National Transportation Safety Board
Washington, DC 20594

Safety Recommendation Report

Providing Occupant Protection for Limousine Passengers

Accident Number:	HWY19MH001
Location:	Schoharie, New York
Date:	October 6, 2018
Recommendation Nos.:	H-19-14 through -17 and Reiteration of H-15-42 to the state of New York
Adopted:	September 13, 2019

Background

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—railroad, highway, marine, and pipeline. We determine the probable causes of the accidents and issue safety recommendations aimed at preventing future accidents or lessening their severity.

The NTSB is investigating a collision involving a 2001 Ford Excursion stretch limousine, a 2015 Toyota Highlander sport utility vehicle (SUV), and two pedestrians that occurred in Schoharie, New York, on October 6, 2018. In the course of our investigation, we have identified safety issues related to occupant protection, including the integrity of limousine seat and seat belt systems and the accessibility and use of seat belts by limousine passengers.[1] Consequently, the NTSB is issuing safety recommendations to the National Highway Traffic Safety Administration (NHTSA), the New York State Department of Transportation (NYSDOT), and the National Limousine Association. The NTSB is also reiterating one recommendation to the state of New York. The NTSB is providing the following information in support of the recommendations.[2] (The NTSB will issue a final accident report at the completion of the Schoharie investigation.)

[1] In this safety recommendation report, the term "limousine" refers to a vehicle that has been modified from its original configuration so that it can be used in commercial limousine operations; the modified vehicle has occupancy for 9 or more persons (including the driver) and a gross vehicle weight rating of 10,001–26,000 pounds.

[2] Much of the support for this safety recommendation report may be found in the "Survival Factors Group Chairman's Factual Report" in the NTSB public docket for this investigation; search for NTSB accident HWY19MH001.

Schoharie Crash

On October 6, 2018, about 1:55 p.m. (local time), a 2001 Ford Excursion XLT stretch limousine, operated by Prestige Limousine Chauffeur Service, was traveling south on New York State Route 30 (NY-30) in Schoharie, Schoharie County, New York. The limousine, occupied by a 53-year-old driver and 17 passengers, was traveling from Amsterdam, New York, to Cooperstown, New York, making several scheduled stops en route. As the limousine traveled on NY-30, it approached New York State Route 30A (NY-30A), which forms a T-intersection controlled by a stop sign. The posted speed limit is 50 mph on NY-30 and 55 mph on NY-30A. The limousine did not stop at the stop sign; instead, it crossed the intersection at a speed considerably in excess of the posted limit and entered the paved driveway of a restaurant parking lot. The limousine struck an unoccupied 2015 Toyota Highlander SUV that was parked in a grassy area adjacent to the driveway. Three pedestrians were in the proximity of the SUV; two of these pedestrians were in the SUV's path when the limousine struck it. They were subsequently struck by the SUV and received fatal injuries. The limousine continued across the edge of the parking lot and into a ravine with undergrowth and trees, where it collided with an earthen embankment and came to rest. As a result of the crash, 20 people died, including all 18 limousine occupants and 2 pedestrians.[3]

Crash Damage

As a result of the impacts with the SUV and the embankment, the limousine sustained severe damage to its front end, with greater deformation to the driver's side (see figures 1 and 2). Overall, the left front of the vehicle was displaced rearward by about 60 inches, and the left wheel was moved about 49 inches rearward. The engine was pushed down and rearward toward the driver's footwell, and the steering wheel was pushed rearward and up toward the vehicle roofline. Survival space was compromised for the driver and front passenger areas.[4] Despite the severe damage and intrusion, rear portions of the passenger compartment remained relatively intact, maintaining space for the occupants to survive.

[3] The probable cause of this crash will be established in the final accident report.

[4] Survival space is the interior portion of a vehicle that maintains livable space during a crash.

Figure 1. Postcrash front view of the 2001 Ford Excursion limousine (not in the crash final rest position).

Figure 2. Postcrash passenger side view of the 2001 Ford Excursion limousine (not in the crash final rest position).

Vehicle Modifications and Seating Positions

In early 2001, the firm 21st Century Coachworks in Springfield, Missouri, purchased the Ford Excursion XLT 2001 from the original equipment manufacturer (OEM) and altered it into an Excursion stretch limousine.[5] The alteration process entailed cutting the factory frame of the Excursion and welding an additional 144 inches of frame rail to extend the factory frame rails. The interior of the vehicle was reconfigured with perimeter-style bench seating and entertainment accommodations, as detailed below.

