these requirements by way of a newly proposed FMVSS No. 217a. If a final rule is issued, we may keep the requirements in Standard No. 217a or we may incorporate them into FMVSS No. 217.

("Martec study").) The proposed test procedures are also based on a follow-on NHTSA research study.[12]

The glazing types currently used in the motorcoach industry for side windows are single-pane laminated glass, single-pane tempered (or "toughened") glass, or a double-pane of either laminated or tempered glass or a combination of both. A single-pane laminated glass actually contains two thin glass layers held together by an interlayer, typically of polyvinyl butyral (PVB). The interlayer works to keep the outer layers of glass bonded together in the event they break or crack, and prevents the formation of large shards of sharp glass. Laminated glass may crack or splinter upon impact with the ground, but can still provide a means of keeping passengers within the occupant compartment of the bus if the glazing is retained within the window frame, the PVB interlayer is not excessively torn or punctured, and the window latch remains closed. We believe that laminated glass could meet the requirements proposed in this NPRM. We consider glass meeting the requirements to be "advanced glazing."

Tempered glass is glass processed with controlled thermal or chemical treatments. These treatments increase the strength of the glass, and also create balanced internal stresses so that when the glass does break, it breaks or crumbles into smaller granular chunks instead of large jagged shards. Tempered glass is stronger than laminated glass, but with tempered glass, occupant loading to the window during the rollover event and the bus impact with the ground can potentially shatter tempered glass, causing the glazing to vacate the window frame and create an ejection portal.

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[12] "Motorcoach Side Glazing Retention Research, "NHTSA Report DOT HS 811 862, http://www.nhtsa.gov/Research/ci.Defects+Analysis+and+Crashworthiness+Division.print, Last accessed on December 23, 2015.

NHTSA is proposing performance requirements that covered buses would have to meet by way of anti-ejection safety countermeasures to prevent partial and complete ejection of passengers. We would adopt a new FMVSS No. 217a that specifies impactor testing of glazing material. In the tests, a 26 kg (57 lb) impactor would be propelled from inside the test vehicle toward the window glazing at 21.6 kilometers per hour (km/h) (13.4 miles per hour (mph)). Each side and rear window and glass panel/window on the roof would be subject to any one of three impacts, as selected by NHTSA in a compliance test: (a) an impact near a latching mechanism of an intact window[13]; (b) an impact at the center of the daylight opening[14] of an intact window; and (c) an impact at the center of the daylight opening of a pre-broken window. The impactor and impact speed in these proposed tests, developed in the Martec study, simulate the loading from an average size adult male impacting a window on the opposite side of a large bus in a rollover.

The proposed performance requirements are as follows:

- In tests described in (a) and (b) in the previous paragraph, the window would have to prevent passage of a 102 millimeter (mm) (4 inch) diameter sphere during the impact, and after the test. The agency would assess the window during the impact by determining whether any part of the window passes a reference plane defined during a pre-test set up procedure. These requirements would ensure that glazing is securely bonded to window frames, no potential ejection portals are created due to breaking of the glass, and the windows remain closed when impacted.

[13] For non-emergency exit fixed side and rear windows and fixed glass panels on the roof, the proposed test would be conducted at the location of one of the fixed latches or discrete attachment points. For fully rubber bonded or glued windows with no latch mechanisms, the test would be conducted along the center of the lower window edge one inch above the daylight opening periphery.

[14] Center of daylight opening is the center of the total unobstructed window opening that would result from the removal of the glazing.

- In the test of (c) above, the maximum displacement of the impactor at the center of daylight opening would be limited to 175 mm (6.9 inches) for pre-broken glazing. This requirement in particular would drive the installation of advanced glazing. The requirement would also help ensure the advanced glazing reasonably retains occupants within the structural sidewall of the bus even when the glass surrounding the PVB interlayer is broken. It also ensures that no potential ejection portals are created during and after impact.
- Emergency exit latch protrusions may not extend more than one inch into the emergency exit opening of the window when the window is opened to the minimum emergency egress opening (allowing passage of an ellipsoid 500 mm (19.7 inches) wide by 300 mm (11.8 inches) high). This requirement would minimize the potential for the latch plate protrusions (or other projections) to hinder the emergency egress of passengers.
- Latches would have to be functional following the impact test to ensure that occupants can open the emergency exits to egress the vehicle after the crash.

The Motorcoach Enhanced Safety Act emphasizes anti-ejection safety countermeasures, particularly advanced glazing (§ 32703(b)(2)). With regard to advanced glazing standards, NHTSA's strategy has been first to seek improvements to the rollover structural integrity of motorcoaches (roof strength and crush resistance) and then to pursue measures that would drive use of advanced glazing. This ordered approach is based on findings from the Martec study that found the integrity of the bus structure has a profound impact on the effectiveness of glazing as an anti-ejection safety countermeasure. That is, in the absence of a threshold of requisite performance for bus structural integrity, a twisting motion of a bus in a rollover could simply pop out any advanced glazing used in the windows and negate the potential benefits of the glazing in mitigating occupant ejection.

To better ensure that the full benefits of anti-ejection countermeasures such as advanced glazing could be realized, we adopted a holistic approach. We first focused on improving bus structural integrity and the strength of side window mountings. The 2014 NPRM on large bus structural integrity proposed requirements that would increase the likelihood that bus glazing will be retained in their mountings in a rollover.[15] Next in our strategy is issuance of today's NPRM, which has performance requirements that would increase use of advanced glazing that prevent partial or complete ejection of motorcoach passengers and further ensure the integrity of glazing mounting. Today's NPRM directly addresses the directive in section 32703(b)(2) of the Motorcoach Enhanced Safety Act that NHTSA consider requiring advanced glazing standards for each motorcoach portal.

We have designed this NPRM in furtherance of NHTSA's goal to enhance the safety of all heavy buses used in intercity bus transportation, while attending to the Motorcoach Enhanced Safety Act's focus on over-the-road buses (motorcoaches). Since today's NPRM builds on the 2014 rollover structural integrity NPRM, we propose to apply today's advanced glazing proposal to the vehicles subject to the 2014 NPRM.[16, 17]

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[15] The 2014 rollover structural integrity NPRM proposes performance requirements that must be met when the bus is tipped over from an 800 mm (31.5 inch) raised platform onto a hard level surface. Among other requirements, the proposed standard would require that the occupant "survival space" (space around occupant seating positions) be maintained during and after the dynamic test, and that side window glazing opposite the impacted side of the vehicle remain attached to its mounting such that there is no opening that will allow the passage of a 102 mm (4 inch) diameter sphere. These proposed requirements would help ensure glazing is retained in the windows by limiting the twisting motion of a bus and strengthening window mountings.
[16] With the exception of prison buses. We have tentatively determined that an advanced glazing standard would not be appropriate for prison buses since these buses typically have bars over the windows.
[17] Note that this NPRM proposes requirements limiting how far emergency exit latches may protrude into the exit space. We propose applying the requirement to the buses to which NHTSA proposed would be subject to the 2014 structural integrity NPRM, except prison buses. We are also proposing to apply the requirement to school buses,

NHTSA estimates that this rulemaking would be cost beneficial.[18]

The agency estimates an annual incremental material cost for all new buses covered by this proposed rule to be $0.19 million (see Table 1 below). The countermeasures would likely be advanced glazing and improved emergency exit latches, resulting in an average incremental material cost per bus of $87 for buses covered under today's proposed rule. We estimate the testing cost of $8,700 per bus model. We estimate there would be no weight increase due to the proposed requirements; in fact, there could be a weight reduction of approximately 10.5-15 kg (23-33 lb) per window (125.5-180 kg (276-396 lb) per bus) as glazing designs change from a double-glazed tempered/tempered configuration to a single-glazed laminated configuration. We estimate that the proposal would result in fuel saving of $2.18 million to $2.9 million. This exceeds the material costs of $0.19 million for the proposal.

Beyond the benefits attributable to the agency's final rules on seat belts and ESC and a potential final rule on rollover structural integrity that also may apply to the subject buses, we estimate that requiring new subject buses to meet the proposed performance criteria would save 1.54 lives and prevent 0.4 serious to critical injuries annually if 15 percent of occupants use seat belts, and save 0.33 lives and prevent 0.08 serious to critical injuries annually if 84 percent of occupants use seat belts. Thus, we estimate that this proposal would save 1.6 equivalent lives

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and are considering applying the proposed maximum emergency exit latch protrusion requirements to all buses governed under FMVSS No. 217. Comments are requested on this issue.

[18] NHTSA has developed a Preliminary Regulatory Evaluation (PRE) that discusses issues relating to the potential costs, benefits and other impacts of this regulatory action. The PRE is available in the docket for this NPRM and may be obtained by downloading it or by contacting the Docket at the address or telephone number provided at the beginning of this document.

annually (undiscounted) if 15 percent of occupants use seat belts, and 0.34 equivalent lives annually (undiscounted) if 84 percent of occupants use seat belts (see Table 2, below).[19]

Since the fuel savings from the proposed rule would be far greater than the material costs of this proposal, we did not estimate cost per equivalent lives saved. The estimated net cost/benefit impact ranges from a net benefit of $5.87 million to $17.52 million at the 3 percent discount rate and a net benefit of $4.37 million to $13.15 million at the 7 percent discount rate (see Table 3, below).