The driver and front passenger seats provided by the OEM were retained, as well as five of the six rear OEM passenger seats. A privacy divider was added between the driver's seat and the passenger compartment. In the stretched portion of the vehicle, a rear-facing bench seat was added, abutting the privacy divider and facing into the passenger compartment (see figure 3). In addition, side-facing bench seats were installed along each side of the compartment, forming a perimeter seating layout (see figures 3 and 4). The side-facing bench seat on the passenger side was shorter than the one on the driver side, and a refreshments bar was installed next to this bench seat and forward of the passenger-side rear door. A small table was also added next to the driver-side side-facing bench seat. The back of the limousine consisted of five Excursion OEM rear seats that faced forward (see figure 4). The OEM seat next to the rear door on the passenger side was removed to allow access to the rear of the passenger compartment.

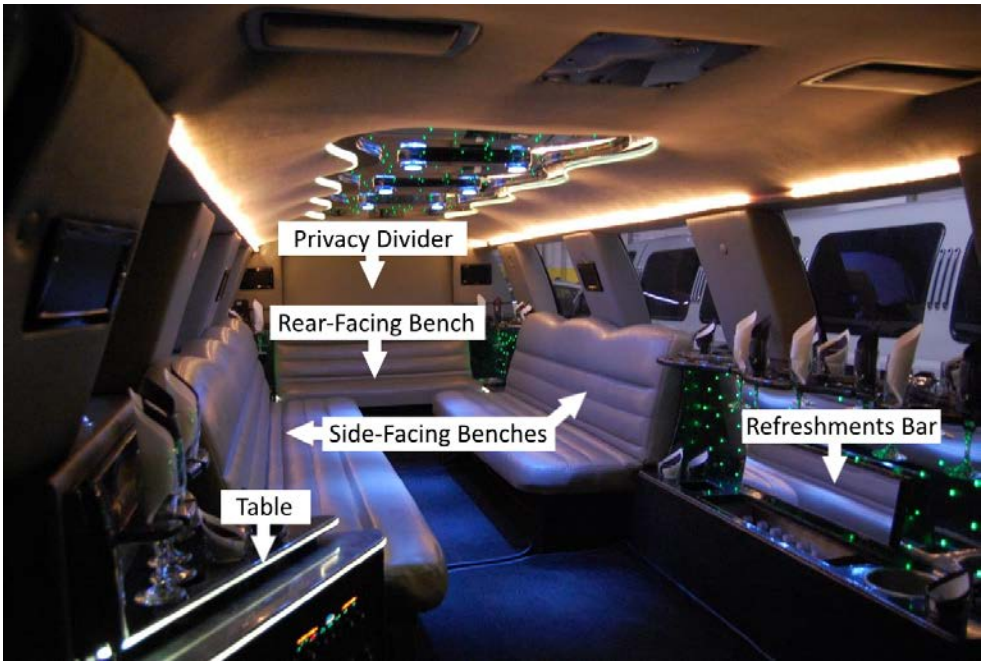

Figure 3. A 2010 photograph of the limousine's interior, looking from the rear of the passenger compartment toward the driver's compartment. The view to the driver's compartment is blocked by a white privacy divider. (Courtesy of the vehicle's previous owner, Advantage Transportation Group)

[5] Title 49 *Code of Federal Regulations* (CFR) Part 567 requires that final-stage manufacturers (manufacturers of a remanufactured vehicle or a vehicle manufactured in two or more stages) complete the vehicle to conform to the applicable standards and that incomplete and intermediate manufacturers provide the appropriate information to enable the final-stage manufacturer to meet applicable standards.

Figure 4. A 2010 photograph of the limousine's interior, looking from the front of the vehicle toward the rear of the passenger compartment. (Courtesy of the previous owner, Advantage Transportation Group)

The three non-OEM bench seats were equipped with passenger lap belts; the OEM seats retained their original lap/shoulder belts on the outboard seats and lap belts on the middle seats. According to a NYSDOT vehicle examination report, the vehicle's total seating capacity was 18 occupants.[6] The NTSB's postcrash inspection of seat belt anchor points indicated 21 belted seating positions in the vehicle. NTSB investigators noted that the seating positions available in the vehicle could range from 18 to 22, depending on how a position is defined.[7] On the day of the crash, all 17 limousine passengers were seated within the passenger compartment. Evidence from first responders and postcrash examinations of victims indicated that none of the passengers were wearing the passenger lap or lap/shoulder belts at the time of the crash.[8]

Occupant Survivability

The Schoharie crash was an extreme event in which the occupants were subject to high crash forces. The NTSB has investigated other limousine crashes, such as those in Elgin, Illinois, and Cranbury, New Jersey, that involved lower crash forces but still resulted in serious injuries

[6] See the driver/vehicle examination report in "Previous Owner NYDOT Limo Inspections" in the NTSB public docket for this investigation; search for NTSB accident HWY19MH001.

[7] Different approaches may be used for determining seating positions, which accounts for the wide range of possible seating capacity numbers. For more information, see the "Survival Factors Group Chairman's Factual Report" in the NTSB public docket for this investigation; search for NTSB accident HWY19MH001.

[8] Victim condition information to date is based on communication with the local medical examiner.

and fatalities.[9] In all these crashes, properly designed and installed seats and seat belt systems (and seat belt use) had the potential to mitigate injuries and increase survivability.

Surviving a crash requires three basic components, sometimes described as a "chain of survivability." First, the occupant survival space must remain intact and not be compromised by intrusion; second, the crash impact loading (crash forces) experienced by the occupants must be within survivable limits; and third, the postcrash environment must remain survivable for evacuation.[10] Because there were no issues related to postcrash survival, such as fire, this report focuses on occupant survival space and crash impact loading.

Occupant Survival Space

This crash resulted in the complete loss of occupant survival space for the driver and front passenger seats, and partial intrusion into the left front corner of the passenger compartment. Figure 5 shows a driver-side and overhead view of the limousine created by 3D scans of the vehicle, with line drawing overlays. The overhead scan uses a "slice" just above the floor of the vehicle. The line drawings of the front of the limousine were reconstructed from drawings provided by Ford Motor Company and estimates of the limousine's precrash dimensions. Portions of both views have a yellow outline that roughly represents the original structure of the limousine before the crash. The red-shaded areas represent the approximate region of intrusion and compromised survival space. The green-shaded areas highlight the portion of the limousine that remained relatively intact and where survival space was maintained.

The limousine driver was wearing his lap/shoulder belt at the time of the crash and his air bag deployed; however, the driver's compartment had a complete loss of survival space. Therefore, the NTSB concludes that the crash was not survivable for the limousine driver. There was also intrusion into the passenger seats immediately behind the privacy divider. Specifically, the passengers seated in these rear-facing seats and in the forward portion of the side-facing bench seat on the driver's side (a portion of the red-shaded areas in figure 5) were at risk of fatal injuries from intrusion and the vehicle crush that compromised the driver's compartment. A large portion of the limousine's passenger compartment, identified in the green-shaded areas of figure 5, was not compromised by intrusion and retained survival space.

[9] (a) In the Elgin crash, a 1998 Lincoln Town Car stretch limousine collided with a highway crash attenuator and concrete barrier while traveling east on Interstate 90 in Elgin Township, Illinois. The estimated impact speed was 60–65 mph. The limousine driver and four of the six passengers sustained serious injuries, one passenger died, and one suffered minor injuries. For more information, see the NTSB public docket for the Elgin, Illinois, investigation; search for NTSB accident HWY16FH008. (b) In the Cranbury crash, a truck-tractor semitrailer was traveling north on Interstate 95 when it encountered traffic that had slowed to less than 10 mph along a construction corridor. The truck struck the left rear of a slowly moving limo van, resulting in a series of impacts. The limo van came to rest overturned on its left side across the center lane. Twenty-one people in six vehicles were involved in the crash. One limo van passenger died on scene, and four other limo van passengers were seriously injured. For more information, see *Multivehicle Work Zone Crash on Interstate 95, Cranbury, New Jersey, June 7, 2014*, NTSB/HAR-15/02 (Washington, DC: NTSB, 2015).

[10] See D. F. Shanahan, "Human Tolerance and Crash Survivability" (paper presented at North Atlantic Treaty Organization Research and Technology Organization lecture series "Pathological Aspects and Associated Biodynamics in Aircraft Accident Investigation" in Madrid, Spain, October 2004, and Königsbrück, Germany, November 2004, sponsored by Human Factors and Medicine Panel), RTO-EN-HFM-113: 6-1–6-15.