Table 1: Estimated Annual Costs (2013 dollars)

Potential Costs	
Material Costs Per Vehicle	$87
Material Costs, Total New Fleet	$0.19 Million

Table 2: Estimated Annual Benefits (Undiscounted Equivalent Lives Saved)

15 percent belt usage	1.6
84 percent belt usage	0.34

Table 3: Annualized Net Benefits in Millions of 2013 Dollars

Discount Rate	Benefits	Net Costs	Net Benefits
3%	$13.22 - $2.82	($4.30 - $3.05)	$17.52 - $5.87
7%	$9.95 - $2.12	($3.20 - $ 2.25)	$13.15 - $4.37

NHTSA has considered retrofit requirements and has made the following tentative conclusions. The agency does not believe it would be sensible to apply the requirements

[19] NHTSA used the same low seat belt usage rate estimate of 15 percent from the November 25, 2013 final rule requiring seat belts on motorcoaches and other large buses (78 FR 70416). The agency also utilized the same source of information to establish the high seat belt usage rate estimate (the National Occupant Protection Use Survey). Today's NPRM uses the 2009 data which estimates seat belt use of passenger vehicles to be 84 percent. *See* 2009 National Occupant Protection Use Survey. More information at: http://www-nrd.nhtsa.dot.gov/pubs/811100.pdf.

NTSB initiated a special investigation reviewing 36 motorcoach crashes that were investigated from 1968 through 1997.[24] It found that of the 168 occupant fatalities, 106 occurred in crashes involving a rollover. Of those 106 fatalities, 64 were ejected from the bus.

NTSB also found that glazing composition may mitigate injury during a rollover event. In one investigation of a 1988 crash,[25] a 1987 Motor Coach Industries, Inc., intercity-type coach overturned on its right side and slid 220 feet across the highway before coming to rest. There was no intrusion into the occupant compartment and no fatalities. Forty-nine passengers and the driver sustained minor to severe injuries such as fractured ribs, lacerations, abrasions, and contusions. The 27 passengers on the left side were thrown from their seats and fell on top of the 22 right side passengers during the overturn sequence; however, all of the passengers were contained within the coach through the event. NTSB determined that because the bus's abrasive-resistant, coated acrylic windows did not break, the passengers may have been afforded protection from contacting the road surface and possibly sustaining more serious or even fatal injuries. NTSB concluded that buses equipped with advanced glazing may decrease the number of ejections of unrestrained passengers and reduce the risk of serious injury to restrained passengers during bus crashes, particularly rollover events. NTSB issued the following recommendation to NHTSA:

"H-99-049: Expand your research on current advanced glazing to include its applicability to motorcoach occupant ejection prevention, and revise window glazing requirements for newly manufactured motorcoaches based on the results of this research."

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[24] NTSB/SIR-99/04 PB98-917006; Highway Special Investigation Report: Bus Crashworthiness Issues; September, 1999.

[25] NTSB/HAR-89/01/SUM PB89-916201; Highway Accident Summary Report: Intercity-Type Buses Chartered for Service to Atlantic City; April 1989.

NTSB made three safety recommendations, including the following:

"H-11-037: Modify Federal Motor Vehicle Safety Standard 217 or the corresponding laboratory test procedure to eliminate the potential for objects such as latch plates to protrude into the emergency exit window space even when that protrusion still allows the exit window to meet the opening size requirements."

e. NHTSA's Previous Work on Motorcoach Crashworthiness Standards

1. Seat belt final rule

Section 32703(a) of MAP-21 directs the Secretary to require seat belts for each designated seating position in motorcoaches. NHTSA fulfilled this mandate in 2013, issuing a final rule amending FMVSS No. 208, "Occupant crash protection" to require lap/shoulder seat belts for each passenger seating position in: (a) all new OTRBs (except school buses and prison buses); and (b) in new buses other than OTRBs,[27] with a GVWR greater than 11,793 kg (26,000 lb).[28] The final rule significantly reduces the risk of fatality and serious injury in frontal crashes and the risk of occupant ejection in rollovers, thus considerably enhancing the safety of these vehicles.

2. Rollover Structural integrity NPRM

Section 32703(b)(1) of MAP-21 specifies that the Secretary is to establish improved roof and roof support standards that "substantially improve the resistance of motorcoach roofs to deformation and intrusion to prevent serious occupant injury in rollover crashes involving motorcoaches" if such standards meet the requirements and considerations of subsections (a) and (b) of section 30111 of the Vehicle Safety Act. In 2014, NHTSA published an NPRM proposing

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[27] Except school buses, transit buses, perimeter seating buses, and prison buses.
[28] 78 FR 70416; November 25, 2013.

that OTRBs (except school buses) and buses other than OTRBs[29] with a GVWR greater than 11,793 kg (26,000 lb) meet increased structural integrity requirements to protect both restrained and unrestrained occupants in rollover crashes. The NPRM was based on a rollover test set forth in the Economic Commission for Europe (ECE) Regulation No. 66, "Uniform Technical Prescriptions Concerning the Approval of Large Passenger Vehicles with Regard to the Strength of their Superstructure," (ECE R.66).[30]

NHTSA proposed performance requirements that each bus must meet when subjected to a dynamic rollover test. The bus is placed on a tilting platform that is 800 mm above a smooth and level concrete surface. One side of the platform is raised at a steady rate until the vehicle becomes unstable, rolls off the platform, and impacts the concrete surface below.

The proposed rollover structural integrity test is illustrated below in Figure1.

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[29] Exceptions are transit buses, and perimeter seating buses.
[30] Supra. 79 FR 46090; August 6, 2014.

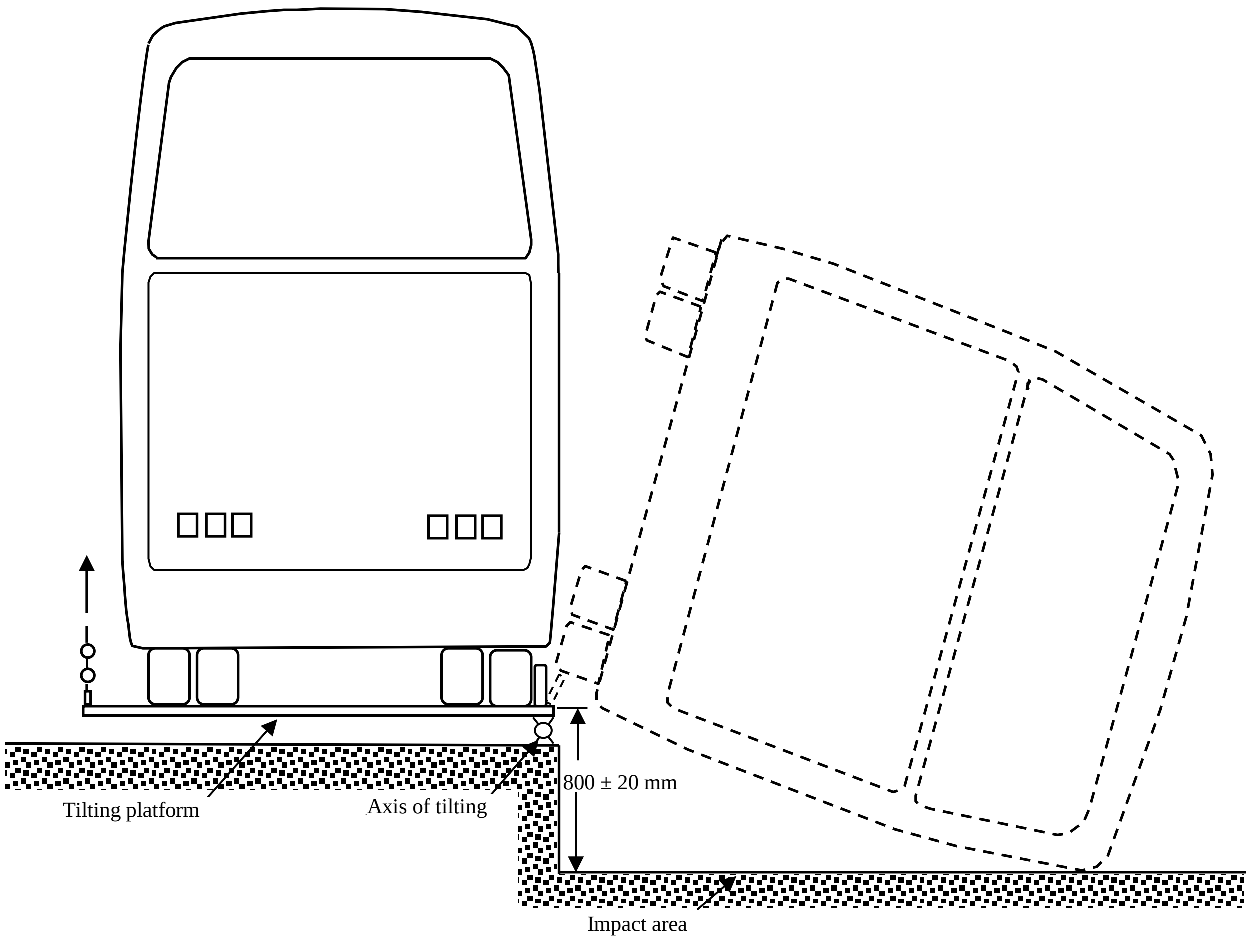

Figure 1: Vehicle on Tilting Platform

The following are the main proposed performance requirements that buses would have to meet when subjected to the rollover structural integrity test:

(1) intrusion into the "occupant survival space," demarcated in the vehicle interior, by any part of the vehicle outside the survival space is prohibited;

(2) each anchorage of the seats and overhead luggage racks must not completely separate from its mounting structure;

(3) emergency exits must remain shut during the test and must be operable in the manner required under FMVSS No. 217 after the test; and,

(4) each side window glazing opposite the impacted side of the vehicle must remain attached to its mounting such that there is no opening that will allow the passage of a 102 mm (4 inch) diameter sphere.

III. Safety Need

a. Background

Each year, the commercial bus industry transports millions of people between and in cities, for long and short distance tours, school field trips, commuting, and entertainment-related trips. According to a census published by the American Bus Association (ABA) in 2008, there were approximately 3,400 motorcoach[31] carriers in the United States and Canada in 2007.[32] These motorcoach carriers operated over 33,000 motorcoaches, logged nearly 750 million passenger trips, and traveled over 1.8 billion miles yearly. Approximately 3,100 of the carriers were chartered U.S. carriers that operated about 29,000 motorcoaches.

In an updated 2011 motorcoach census,[33] the motorcoach industry had grown to 4,478 carriers and 42,960 motorcoaches in the United States and Canada by the year 2010. In the U.S. alone, 4,088 carriers operated 39,324 motorcoaches. Although the number of motorcoaches on the road increased from 2007, the actual number of passenger trips logged dropped to 694 million trips, while the amount of vehicle miles traveled increased to 2.4 billion miles and passenger miles traveled increased to over 76.1 billion. In essence, the data indicated that the frequency of passenger trips may have decreased from 2007 to 2010, but the length or distance of each trip increased.

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[31] As used in the ABA census report, "motorcoach" refers to an OTRB. When we discuss this report and use the term motorcoach, we mean an OTRB.
[32] "Motorcoach Census 2008, A Benchmarking Study of the Size and Activity of the Motorcoach Industry in the United States and Canada in 2007," Paul Bourquin, December 18, 2008.
[33] "Motorcoach Census 2011, A Benchmarking of the Study of the Size and Activity of the Motorcoach Industry in the Unites States and Canada in 2010," John Dunham & Associates, June 18, 2012.

Carriers with a small fleet size (less than 10 motorcoaches) have older average motorcoach fleet age than carriers with a large fleet size (more than 50 motorcoaches). In 2007, the small carriers had an average motorcoach fleet age of 9 years, whereas the large carriers had an average fleet age of 6 years. In 2010, the small carrier's average fleet age increased to 10 years, whereas the large carrier's average fleet age remained the same at 6 years old.

b. FARS Data

NHTSA's Fatality Analysis Reporting System (FARS)[34] was analyzed for a 10 year period from 2004 to 2013 to look at fatal bus crashes within the United States.[35] During this period there were 85 fatal crashes involving all OTRBs regardless of GVWR and other covered non-OTRBs with a GVWR>11,793 kg (26,000 lb) resulting in a total of 212 occupant fatalities (an average of 21.2 total occupant fatalities per year). Tables 4 and 5 show the breakdown of the number of crashes and fatalities by bus body type, GVWR, and crash type, respectively.[36] Fatalities resulting from other events such as fires or occupants jumping from a bus were not included.

There were 59 OTRB and 26 large bus crashes. Among these 85 OTRB and large bus crashes, 40 were rollovers, 41 were frontal crashes, and 4 were side crashes. About 70 percent of the fatal bus crashes involved OTRBs among which 90 percent had a GVWR greater than 11,793 kg (26,000 lb).

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[34] NHTSA's FARS contains data on a census of fatal traffic crashes in the United States and Puerto Rico. Crashes in FARS involve a motor vehicle traveling on a road customarily open to the public resulting in a fatality within 30 days of the crash.

[35] Over-the-Road Bus (Motorcoach) in the FARS database is identified by the bus body type category, "cross-country/intercity bus," and large bus is identified by the bus body categories: "other bus," "unknown bus," and "van-based bus," and by the vehicle's GVWR greater than 11,793 kg (26,000 lb).

[36] The other two bus body types in the FARS database, transit bus and school bus, were also examined and the safety problem due to ejections in rollover accidents was found to be significantly lower than that in OTRBs and large buses. For the 10-year period from 2004 to 2013, 6 passengers (or 0.81 passengers annually on average) were ejected in rollover crashes of school buses and transit buses with GVWR>11,793 kg (26,000 lb), but the ejection path was not known.

Table 4: Over-the-road bus and large bus fatal crashes (FARS 2004-2013)

	rollover	front	side	rear	total
Over-the-road bus	33	25	1	0	59
Large bus GVWR > 11,793 kg (26,000 lb)	7	16	3	0	26
Total	40	41	4	0	85

Table 5: Over-the road bus and other large bus occupant fatalities in crashes (FARS 2004-2013)

Body type	Over-the-road bus		Large bus GVWR>11,793 kg (26,000 lb)		Total		
Crash Type	Driver	Passenger	Driver	Passenger	Driver	Passenger	All
Rollover	6	133	1	7	7	140	147
Front	19	19	8	11	27	30	57
Side	1	1	0	6	1	7	8
Rear	0	0	0	0	0	0	0
Total	26	153	9	24	35	177	212

The OTRB and large bus fatalities were broken down by separating the fatalities for drivers and passengers (Table 5). Passenger fatalities were significantly higher than driver fatalities, accounting for over 83 percent of the total fatalities, and were particularly prevalent in the OTRB category. Rollover events accounted for 79 percent of OTRB and large bus passenger fatalities (compared to 21 percent for driver fatalities).

With the focus on passenger fatalities only, the passenger fatalities were further broken down based on ejection status (Table 6). Of the 79 percent of OTRB and large bus passenger fatalities that were from rollover events, 57 percent of those passenger fatalities were ejected. One in eight of the passenger ejections had a documented known ejection portal through the side window of the bus. Rollovers remain the largest cause of passenger fatalities, for both ejected and non-ejected, in OTRB and large bus crashes.

Table 6: OTRB and large bus passenger fatalities by ejection status (FARS 2004-2013)

Crash Type	OTRB		Large bus GVWR>26,000 lb		Total	
	Eject	No Eject	Eject	No Eject	Eject	No Eject
Rollover	74	59	6	1	80	60
Front	5	14	2	9	7	23
Side	1	0	0	6	1	6
Rear	0	0	0	0	0	0
Total	80	73	8	16	88	89

The agency is proposing the requirements in today's NPRM to improve rollover safety in high-capacity buses. The aforementioned data show that crashes involving rollovers and ejections present the greatest risk of death to the occupants of these buses. The majority of fatalities occur in rollovers, and nearly 60 percent of rollover passenger fatalities are associated with occupant ejection.

In nearly all the recent OTRB and large bus fatal rollover events, there was a significant amount of structural damage to the roof and side structure of the vehicles, as well as open window portals. Hence, NHTSA tentatively believes that the prevention of occupant ejection through portals is a critical part of mitigating the OTRB and large bus fatality and injury rate.

IV. Research

The test procedure and test device proposed in this NPRM were developed from the findings of several NHTSA research programs described in this section.

a. Joint NHTSA and Transport Canada Motorcoach Program (Martec Study)

In 2003, NHTSA and Transport Canada entered into a joint program that focused on improving glazing and window retention on OTRBs to prevent occupant ejection. ("Motor Coach Glazing Retention Test Development For Occupant Impact During a Rollover," August

Federal Motor Vehicle Safety Standards; Glazing Materials

A Proposed Rule by the National Highway Traffic Safety Administration on 04/04/2019

DOCUMENT DETAILS

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National Highway Traffic Safety Administration (https://www.federalregister.gov/agencies/national-highway-traffic-safety-administration)

Dates:
As of April 4, 2019, the proposed amendments to 49 CFR part 571 (/select-citation/2020/12/19/49-CFR-571) that were contained in the notice of proposed rulemaking (NPRM) published June 21, 2012 (77 FR 37477 (/citation/77-FR-37477)) are withdrawn.