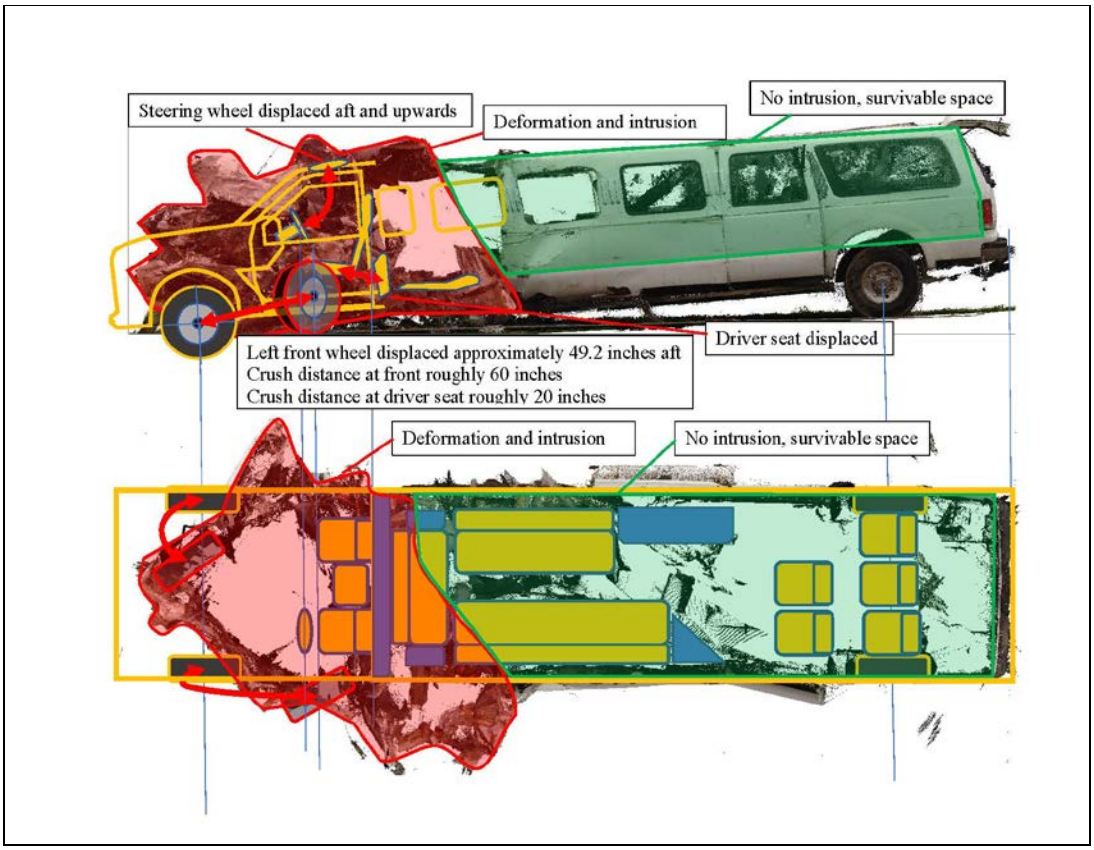

Figure 5. Top image shows side view postcrash 3D image of the limousine with an overlaid reconstruction of the vehicle's precrash structure. Bottom image shows overhead view of postcrash 3D image of the limousine with an overlaid reconstruction of the vehicle's precrash structure.

Crash Impact Loading

The next step in the survivability chain is determining whether the occupants could survive the crash impact loading. Even in severe collisions such as this one, properly designed seats and seat belt systems have the potential to mitigate injuries and improve the chance of survival when occupant survival space is retained.[11] In addition, seat integrity and seat belt design should work in synchrony to minimize the impact loading experienced by occupants.

The *Federal Motor Vehicle Safety Standards* (FMVSSs) provide minimum performance specifications for vehicle systems and equipment based on vehicle type, configuration, and date of manufacture.[12] The crash limousine was originally manufactured as an SUV with a gross vehicle weight rating (GVWR) of 8,600 pounds. Although there is no evidence that the vehicle was

[11] Refer to the "Survival Factors Group Chairman's Factual Report" in the NTSB public docket for this investigation; search for NTSB accident HWY19MH001. It cites studies indicating the opportunity for occupants to survive very severe impacts. One road study characterized survival with serious injury in frontal collisions with velocity changes (analogous to hitting a rigid wall) of over 60 mph. Another study illustrated the capabilities of racing cars with excellent restraints and vehicle design that allowed drivers to survive, without significant injury, crashes with velocity changes as high as 60 to 70 mph.

[12] See Title 49 CFR Part 571.

certified with a new GVWR when it was modified into a limousine, it was recorded as having a weight of 13,080 pounds during NYSDOT inspections conducted on July 30, 2014; January 8, 2015; and June 15, 2015. This weight change moved the vehicle into the FMVSS classification category of a midsize bus (GVWR of 10,001–26,000 pounds). Passenger seats in vehicles in this category, including the Schoharie limousine, are not subject to some vehicle safety occupant, seat, and seat belt standards that apply to other classes of vehicles, including occupant protection for rear passenger seats.[13] Consequently, the alteration of the vehicle removed the federal safety standard requirements for all of the seats and seat belts in the passenger compartment.[14]

Seat Integrity. Postcrash examination of the limousine's non-OEM bench seats showed that the seat frames were constructed from welded square tubular steel and were attached to the floor using individual screws that were mounted through the metal seat anchor straps.[15] During the crash sequence, the side- and rear-facing bench seats failed in the direction of the crash forces. The seat cushions separated from the seat frames, and the seat frames separated from their anchorage points, collapsed, and were displaced forward toward the passengers and the privacy divider.[16] The mounting holes in the seat frame anchor straps were elongated, which released the screws that anchored the seat straps to the floor. (See figure 6.) Therefore, the strength of the non-OEM side- and rear-facing bench seats and their anchorages was inadequate to keep them secured to the floor during the collision, even without the additional loading that would have occurred with belted passengers. In contrast, the rear OEM seats remained attached to the floor and intact, despite experiencing some damage.[17] (See figure 7.)