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Document Number:
2019-06518

EXHIBIT 24

`ILS

Feedback

PUBLISHED DOCUMENT

AGENCY:

National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION:

Proposed rule; withdrawal.

SUMMARY:

NHTSA withdraws its June 21, 2012 Notice of Proposed Rulemaking (NPRM), which proposed revising Federal motor vehicle safety standard (FMVSS) No. 205, "Glazing materials," to harmonize it with Global Technical Regulation (GTR) No. 6, "Safety Glazing Materials for Motor Vehicles and Motor Vehicle Equipment." Based on the results of the agency's review of available information and analysis of the technically substantive comments on the proposal, NHTSA is unable to conclude at this time that harmonizing FMVSS No. 205 with GTR No. 6 would increase safety.

DATES:

As of April 4, 2019, the proposed amendments to 49 CFR part 571 (/select-citation/2019/04/04/49-CFR-571) that were contained in the notice of proposed rulemaking (NPRM) published June 21, 2012 (77 FR 37477 (/citation/77-FR-37477)) are withdrawn.

FOR FURTHER INFORMATION CONTACT:

James Myers, Office of Crashworthiness Standards (Phone 202-366-1810; FAX: 202-366-2739) or Callie Roach, Office of the Chief Counsel (Phone: 202-366-2992; FAX: 202-366-3820).

You may send mail to these officials at: National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

I. Background

Federal Motor Vehicle Safety Standard (FMVSS) No. 205, "Glazing materials," (49 CFR 571.205 (/select-citation/2019/04/04/49-CFR-571.205)), specifies performance requirements for the types of glazing that may be installed in motor vehicles. It also specifies the vehicle locations in which the various types of glazing may be installed. The purpose of FMVSS No. 205 is to reduce injuries (*e.g.,* lacerations) resulting from impact to glazing surfaces, to ensure a necessary degree of transparency in motor vehicle windows for driver visibility, and to minimize the possibility of occupants being thrown through the vehicle windows in collisions. FMVSS No. 205 applies to passenger cars, multipurpose passenger vehicles, trucks, buses, motorcycles, slide-in campers, pickup covers designed to carry persons while in motion and low speed vehicles, and to glazing materials for use in those vehicles.

GTR No. 6, "Safety Glazing Materials for Motor Vehicles and Motor Vehicle Equipment," was adopted under the United Nations/Economic Commission for Europe (UN/ECE) 1998 Agreement, which is administered by World Forum for Harmonization of Vehicle Regulation (WP.29). At the one-hundred-and-thirty-second session of the WP.29 in March 2004, the formal proposal to develop a GTR on safety glazing was adopted, and at that time restricted the scope of the glazing GTR to glass safety glazing, thereby excluding other materials, such as plastics. The objective of GTR No. 6 is to develop an internationally harmonized standard regarding the safety of glass automotive glazing materials. GTR No. 6 includes requirements and tests to ensure that the mechanical properties, optical qualities and environmental resistance of glazing are satisfactory; it does not include type approval, plastic glazing and installation requirements.

II. NPRM

On June 21, 2012, NHTSA published a NPRM [1] as part of the agency's ongoing effort to harmonize vehicle safety standards under the UN/ECE 1998 agreement when, and to the extent, appropriate to do so. The agency stated in the NPRM that harmonization with GTR No. 6 would modernize the test procedures for tempered glass, laminated glass, and glass-plastic glazing used in front windshields and rear and side windows. The GTR proposed an upgraded fragmentation test for testing the tempering of curved tempered glass, and a new procedure for testing an optical property of the windshield at the angle of installation, to more accurately reflect real world driving conditions than the current procedure used in Standard No. 205. The agency said further that most of the proposals were minor amendments that would harmonize differing measurements and performance requirements for similar test procedures. Many of the tests in the GTR were said to be substantially similar to tests currently included in FMVSS No. 205.

III. Comments Received

Start Printed Page 13223

In the NPRM, the agency requested public comment on whether the proposed amendments reflecting provisions of the GTR are suitable for being adopted into the Federal glazing standard. NHTSA received comments from 14 entities in response to the NPRM to adopt GTR provisions in FMVSS No. 205.[2] These comments came from trade associations, glazing manufacturers, automobile manufacturers, a glazing industry expert, and a safety technology company. Overall, most of the comments supported the harmonization efforts, though several suggested revisions or requested clarification. A few commenters were opposed to certain aspects of the proposed harmonization of glazing standards, with one respondent completely opposing the NPRM. NHTSA also received comments for definitions, markings, and cost.

IV. Decision to Withdraw Rulemaking

Crash data indicates that current glazing materials are performing acceptably. Since the 1960s, the magnitude of the safety problem for glazing has been substantially reduced.[3] The increased availability of automatic occupant protection systems has resulted in a substantial reduction in the numbers of occupants impacting the windshield and thus being exposed to lacerative injuries from broken glass. The current glazing standard ensures that emerging and evolving glazing technologies produce commensurate benefits and that glazing remains a safety concern rather than becoming a safety problem.

According to agency crash data, occupant ejection, particularly during rollover events, is a much larger safety problem than lacerations from broken glass. NHTSA addressed this safety problem by issuing FMVSS No. 226, "Ejection mitigation," in 2011. The standard became fully phased-in in 2017. While glazing materials may be one component of an ejection mitigation countermeasure system, the scope of FMVSS No. 205 is focused on material performance in terms of the glazing mechanical strength, optical properties, and environmental durability. The tests described in FMVSS No. 205 assure conformance with minimum required glazing equipment performance levels.

Based on the results of our review and of available data and analysis of the technically substantive comments, the agency is unable to conclude at this time that harmonizing FMVSS No. 205 with GTR No. 6 would, on balance, increase or decrease safety. While some of the proposed changes would be expected to improve safety as they more accurately reflect real world driving conditions, others may result in a decrease in safety. NHTSA has determined that it does not have sufficient data to evaluate the safety implications of harmonizing FMVSS No. 205 with GTR No. 6. Therefore, NHTSA has determined that the most appropriate path forward at this time is to withdraw the 2012 NPRM.

In order to better inform future agency decisions, NHTSA is planning a glazing research study. NHTSA is also monitoring SAE International's efforts to publish a new Glazing Standard, SAE Standard J3097 "Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways." If this study is undertaken as planned, it may enable the agency to reach clearer conclusions about the impact of harmonizing FMVSS No. 205 with GTR No. 6. Depending on the outcome of that study and SAE's progress, NHTSA would consider those data in potential next steps.

The agency notes that this document does not represent a decision whether or not to adopt GTR No. 6. NHTSA voted in favor of establishing a global technical regulation (GTR) on automotive glazing and considered adopting the regulations by issuing an NPRM in 2012. However, after considering public comments received in response to the proposal, the agency is withdrawing the NPRM to reconsider its next steps. Accordingly, NHTSA withdraws the 2012 proposed glazing GTR harmonization rulemaking.

Issued in Washington, DC, under authority delegated in 49 CFR part 1.95 (/select-citation/2019/04/04/49-CFR-1.95) and 501.5.

Heidi Renate King,

Deputy Administrator.

Footnotes

1. *77 FR 37478 (/citation/77-FR-37478).*
Back to Citation

2. *Docket No. NHTSA-2012-0083.*
Back to Citation

3. *Kahane, C.J. (2015, January). Lives saved by vehicle safety technologies and associated Federal Motor Vehicle Safety Standards, 1960 to 2012—Passenger cars and LTVs—With reviews of 26 FMVSS and the effectiveness of their associated safety technologies in reducing fatalities, injuries and crashes. (Report No. DOT HS 812 069). Washington, DC: National Highway Traffic Safety Administration.*
Back to Citation

[FR Doc. 2019-06518 (/a/2019-06518) Filed 4-3-19; 8:45 am]

AMECA Automotive Safety Glazing Certification Program

Certificate Number: 4308.01

EXHIBIT 25

Automotive Manufacturers Equipment Compliance Agency, Inc.	Document No.	SC04
	Revision No.	10
	Date	1-10-2020
AMECA Automotive Safety Glazing Certification Program		Page 1 of 24

Automotive Manufacturers Equipment Compliance Agency, Inc. 250 Englar Rd., Suite 1 Westminster, MD 20057 Tel. No. +202-898-0145 Fax No. +202-898.0148 Email : **info@ameca.org**	Prepared by	Sign.	
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		Designation	Technical Director

This manual is the property of **Automotive Manufacturers Equipment Compliance Agency, Inc.** No corrections / amendments are to be made except by the person authorized. The holder to return the manual when he leaves the organization or when he has no further use for it.

The Certification Process Overview

1. <u>Manufacturer Factory Approval.</u>

Prior to ANY parts being approved AMECA will conduct a thorough on-site review of the manufacturers quality system, access to OEM/SAE and FMVSS standards, inventory tracking, quality verification and geometric dimensioning and tolerancing capabilities.

Each factory, each part, stands on its own.