[13] FMVSS 208 provides the overall requirements for occupant crash protection, while FMVSS 207 establishes specific requirements for seating systems; FMVSS 209, for seat belt assemblies; and FMVSS 210, for seat belt anchors. If a vehicle is not subject to FMVSS 208, it may also not be subject to FMVSS 207, 209, and 210. In this case, the standards specified in FMVSS 207, 208, 209, and 210 were not required for the rear passenger seats added during the modification of the Schoharie crash limousine.

[14] (a) Title 49 CFR 571.207 establishes requirements for seats, their attachment assemblies, and their installation to minimize the possibility of their failure by forces acting on them as a result of vehicle impact. (b) Title 49 CFR 571.208 specifies performance requirements for the protection of vehicle occupants in crashes. The purpose of this standard is to reduce vehicle occupant deaths and the severity of injuries by specifying vehicle crashworthiness requirements in terms of forces and accelerations measured on anthropomorphic dummies in test crashes, and by specifying equipment requirements for active and passive restraint systems. (c) Title 49 CFR 571.209 specifies performance requirements for seat belt assemblies. (d) Title 49 CFR 571.210 specifies performance requirements for seat belt assembly anchorages. The purpose of this standard is to establish requirements for seat belt assembly anchorages to ensure their proper location for effective occupant restraint and to reduce the likelihood of their failure.

[15] The anchor straps appeared to be made from commonly available, thin steel, pipe-hanging strap. The installation of the bench seat frame and anchorage was not consistent with the methods used for the dynamic load environment of a motor vehicle.

[16] Although the crash impact was severe, because the passengers were not using their lap belts, the loads placed on the side- and rear-facing bench seats were greatly reduced, which means that those seats would have been even more likely to fail had the passengers been using the belts.

[17] Both the OEM and non-OEM seats sustained deformation from being struck by the unrestrained passengers, and the last row of OEM seats sustained damage from being struck by a vehicle battery stored in the cargo compartment.

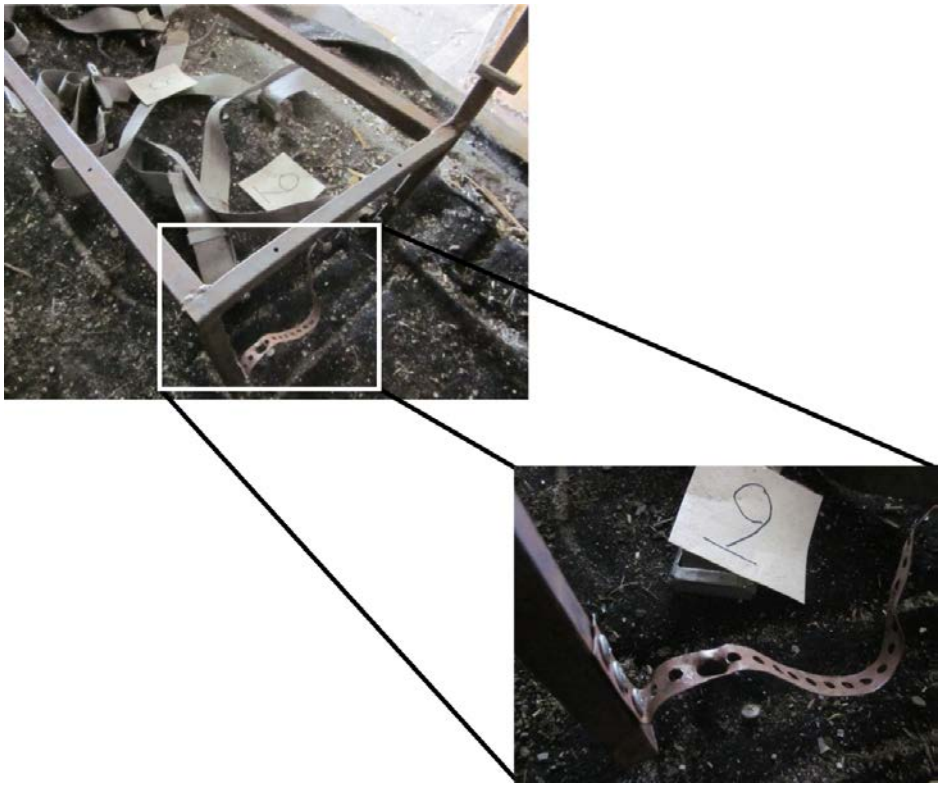

Figure 6. Right-side bench seat frame, with a closeup view of the damage to the seat frame anchor strap.

Figure 7. The rear OEM seats, which were deformed during the crash but remained structurally intact and attached to the floor. (Although the seat belts appear latched in this photograph, they were not found fastened after the crash.)