Items must be tested prior to inclusion to the AMECA Program.

2. <u>Manufacturer Part Approval.</u>

All safety glazing must meet FMVSS 205/205A. However, there may be additional tests required by the vehicle type and glazing application. Different vehicles may have very different design and service requirements. This scheme will attempt to provide as much information as possible on the testing requirements. During application process, the manufacturer and AMECA must agree on a set of standards to which a product will be tested to.

Factory Application Process is in Section 1.

Part Certification Requirements including details on tests, measurements required Section 7.5.1.

3. <u>Part Certification/Vehicle Fit.</u>

After the factory is approved, the manufacturer may submit individual parts for certification from that factory only.

Each part is tested to relevant OEM, SAE and or FMVSS standards. In addition, products are tested for fit, finish, electrical compatibility and material selection. Products must be marked to FMVSS/SAE standards including country and date of manufacture. If all tests are passed a company may apply the AMECA Certification Sticker.

To be included in the AMECA Registry of Certified products all products must:

- Have test reports submitted to AMECA and approval granted.

- Product manufactured in AMECA approved facility.
- Must use the AMECA Certification Sticker.
- Be marked with individual serial numbers and barcoded **OR** QR code.
- Part Numbers/Serial numbers must be sent to AMECA.
- Use at least 3 OE samples for the initial part design.
- Final measured results must be **between** the values of the 3 initial samples.

AMECA Certification Stickers

Vehicle Safety glass presents a unique challenge in regards to marking. There are specific markings required by FMVSS 205 which are typically silkscreened at the factory and do not lend themselves to serialization. In addition, any non-removable sticker may interfere with the drivers required field of view. Consequently, for safety glazing, the AMECA Certified stickers may be **removable** as long as the AMECA Certified Logo and the serial number and barcode/QR Code is permanently marked on the glazing in an area visible when installed.

Special exceptions can be made for historic vehicle glazing.

4. Maintaining Quality.

After factory and part approval is completed, each part is checked by a market audit by purchasing the part from a retailer. Any damage to the product from shipping and handling is noted. Factories are also regularly audited by AMECA.

AMECA has an open complaint process where anyone can file a complaint if they believe the part does not meet standards—including cosmetic requirements.

AMECA random market audit and complaint program can lead to the delisting of parts. The delisted parts will also be available on the AMECA website. AMECA has an appeal process for manufacturers to ensure that the process is conducted impartially.

5. Warranty.

AMECA does not warranty parts. Parts warranties are between the buyer and seller and can vary by state and jurisdictions involved.

Manufacturers are responsible for ensuring that the product displaying the AMECA Certified Logo conforms to the necessary standards for its safe operation. AMECA is certifying that part meets those standards.

6. Program Cost.

Manufacturers are charged the amounts listed below plus expenses, for each facility audit fee.

- $2500 for each factory audit. One per year. Approximately 2-3 days.
- $1500 for each factory validation audit-one per year. Approximately 1-2 days.
- $350 for each product.
- $1000 Market Audit Testing fees are separate from the independent laboratory.
- Label Costs

100,000	$0.05 EA
500,000	$0.04 EA
1,000,000	$0.03 EA

Certification Program Details

1. **<u>Document Description.</u>**

1.1. This document is the ISO-17067 Certification Scheme for materials to comply with the ISO-17065 certification process conducted by AMECA.

1.2. Our program scope will be automotive safety glazing products. (17067 S6.5.1a).

1.3. AMECA will be operating a Type 4 certification scheme.

1.4. AMECA personnel and AMECA contractors will conduct an onsite audit of each manufacturing location. AMECA and the contractor will alternate every 6 months. Audits will verify manufacturers are:

- Maintaining product quality.
- Have up to date documents, procedures and standards.
- Properly marking certified products.
- Conducting production line testing.
- Spot checking production line testing results.
- Access to OEM information, as necessary.
- Using the correct material specifications.
- Not making any undocumented/unapproved changes.

Factory Application Process

Each manufacturing location will stand on its own.

Companies with multiple locations must all undergo the same process.

1.4.1. Manufacturers will provide the following information for each facility which will be manufacturing parts.

1.4.2. Copy of ISO-900I/IATF-16949 (ISO/TS 16949) Certificate issued by a Management System Certification Body accredited to ISO/IEC 17021-1 by an IAF-MLA Signatory

Accreditation Body. AMECA will NOT be conducting an ISO-9001/IATF-16949 (ISO/TS 16949) audit. Merely that the audit in place is adequate.

1.4.3. Completed F31 AMECA Glazing Manufacturer Application.

1.4.4. List of standards available to company. For SAE Standards having access to current year SAE Handbook is sufficient. Manufacturers *must* have a complete set of standards and reference documents detailed in Section 2 for the products they manufacture.

1.4.5. Manufacturers must be able to provide the information in Section 7.5.1 for all products requesting certification.

1.5. Knowledge of SAE J1739 Potential Failure Mode and Effects Analysis in Design (Design FMEA), Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes (Process FMEA) or equivalent.

1.6. Certified products must use the “AMECA Certified” Logo on their products or packaging as per F28, AMECA Certification and Licensing Agreement. See Appendix B.

1.6.1. Manufacturers must have the ability to conduct production line quality testing.

1.6.2. Manufacturers may use two methods for production sampling. Either sample according to ISO 28590/ISO 2859/2 **OR** an use the Production Testing Sampling table below.

a. ISO 2859/2 5% Quality Limit (See ISO 2859/2 Table B6)

Production Testing Sampling			
Topic	Criteria	Mininum Frequency	
		< 600	≥ 600
Lens coating thickness	Minimum Coating Manufacturer Recommendations	1/Lot	1/Lot
Appearance (Class A and visible Class B Surfaces) See Section 7.5.7	Nothing below 8 per ASTM D660-90	100%	100%
Identification	FMVSS 108/SAE J759, including lot #	100%	100%

Trim/Gap Checking	1 beginning, 1 middle, 1 end	3 pcs/lot	3 pcs/lot
Flush Measurement	1 beginning, 1 middle, 1 end	3 pcs/lot	3 pcs/lot
Hole size/location	1 beginning, 1 middle, 1 end	3 pcs/lot	3 pcs/lot
Weight (NOT under OE weight)	1 beginning, 1 middle, 1 end	3 pcs/lot	3 pcs/lot
Photometrics	3 Points per Function	100%	100%
Sealing Test	FMVSS 108 S14.6.9, (1 cycle) or submerge lamp for 60 seconds with 70 kPa pressure applied to inside of lamp.	100%	100%

2. <u>Normative References/Standards (17067 S6.5.1 b).</u>

Manufacturers will be responsible to ensure that all relevant standards are met for their products to ensure a safe and reliable product. In many instances, OEM references may go far beyond what is required by either FMVSS or SAE.

If there is a conflict between an FMVSS standard and a SAE Standard, **FMVSS always prevails**.

Not every item will use every standard. However, AMECA will ONLY be certifying glazing to FMVSS 205 or 205a. Manufacturers are required to have access to SAE and OEM specifications as necessary.

Below are some of the standards which a manufacturer may need. This is not a complete list but a list of some of the standards which may be required.

FMVSS 205

FMVSS 205a

ANSI Z26.1 1996

Correctness to OEM Fit, Finish and Geometric Dimensioning and Tolerance standards

SAE J100 Class "A" Vehicle Glazing Shade Bands

AUTOMOTIVE MANUFACTURERS EQUIPMENT COMPLIANCE AGENCY, INC.

AMECA CERTIFICATE OF EQUIPMENT COMPLIANCE

250 Englar Rd., #1 Westminster, MD 21157
TELEPHONE: (202) 898-0145 · FAX: (202) 898-0148 · WWW.AMECA.ORG

This Certificate verifies that the item described below has been tested by an accredited laboratory and has been found to be in compliance with the jurisdictional standard(s) listed below where applicable. The issuance of this AMECA Certificate of Equipment Compliance does not denote or imply any endorsement or recommendation of the item described below.

Certificate Number: 2xxxxxxx

Test Report Date: November 21, 2016
Certification Date: September 7, 2017
Expiration Date: January 1, 2020

Applicant: Acme Engineering
123 Main Street
Warner, CA, 201708

ITEM: "abc-123" – (Item Description)

Use: On (make, model and year as much as possible)

Jurisdictional Compliance Standard(S)
Identical To: United States FMVSS or SAE as applicable

Markings: (Identification markings)

Test Lab: (Lab which conducts testing.
Report Number: (supplied by lab)

____
Executive Director

Form F203A, Lighting/Glazing/Wheel and Suspension Certificate, Revision No. 01

Chapter 12

Marijuana and Driving Impairment

Barry K. Logan

1. Effects of Marijuana

After alcohol, marijuana is the most popular recreational drug in North America. Its effects are largely predictable in type, but not in degree, although they do appear in a roughly dose-dependent manner. The effects discussed here make a very convincing case for the potential for marijuana to impair driving, although as noted, the extent to which that potential is realized in a given case will be related to many other factors.