Loss of seating integrity can result in additional injuries for both unbelted and belted occupants. Failed seats and seat cushions can introduce sharp surfaces into the passenger compartment and become projectiles that strike occupants within the space. Moreover, when a seat containing a belted occupant fails, the force against the seat belt includes the weight of the seat as well as that of the person, and the person will be displaced from the normal position in the seat that the seat belt is designed to restrain. Both outcomes increase the risk of injury to the belted person. The NTSB has found similar failures of non-OEM bench seats during other investigations, including the investigation of the 2016 stretch limousine crash in Elgin, Illinois.[18]

Seat Belt System Design and Performance. The performance of a seat belt system during a collision depends on its design, attachment, and configuration. Postcrash examination of the non-OEM lap belts found that they were installed so that they did not line up appropriately with the seat positions to create adequate occupant loading geometry in the event of a crash.[19] In some locations, the spacing between the anchorage points was extremely narrow, which would result in improper passenger positioning for seat belt effectiveness as well as interfere with the seating of adjacent occupants.[20] For one lap belt, the space between the anchorage points was only 5.75 inches. When worn by occupants in a crash, lap belts with insufficient spacing between anchorage points can cause injuries to the user's pelvis and abdomen, a safety issue that the NTSB identified in its report of the Concan, Texas, crash investigation.[21]

In addition to requiring appropriate spacing to be effective, a lap belt's anchorage to the floor must have sufficient strength to withstand the loads applied by a belted occupant during a crash.[22] Because the passengers in this crash were unbelted, the strength of the lap belt anchorages to the floor during occupant loading cannot be fully assessed. However, the postcrash damage and the seat failures raise general concerns about the adequacy of the seat belt anchorage attachments in limousines. The NTSB's investigation of the Elgin, Illinois, limousine crash yielded additional evidence of problems with seat belt anchorages in limousines.[23] In the Elgin limousine, the non-OEM passenger lap belts were attached by wood screws to a bench seat frame made of plywood. In a crash, a passenger belted to a plywood bench seat would experience only minimal restraint from the seat belt assembly and would suffer injuries similar to those of an unbelted occupant.

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[18] For more information, see the NTSB public docket for the Elgin, Illinois, investigation; search for NTSB accident HWY16FH008.

[19] Title 49 CFR 571.208 specifies performance requirements for the protection of vehicle occupants in crashes, including the type, design, and performance of seat belts for occupant seating locations within a vehicle.

[20] The "Survival Factors Group Chairman's Factual Report" in the NTSB public docket for this investigation (search for NTSB accident HWY19MH001) includes a diagram of the seat belt anchor points relative to the seat positions.

[21] On March 29, 2017, about 12:20 p.m., a 2007 Dodge Ram 3500 pickup truck, occupied only by its driver, was traveling north on US Highway 83, near Concan, Texas, when it crossed into the southbound lane and collided with a medium-size bus occupied by a driver and 13 passengers. As a result of the crash, the bus driver and 12 passengers were fatally injured. The driver of the truck and one bus passenger were seriously injured. For additional information, see *Pickup Truck Centerline Crossover Collision With Medium-Size Bus on US Highway 83, Concan, Texas, March 29, 2017*, NTSB/HAR-18/02 (Washington, DC: NTSB, 2018).

[22] Title 49 CFR 571.210 specifies requirements for seat belt assembly anchorages to ensure their proper location for effective occupant restraint and to reduce the likelihood of failure.

[23] See the NTSB public docket for the Elgin, Illinois, investigation; search for NTSB accident HWY16FH008.

During a collision, an effective seat belt must control body motion to enable each user to ride-down the crash forces as the vehicle decelerates, to avoid injury-causing contact with the vehicle structure and other occupants.[24] In a 1986 study, the NTSB examined the use of lap belts in 26 crashes and found resulting injuries ranging from minor to fatal to the head, spine, and abdomen of lap belt users, due to upper body flailing.[25] Side-facing seats present an additional challenge because, in a frontal crash, a person's body moves laterally, creating greater potential for injury if the motion is not well controlled.[26] In its Concan, Texas, crash report, the NTSB concluded that the lap belts provided insufficient protection for passengers seated in the rear of the bus, due to the injuries resulting from the upper body flailing over the lap belt and the pinching/scissoring action of the belt webbing caused by the narrow anchorage points.[27] Similarly, had they been worn by the passengers, the lap belts in the Schoharie crash limousine would not have protected the passengers from upper body flailing. Lap belts also would not have controlled the motion of the bodies, especially in the side-facing seats, to enable maximum ride-down of the crash forces. Although federal standards establish requirements for both lap and lap/shoulder belts, lap/shoulder belts reduce upper body flailing and provide better control of occupant motion during a crash. Therefore, the NTSB concludes that, because lap/shoulder belts provide a greater level of occupant protection than lap belts, lap/shoulder belts should be installed as standard equipment for all passenger seating positions in limousines. Further, the NTSB recommends that NHTSA require lap/shoulder belts for each passenger seating position on all new vehicles modified to be used as limousines.

Although lap/shoulder belts provide greater safety than lap belts, they are not the complete answer to the seating system deficiencies found in this crash. Because survival space was maintained in a portion of the passenger compartment and the passengers may have had an opportunity to ride-down the crash forces in the Schoharie crash, injuries to occupants within the passenger compartment might have been mitigated by a combination of adequate seat integrity, well-designed passenger lap/shoulder belts, and proper seat belt use.[28] These were not available in the crash limousine. Therefore, the NTSB concludes that the non-OEM seats and lap belt systems

[24] The concept of "ride-down" refers to the gradual deceleration experienced by passengers who remain within the compartment and attached (restrained) to a crashing vehicle during its movement and crush before coming to rest. The passenger benefits from the energy absorbed by the vehicle crush and deformation. (See Concan report, NTSB/HAR-18/02, and *Collision of CSXT Freight Train and Murray County School District School Bus at Railroad/Highway Grade Crossing, Conasauga, Tennessee, March 28, 2000*, NTSB/HAR-01/03 [Washington, DC: NTSB, 2001].)

[25] See *Performance of Lap Belts in 26 Frontal Crashes*, NTSB/SS-86/03 (Washington, DC: NTSB, 1986).

[26] See *Civil Aircraft Side-Facing Seat Research Summary*, 2012 Federal Aviation Administration lateral-facing seating study, DOT/FAA/AM-12/18, R. DeWeese and others, November 2012. This aviation study found that, because of excessive flailing, an occupant seated in a side-facing (lateral) seat was at increased risk of injury. Further, the study found that, because of the need to provide the same level of safety to occupants in side-facing seats as to those in forward- and rear-facing seats, excessive upper body flailing and associated injuries could be reduced through a combination of effective seat belt system geometry with a barrier.

[27] See Concan report, NTSB/HAR-18/02.

[28] (a) The extensive damage focused at the front of the limousine suggests that the crash forces may have been dissipated to some extent by the front crush, possibly reducing the forces on passengers. (b) A NHTSA study stated that, "In 2016, the use of seat belts in passenger vehicles saved an estimated 14,668 lives of occupants 5 and older." By comparison, it stated that an estimated 2,756 lives of occupants 13 and older were saved by frontal airbags. (See *Traffic Safety Facts—Lives Saved in 2016 by Restraint Use and Minimum-Drinking-Age Laws*, Report No. DOT HS 812 454, National Highway Traffic Safety Administration. [Washington, DC: NHTSA 2017].)

in the modified portion of the passenger compartment, including their structural anchorage points, were not properly designed for occupant crash protection.

The Schoharie crash shows that a comprehensive solution is required to address the multiple occupant protection problems associated with seating systems on limousines that have been modified from other types of vehicles. Federal standards could provide such a solution. Therefore, the NTSB recommends that NHTSA require that seating systems installed in new vehicles modified to be used as limousines meet minimum performance standards to ensure their integrity during a crash.

Seat Belt Accessibility and Use

As described above, the passenger seat belt systems on the Schoharie crash limousine were poorly designed and would not have provided adequate protection. The NTSB previously investigated a 2014 limousine crash that occurred in Cranbury, New Jersey, in which the vehicle's non-OEM seats were equipped with lap/shoulder belts and the integrity of the seats was maintained during the crash sequence.[29] Despite the presence of lap/shoulder belts, all five occupants within the passenger compartment were unbelted at the time of the rear-end crash, resulting in one passenger fatality and four passengers sustaining serious injuries.

In the case of the Schoharie crash limousine, the evidence indicates that none of the passengers were wearing the available lap or lap/shoulder belts at the time of the crash. The non-OEM seat belts were under the bench seats and invisible to passengers. Examination of three other similar limousines used by Prestige Limousine showed that, in the perimeter bench seats, the lap belts were also under the seats, rendering them inaccessible to passengers. After the Schoharie crash, NTSB investigators had to remove the bench seats to gain access to the seat belts. Inspection of the other limousines owned by Prestige Limousine and visits to other limousine companies indicated that seat belts in the non-OEM perimeter seating areas are often not accessible to passengers. Further, investigators of the previously noted stretch limousine crash in Elgin, Illinois, also found that the seat belts installed in the perimeter seating area were not accessible to passengers, and that the passengers were not wearing them at the time of the crash. Therefore, the NTSB concludes that, if seat belts on limousines are not readily assessible to the passengers, they are unlikely to be worn.