1.1. Getting "High"

People variously use marijuana for its exhilarating, relaxing, hallucinogenic, antinausea, and soporific effects.

Marijuana is most frequently smoked and less frequently eaten in baked goods or drunk as an infusion. Cannabis products, including marijuana, hashish, and hashish oil, can be ingested orally, in tea, or baked into brownies. The effect profile from oral ingestion is much longer, taking longer for the drug to be absorbed and for the active Δ^9-tetrahydrocannabinol (THC) to be distributed. The drug is likely subject to enterohepatic cycling when orally ingested, further complicating its kinetics. Metabolite concentrations are often highly elevated. It is not uncommon for the acute effects to last for 24 hours following oral ingestion. Oral use is also more frequently associated with adverse effects, such as paranoia, panic, depression, and irritability. Currently available tests for blood or urine will not allow discrimination of the route of administration.

Following smoking, marijuana effects appear within 5–10 minutes. The lower-grade effects are remarkably similar to those resulting from alcohol consumption: relaxation, social disinhibition, and talkativeness. This disinhibition leads to users perceiving the drug effects as being mildly stimulatory at low doses. Users report the

From: *Forensic Science and Medicine: Marijuana and the Cannabinoids*
Edited by: M. A. ElSohly © Humana Press Inc., Totowa, New Jersey

experience as producing a general sense of well-being, which can rise to the level of exhilaration or euphoria. It is described as a blissful state of reverie, fantasy, free-flowing thought, and clarity. The senses are heightened, with colors, smell, touch, taste, and body perception being enhanced. Cravings for food are common. Bouts of uncontrollable spontaneous laughter or giggling are regularly seen, with even common events appearing to be funny or amusing.

The perceptual effects of marijuana use have an association with driving impairment at least in part as a result of their distracting nature. The degree to which someone is absorbed in his or her drug experience will affect his or her inclination to engage fully in other demanding tasks such as driving. The degree of effect will differ from individual to individual and can be significantly affected by the setting.

1.2. Physiological Effects

The physiological effects of marijuana use are more tenuously related to driving; however, they are useful indicators in assessing a person for recent marijuana use. THC is a vasodilator, and within minutes of smoking marijuana, peripheral vasodilation leads to a precipitous drop in blood pressure and a reflex increase in heart rate. Users can feel dizzy or faint until homeostasis is restored. The dilatory effects of the drug on the capillaries in the sclera produce a distinctive reddening of the eyes, giving them a bloodshot appearance. Users usually report a dry throat and mouth. Among the other effects on the eyes are loss of convergence or ability to cross, hippus (an intermittent change in the size of the pupil occurring without external stimuli), and rebound dilation following changing light conditions, in which the pupil size will oscillate before stabilizing. Nystagmus, or the ability of the eye to track smoothly, is affected by marijuana and becomes more prominent under conditions of very high or repeated dosing.

Although these effects are not indicators of impairment *per se*, this characteristic set of symptoms can be relied on by police officers or medical personnel to make a connection between an individual's appearance of intoxication and recent marijuana use.

1.3. Cognitive and Psychomotor Effects

Driving is a complex task requiring the integration of various cognitive and psychomotor skills. Cognitive skills are those related to the processes of knowing, thinking, learning, and judging. For driving, these effects include memory, perceptual skills, cognitive processing and task accuracy, reaction time, and sustained and divided attention.

Impairment of short-term memory and learning impairment following marijuana use is probably the most frequently reported and validated behavioral effect of marijuana use, and one for which there is the most consistent evidence. The link between memory impairment and driving impairment is, however, difficult to make convincingly. The strongest argument is the contribution of memory impairment to focus and selective attention. A clear recollection of recent events contributes to organizational and planning ability and promotes goal-directed behavior and action, allowing the subject to devote available cognitive capacity more efficiently to the driving task.

The user's perception is altered with respect to the passage of time, which appears to pass more quickly relative to real time. Impairment in perception of speed and distance may be related to the time distortion. Laboratory studies have shown that cannabis users lose the perceptual ability to identify simple geometric figures within more complex patterns when intoxicated. Such perceptual changes can influence a person's normal driving behavior in a potentially unsafe way.

Simple tests of cognitive processing such as measures of associative ability (e.g., digit symbol substitution, Stroop color word test) have been shown to be adversely affected by acute cannabis use resulting in greater numbers of errors. The effect when compared to moderate doses of alcohol, however, is small.

Reaction time effects are also present and are more significant at higher doses, but they are generally small compared with those observed with moderate doses of alcohol. Impairment indicators are more prominent in complex rather than simple reaction time tests, and subjects tend to perform more slowly and make more errors.

Driving is a divided-attention task, and as such, laboratory assessments of divided and sustained attention performance have been scrutinized for evidence of effects. These tests show consistently that the greater the demands on cognitive processing ability, the more complex the tasks, and the more tasks to be attended to, the poorer marijuana-dosed subjects performed. This has important implications for marijuana and driving impairment and explains the findings in some of the on-road driving studies discussed later.

Driving demands various levels of attention, cognitive capacity, and psychomotor ability, depending on factors such as weather, road conditions, vehicle condition, other road user behavior, lighting, and city vs highway driving. The threshold demands of driver performance for satisfactory vehicle operation might be within the subject's ability under normal driving conditions, but if the demands change unexpectedly, or emergencies arise, or there is a confluence of demands occurring at once (merging traffic, signal failure, unfamiliar neighborhood, road construction, etc.), the driver's ability is surpassed and errors arise that result in a crash or bring the driver to the attention of the police. Peak cognitive impairment effects are reported to occur roughly 40–60 minutes following smoking and typically last for about 2–3 hours.

1.4. Hallucinations

The effects noted on heightened awareness of colors, smell, touch, and taste can be enhanced to the point where they constitute hallucinations—perceptions of things or sensations that do not exist. Objects can appear to "melt" or to lose or change form. Synesthesias can occur in which, for example, sound or music can trigger visual or olfactory sensations. In most marijuana users who do experience these, they are more correctly characterized as pseudohallucinations in that the user is aware that the perception is unreal even while experiencing it. Nevertheless, hallucinations of any kind are distracting and absorbing and, when they occur, will impair attention and focus.

Infrequently, flashbacks are reported where individuals will re-experience or vividly recall the experience of a previous marijuana "trip." This can be triggered by environmental cues or by readministration of marijuana or some other psychoactive drug.

1.5. Other Adverse Reactions

Although many of the effects discussed above have the potential to be detrimental to driving, the adverse affects considered here are those not sought by the recreational marijuana user (a "bad trip"). They are atypical, but can be related to the user's underlying frame of mind or mood, and are most commonly reported by naïve users. These include dysphoria, fearfulness, extreme anxiety, mild paranoia, and panic. When this occurs, its relationship to impairment of driving is clear. Typically at higher doses or in naïve users, sedation or sleepiness becomes a significant factor, and presumably users already tired would be more susceptible to this effect.

1.6. Discussion

Based on the above considerations, it is clear than in many respects marijuana has the ability to produce effects—both sought-after and incidental—that can affect the balance of skills and abilities needed to drive safely. These effects can vary in magnitude, but frequently when compared with effects of moderate dosing with alcohol (e.g., the presumptive level for intoxication in many US states of 0.08 g ethanol/100 mL blood), the impairing effects are less severe, even after the use of typical user-preferred doses. Additionally, the consistent observation that the impairing effects of marijuana after moderate use will dissipate in 2–3 hours limits the likelihood of police contact or crash involvement if the driver allows some time to pass between marijuana use and driving. The related ability of marijuana users to recognize the drug effect and take a less risky course of action also contributes positively to harm reduction.

On balance, the empirical evidence suggests that impairment observed following recent marijuana use can very reasonably be ascribed to the drug. This is most likely when the drug use, if moderate, is within 3 hours of driving. Beyond this time frame, however, light to moderate marijuana use under normal demands of driving does not consistently generate impairment in driving skills that would come to the attention of the police or result in increased risk of crash involvement.

2. Evidence of Marijuana Intoxication

2.1. Diagnosis of Marijuana Use: Physiological and Psychomotor Effects

According to the Drug Recognition Expert evaluation matrix used by police officers, characteristic symptoms of marijuana use include a lack of horizontal or vertical gaze nystagmus, pupil size dilated to normal, a lack of pupillary convergence, and pupils normally reactive to light. Pulse is usually elevated within the first few hours following use, and blood pressure is correspondingly elevated. Body temperature will typically be normal. Speech may be slow or slurred, and muscle tone will be normal. Other clues include stale breath; sometimes users will have flakes or residue of marijuana in the mouth or a green discoloration of the tongue. The taste buds may be elevated as a result of irritation from the hot smoke. The user's eyes will typically be bloodshot because of the vasodilatory effects of THC on the capillaries of the sclera. The face may be similarly flushed, and subjects may be diaphoretic. Nystagmus is not typically present, although some studies do suggest an association between acute marijuana use and nystagmus.