The industry should be informed of the passenger safety risks posed by inaccessible seat belts. Therefore, the NTSB recommends that the National Limousine Association educate member limousine operators on the life-saving benefits of proper seat belt use, and recommend that they develop methods to (1) ensure that seat belts are functional and accessible to the passengers and (2) encourage passengers to use them.

Currently in New York, limousines are not required to have seat belts for the rear passengers; however, the New York legislature is considering legislation that would require motor vehicles such as the Schoharie limousine to have at least two seat belts for the front seat and seat belts for the seats in the passenger compartment.[30]

[29] See Cranbury accident report, NTSB/HAR-15/02.

[30] See New York State Assembly bills A. 2157 and S. 6191.

With respect to inspections, in New York, all limousines are required by the NYSDOT to undergo commercial vehicle safety inspections twice a year.[31] The current inspection does not include examination of seat belts. Therefore, the NTSB recommends that the NYSDOT, as an addition to its regular state inspection process, ensure that seat belts are functional and accessible in all limousines in the state equipped with passenger seat belts.

Seat Belt Use Enforcement

The benefits of seat belt systems are clear, and the corresponding reduction in fatalities is considerable.[32] However, a seat belt system, whether in a passenger vehicle, motorcoach, or medium-size bus, is only effective when used. New York state law governing seat belt use requires that the driver and front passenger wear a seat belt. The state seat belt use requirement does not apply to rear seat passengers (unless they are 16 years old or younger). New York has primary enforcement for seat belts, which means that a police officer can issue a traffic ticket solely for failure by the driver or front seat passenger to wear a seat belt. The law also allows the officer to issue a ticket for a driver who does not ensure that rear seat passengers 16 years old or younger are properly secured by a seat belt or in a safety seat appropriate for their age and weight.

All vehicle occupants should have the same level of protection, wherever they are seated. Seat belt use laws with primary enforcement for passengers of buses and specialty vehicles, such as limousines, would have the same effect as they do for passenger cars, SUVs, and trucks: they would increase the use of seat belts and reduce injuries and fatalities. The NTSB concludes that extending New York's mandatory seat belt use laws with primary enforcement to all vehicles, including for all limousine passengers in all seating positions, would decrease fatalities.

In its report on a 2014 crash that took place in Davis, Oklahoma, the NTSB issued Safety Recommendation H-15-42 to the 50 states, the District of Columbia, and Puerto Rico:[33]

> H-15-42
>
> Enact legislation that provides for primary enforcement of a mandatory seat belt use law for all vehicle seating positions equipped with a passenger restraint system.

The status of this recommendation for the state of New York is "Open—Acceptable Response." Based on the lack of seat belt use by the passengers in the Schoharie crash, the NTSB reiterates Safety Recommendation H-15-42 to the state of New York.

[31] Vehicle inspection will be an issue addressed in the final report on this investigation.

[32] In 2016, seat belts saved nearly 15,000 lives. (See NHTSA seat belts save lives webpage.)

[33] *Truck-Tractor Semitrailer Median Crossover Collision With Medium-Size Bus on Interstate 35, Davis, Oklahoma, September 26, 2014*, NTSB/HAR-15/03 (Washington, DC: NTSB 2015).

Findings

1. The crash was not survivable for the limousine driver.

2. Because lap/shoulder belts provide a greater level of occupant protection than lap belts, lap/shoulder belts should be installed as standard equipment for all passenger seating positions in limousines.

3. The non-original equipment manufacturer seats and lap belt systems in the modified portion of the passenger compartment, including their structural anchorage points, were not properly designed for occupant crash protection.

4. If seat belts on limousines are not readily assessible to the passengers, they are unlikely to be worn.

5. Extending New York's mandatory seat belt use laws with primary enforcement to all vehicles, including for all limousine passengers in all seating positions, would decrease fatalities.

Recommendations

New Recommendations

To the National Highway Traffic Safety Administration:

Require lap/shoulder belts for each passenger seating position on all new vehicles modified to be used as limousines. (H-19-14)

Require that seating systems installed in new vehicles modified to be used as limousines meet minimum performance standards to ensure their integrity during a crash. (H-19-15)

To the New York State Department of Transportation:

As an addition to your regular state inspection process, ensure that seat belts are functional and accessible in all limousines in the state equipped with passenger seat belts. (H-19-16)

To the National Limousine Association:

Educate member limousine operators on the life-saving benefits of proper seat belt use, and recommend that they develop methods to (1) ensure that seat belts are functional and accessible to the passengers and (2) encourage passengers to use them. (H-19-17)

Reiterated Recommendation

The NTSB reiterates Safety Recommendation H-15-42 to the state of New York:

> Enact legislation that provides for primary enforcement of a mandatory seat belt use law for all vehicle seating positions equipped with a passenger restraint system. (H-15-42)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

ROBERT L. SUMWALT, III
Chairman

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Member

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Vice Chairman

Report Date: September 13, 2019