Subjects may have short attention spans, express hunger (THC is an appetite stimulant), and giggle or laugh. If acutely intoxicated, users may also seem dazed, disengaged, or unconcerned. Because of the short distribution half-life of THC, users may also appear to sober up or improve in their performance and coordination during the first hour or two in custody.

Field sobriety tests have been criticized for having been validated for alcohol and not for other drugs. The tests, however, are considered tests of impairment; that is, they are tests that a normal sober person can perform without much difficulty, but that a person impaired in cognitive and psychomotor skills cannot. Any errors in the test may therefore be considered indicators of impairment irrespective of its cause. A careful validation of the tests for marijuana has recently been performed in 40 subjects. Papafotiou et al. *(1)* evaluated the efficacy of the standardized field sobriety three-test battery on marijuana smokers. They applied the three tests—horizontal gaze nystagmus, walk and turn, and one-leg stand—at 5, 55, and 105 minutes after smoking a placebo, 1.74%, or 2.93% THC content marijuana cigarette. The data are summarized in Table 1.

The study showed dose-dependent increases in rates of impairment in the subjects, with the most pronounced effects closest to smoking. It also confirmed low rates of failure of 2.5–7.5% in nonintoxicated subjects. After 100 minutes, symptoms of impairment were beginning to diminish. The authors also noted a fourth category of head movements and jerks. Adding the head movements and jerks observations improved the diagnostic value of the tests by 5–20% and should be considered for future inclusion in a battery of tests for drug impairment.

Individually, the walk-and-turn test elicited significant differences in performance between the marijuana and placebo conditions, but misses heel to toe, improper turn, and incorrect number of steps appeared almost as often in the placebo session as they did in the THC conditions and are therefore likely to be observed irrespective of drug consumption. Balance and ability to focus attention were impaired at all three time points. Of the three tests, the one-leg stand was the most significant at all three time points, with poorer performance being significantly related to the level of THC at all testing times, as was performance on all of the scored signs of this test except for hopping at Time 3.

Overall, when impairment caused by drugs including marijuana is present, it apparently can be detected by the tests currently in widespread use by police officers. It is likely that these tests can be further refined to increase their effectiveness and sensitivity.

2.1.1. Toxicological Tests

Marijuana use can be demonstrated by a chemical or toxicological test. Toxicological tests for detection of marijuana use currently include hair, urine, blood, sweat, and oral fluid. Hair marijuana tests offer the possibility of looking at marijuana exposure over the time period during which the hair was growing. Hair grows at a rate of about 1 cm a month, and most commercial vendors offering hair testing will test a 3-cm (~3 month) section closest to the scalp. Upon request, a longer length can be tested, in sections if necessary, to assess patterns of use over the lifetime of the growth of the hair. This test has little applicability in assessing intoxication at any particular point in

Table 1
Relationship Between Time After Smoking, Average Blood THC Concentration (ng/mL), and Percentage of Subjects Considered Impaired Under Standardized Field Sobriety Tests (SFSTs)[a]

	Time 1 (0–5 min)		Time 2 (50–55 min)		Time 3 (100–105 min)	
Dose	Blood THC	% impaired	Blood THC	% impaired	Blood THC	% impaired
Placebo	0	2.5	0	7.5	0	5
1.74% THC	55.5	23	6.8	23	3.7	15
2.93% THC	70.6	46	6.2	41	3.2	28

THC, Δ^9-tetrahydrocannabinol.

[a]Time 1, 0 min after smoking for blood sampling and 5 min for SFSTs; Time 2, 50 min after smoking for blood sampling and 55 min for SFSTs; Time 3, 100 min after smoking for blood sampling and 105 min for SFSTs.

From ref. *1*.

time, however, as would be relevant in an impaired driving investigation. If the subject's prior marijuana use became an issue, this approach could offer some qualitative insight.

2.1.1.1. Toxicological Evidence: Urine

As discussed in Chapters 5 and 9, THC is metabolized to 11-OH-THC and 11-carboxy-THC (THC-COOH). The latter compounds are glucuronidated and excreted in the urine. Substantial variation exists in the excretion patterns of marijuana metabolites in subjects' urine. THC metabolites appear in the urine in detectable amounts within 30–90 minutes following smoking, but they may not reach the levels needed to cause a positive response at typical thresholds used for screening. Many laboratories use the 50 ng/mL screening cutoff mandated for federal workplace urine drug testing, but one study showed that first void urine specimens after smoking a single 3.55% THC marijuana cigarette quantitated below that threshold in five of six subjects, at times ranging from 1 to 4 hours (mean 3.0 hours; ref. *2*). In the same subjects, each smoking an identical 3.55% THC cigarette, peak urine concentrations varied considerably (29–355 ng/mL, mean 153 ng/mL), as did the time to peak (5.6–28 hours, mean 13.9 hours). Similarly, urine specimens were confirmed positive by gas chromatography/mass spectrometry at a 15 ng/mL cutoff for 57–122 hours following this single use (mean 89 hours or 3.7 days). The same authors have reported similar results in other subjects *(3)*. Using a lower threshold, for example, 20 ng/mL, was shown to be more effective in identifying use for a longer period of time and presumably for earlier detection of use in urine samples.

Other workers have evaluated the time it took for urine samples to test consistently negative in chronic marijuana users *(4)*. These authors identified an extreme case of a subject who took 77 days to produce 10 consecutive negative urine samples screened at a 20 ng/mL cutoff. Of the 86 subjects evaluated, the mean time to the end of their consecutive positive results at that threshold was 27 days.

There are significant implications following from these and similar studies for the use of urine as the specimen in a driving-under-the-influence-of-drugs (DUID)

2.1.1.4. Summary

Blood concentrations of both THC and THC-COOH drop precipitously in the first few hours following smoking, because these substances partition into fatty compartments. It is recommended that blood or plasma concentrations of THC and THC-COOH be interpreted with caution. Under most circumstances, detection of parent THC will reflect recent use, meaning within the last few hours, making the likelihood of impairment within that time frame that much greater. More distant, higher-intensity marijuana use cannot be ruled out, however, when THC is detected, and under that pattern of use impairment may persist longer than the 2–3 hours typical of the low- to moderate-dose administration. Detection of THC-COOH in the absence of the parent drug (i.e., <2 ng/mL) tends to suggest more distant use (>2 hours). It should go without saying that the screening threshold and confirmatory test sensitivity of the analytical laboratory must be taken into consideration when evaluating these results.

3. Epidemiology of Marijuana and Driving

A thorough review of epidemiological studies related to marijuana in various driving populations was done recently by Huestis *(14)*, and we will not attempt to replicate that in this chapter. The focus of this discussion is on studies that have attempted to relate marijuana use to risk of accident involvement or accident culpability.

A survey of many of the studies cited by Huestis shows various rates of marijuana positivity in impaired drivers, fatally injured drivers, drivers injured in motor vehicle accidents, and commercial vehicle operators. The rates of positivity vary depending on whether blood or urine was tested, whether the parent or metabolite was tested for, whether the samples were provided voluntarily or following arrest, the sensitivity of the testing method, and whether the study group was selected out (e.g., only subjects without alcohol tested). In spite of these variables, in the fatally injured driving population overall, 10–20% of drivers test positive for cannabinoids, whereas in the arrest population rates are between 15 and 60%, suggesting a significant role for marijuana use.

None of these studies has control data, however, that would show the rate of marijuana use in the local driving population not killed or injured in a collision, such that a comparative rate or odds ratio for fatal accident involvement could be calculated. Another limiting factor was that in some studies urine was tested, and, as noted above, urine can test positive for marijuana use for a few days following use, while the impairing effects last only for a few hours.

These studies do uniformly find evidence, however, that there is widespread use of marijuana in all these driving populations. In nonselected populations (e.g., all fatally injured drivers, trauma patients), the incidence of cannabinoid positives was typically between 5 and 20%, and in selected populations (e.g., young males, fatally injured drivers) the rate was as high as between 15 and 60%.

A recent voluntary test of commercial vehicle operators in Washington and Oregon *(15)* showed a marijuana-positive rate of 5%, in spite of a 19% refusal rate in what is a heavily regulated industry with mandatory random testing. A similar survey done in 1988 showed 15% of tractor trailer drivers positive for cannabinoids, suggesting some improvement following the introduction of testing *(16)*.

3.1. Assessment of Relative Crash Risk Following Marijuana Use

Studies that have assessed crash responsibility offer more insight into the quantitative relationship between marijuana usage and crash involvement. An excellent review of culpability studies has recently been published *(17)*. The general design of these studies is to compare rates of drug use in at-fault drivers vs no-fault drivers and compute the ratio, with values greater than 1.0 indicating increased rates of risk. The 95% confidence interval is also computed, and when the range includes 1.0, the difference in responsibility rates is not significant at the $p = 0.05$ level.

In most of these studies, authors validate their data set and methodology by assessing odds ratios for alcohol. The relationship between alcohol and risk of crash involvement has been well established, most famously in the 1960 Grand Rapids Study. In each case the method showed the expected significant relationship at the $p = 0.05$ (95% confidence interval) level between alcohol positivity and greater odds of crash involvement.

The data from studies that made odds ratio assessments based on the presence of the inactive THC-COOH metabolite uniformly failed to show significant differences at the $p = 0.05$ level in rates of accident involvement for the drug-positive drivers. This can be rationalized in terms of the fact that the metabolite is inactive and that in most cases urine was being tested. Bearing this in mind, together with the fact that urine can test positive for the metabolite for many hours or even days after the effect has passed, its detection in urine is not a good surrogate for impairment, and the negative findings are not surprising.

Studies assessing crash risk based on parent THC in blood are more informative. One study of 2500 injured drivers *(18,19)* showed a trend towards increasing odds ratio with increasing THC concentration (although not significant at $p = 0.05$) and found that culpable drivers had a higher mean THC concentration ($p = 0.057$). This suggests a dose-dependent increase in risk, with the threshold for significance being somewhere above 2 ng/mL THC. One limitation of the Hunter study is the lack of control of the interval between driving and when the sample was collected. Intervals of an hour or less between the driving and the time the sample was collected would cause appreciable decreases in THC concentration.

In a cohort of 3398 fatally injured drivers *(20)*, the authors avoid this limitation because absorption of THC will stop at the time of death. Those data showed an odds ratio of 2.7 in cases in which THC was detected and 6.6 when the THC concentration was greater than 5 ng/mL.

Several studies have evaluated crash risk in drivers positive for both alcohol and marijuana (THC or THC-COOH). Table 4 shows that irrespective of whether the parent drug or metabolite was measured, when combined with alcohol the odds ratio for crash involvement was between 3.5 and 11.5 (significant in all cases, $p = 0.05$) and compared to alcohol positive cases was still significant, with an odds ratio of 2.9.

Taken together, these data represent strong evidence for a concentration-dependent (and consequently dose-dependent) relationship between THC and risk of crash involvement and enhanced risk for any use of marijuana when combined with alcohol.

NO. 19-004578-CV

COURTNEY WHITE	§	**IN THE 748th DISTRICT COURT**
	§	
Plaintiff,	§	**IN AND FOR**
v.	§	
	§	
AEROCOACH BUS WORKS, INC.	§	**TRAVIS COUNTY**
	§	
Defendant.	§	**STATE OF LONE STAR**

FINAL JURY INSTRUCTIONS

Members of the jury, I shall now instruct you on the law that you must follow in reaching your verdict. It is your duty as jurors to decide the issues, and only those issues, that I submit for determination by your verdict. In reaching your verdict, you should consider and weigh the evidence, decide the disputed issues of fact, and apply the law on which I shall instruct you to the facts as you find them, from the evidence.

The evidence in this case consists of the sworn testimony of the witnesses, all exhibits received into evidence, and all facts that may be admitted or agreed to by the parties. In determining the facts, you may draw reasonable inferences from the evidence. You may make deductions and reach conclusions which reason and common sense lead you to draw from the facts shown by the evidence in this case, but you should not speculate on any matters outside the evidence.

In determining the believability of any witness and the weight to be given the testimony of any witness, you may properly consider the demeanor of the witness while testifying; the frankness or lack of frankness of the witness; the intelligence of the witness; any interest the witness may have in the outcome of the case; the means and opportunity the witness had to know the facts about which the witness testified; the ability of the witness to remember the matters about which the witness testified; and the reasonableness of the testimony of the witness, considered in the light of all the evidence in the case and in light of your own experience and common sense.

The issue for your determination is whether the injuries sustained by Courtney White were the result of a design defect in the tour bus manufactured by Aerocoach Bus Works, Inc., or of the negligence of Gary Winters, or of the negligence of Courtney White. In that regard, you are instructed that Courtney White has the burden of proof on the design defect claim against Aerocoach Bus Works, Inc., meaning that Courtney White must convince you by a preponderance of the evidence that a design defect in the tour bus was a substantial factor in bringing about Plaintiff's injuries and without which the injuries would not have occurred. You are further instructed that Aerocoach Bus Works, Inc. has the burden of proof on the claim that Plaintiff's injuries were caused solely or in part by the negligence, if any, of Plaintiff or by the negligence of Gary Winters or a combination of the negligence, if any, of one or more of those parties, or from some other cause.

A "design defect" is a condition of the product that renders it unreasonably dangerous as designed, taking into consideration the utility of the product and the risk involved in its use. For a design defect to exist there must have been a safer alternative design. "Safer alternative design" means a product design other than the one actually used that in reasonable probability—

1. would have prevented or significantly reduced the risk of the injury in question without substantially impairing the product's utility, and
2. was economically and technologically feasible at the time the product left the control of Aerocoach Bus Works, Inc. by the application of existing or reasonably achievable scientific knowledge.

An “unreasonably dangerous” product is one that is dangerous to an extent beyond that which would be contemplated by the ordinary user of the product, with the ordinary knowledge common to the community as to the product’s characteristics

“Producing cause” means a cause that was a substantial factor in bringing about the injury, and without which the injury would not have occurred. There may be more than one producing cause.

There may be more than one cause of an injury, but if an act or omission of any person not a party to the suit was the “sole cause” of the injury, then no act, omission, or product of any party could have been a cause of the injury.

“Negligence” means failure to use ordinary care, that is, failing to do that which a person of ordinary prudence would have done under the same or similar circumstances or doing that which a person of ordinary prudence would not have done under the same or similar circumstances.

“Ordinary care” means that degree of care that would be used by a person of ordinary prudence under the same or similar circumstances.

“Proximate cause” means that cause which, in a natural and continuous sequence, produces an event, and without which cause such event would not have occurred. In order to be a proximate cause, the act or omission complained of must be such that a person using *ordinary care* would have foreseen that the event, or some similar event, might reasonably result therefrom. There may be more than one proximate cause of an event.

Answer “Yes” or “No” to all questions unless otherwise instructed. A “Yes” answer must be based on a preponderance of the evidence unless you are otherwise instructed. If you do not find that a preponderance of the evidence supports a “Yes” answer, then answer “No.” The term “preponderance of the evidence” means the greater weight and degree of credible evidence admitted in this case. Whenever a question requires an answer other than “Yes” or “No,” your answer must be based on a preponderance of the evidence unless you are otherwise instructed.

At this point in the trial, you, as jurors, are deciding if Courtney White’s injuries were proximately caused, in whole or in part, by a design defect, if any, in the Aerocoach Bus Works, Inc. tour bus, or by the negligence, if any, of Courtney White, or by the negligence, if any, of Gary Winters, or from some other cause. If you find Aerocoach Bus Works, Inc. was at fault in whole or in part, you will hear additional argument from the attorneys and you will hear additional witnesses testify concerning damages. Until that time, you are not to concern yourselves with any question of damages. Your verdict must be based on the evidence that has been received and the law on which I have instructed you. In reaching your verdict, you are not to be swayed from the performance of your duty by prejudice, sympathy, or any other sentiment for or against any party. When you retire to the jury room, you should select one of your members to act as foreperson, to preside over your deliberations, and to sign your verdict. You will be given a verdict form, which I shall now read and explain to you.

(READ VERDICT FORM)

When you have agreed on your verdict, the foreperson, acting for the jury, should date and sign the verdict form and return it to the courtroom. You may now retire to consider your verdict.

NO. 19-004578-CV

COURTNEY WHITE	§	**IN THE 748th DISTRICT COURT**
	§	
Plaintiff,	§	**IN AND FOR**
v.	§	
	§	
AEROCOACH BUS WORKS, INC.	§	**TRAVIS COUNTY**
	§	
Defendant.	§	**STATE OF LONE STAR**

JURY QUESTION NO. 1

Was there a design defect in the tour bus at the time it left the possession of Aerocoach Bus Works, Inc. that was a producing cause of the injuries in question?

Answer "yes" or "no."

Answer: ______________

If you have answered "yes" to Jury Question No. 1, answer the following question. Otherwise, do not answer the following question.

JURY QUESTION NO. 2

Did the negligence, if any, of the following proximately cause the injuries sustained by Courtney White?

Answer "Yes" or "No" for each of the following:

1. Gary Winters ____________________
2. Courtney White ____________________

If you have answered "yes" with respect to more than one party in response to Jury Question No. 2, answer the following question; otherwise, do not answer the following question.

JURY QUESTION NO. 3

For each person or product you found caused or contributed to cause the injury, find the percentage of responsibility attributable to each:

1. Aerocoach Bus Works, Inc. ________________%
2. Gary Winters ________________%
3. Courtney White ________________%

Total ______100____%

CERTIFICATE

We the jury, have answered the above and foregoing questions as herein indicated, and herewith return same into Court as our verdict.

____
Presiding Juror

To be signed by those rendering the verdict if not unanimous.
