July 10, 2025 HIR-25-04

# Tire Failure, Motorcoach Roadway Departure, and Rollover

Wawayanda, New York
September 21, 2023

On September 21, 2023, about 1:12 p.m. eastern daylight time, a 2014 Prevost H3-45 motorcoach operated by Regency Transportation LTD was traveling west on Interstate 84 (I-84) in Wawayanda, New York, when its left-front (steer) tire failed. As a result of the tire failure, the motorcoach crossed the left lane and shoulder, penetrated a roadside cable barrier, traveled down into the median, and rolled before coming to rest on its left side (see figure 1).[1] The motorcoach was occupied by a 59-year-old driver, 40 high school students, and 3 adult chaperones. Two adult chaperones were ejected and fatally injured. The driver was ejected and seriously injured, 14 other occupants sustained serious injuries, and 27 had minor injuries. At the time of the crash, it was daylight, and the roadway was dry.

[1] (a) In this report, all times are eastern daylight time. (b) Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. HWY23FH016). Use the CAROL Query to search safety recommendations and investigations.


**Figure 1**. An aerial view of the motorcoach at final rest on its left side at the bottom of the median. (Source: New York State Police)

| | |
|---|---|
| **Location** | Interstate 84 westbound, near mile marker 12, Wawayanda, New York (see figure 2) |
| **Date** | September 21, 2023 |
| **Time** | 1:12 p.m. eastern daylight time |
| **Involved vehicles** | 1 |
| **Involved people** | 44 |
| **Injuries** | 2 fatal (adult chaperones), 15 serious (motorcoach driver, 1 adult chaperone, and 13 student passengers), and 27 minor (all student passengers) |
| **Weather** | Dry, clear, and daylight |
| **Roadway information** | Rural, limited-access, asphalt-paved highway consisting of two westbound and two eastbound lanes separated by a depressed earthen median |


**Figure 2**. Motorcoach route from New York to Pennsylvania and the crash location on I-84.

# 1. Factual Information

## 1.1 Background

The 2014 Prevost H3-45 motorcoach was the lead vehicle in a six-motorcoach convoy chartered by Farmingdale High School that was transporting members of a high school band from Farmingdale, New York, to a band camp in Greeley, Pennsylvania, about 150 miles away (refer to figure 2). On the day of the crash, the motorcoach left the school about 10:45 a.m. with 44 occupants on board: the 59-year-old driver, 3 adult chaperones, and 40 high school students.

At the crash location, I-84 consisted of two travel lanes in each direction of travel (eastbound and westbound) separated by a depressed earthen median. The posted speed limit for this section of I-84 was 65 mph. The median measured about 30 feet in depth from the road surface to its lowest point. The side slopes were steep—about 2 feet of vertical distance for every 3 feet of horizontal distance.[2] The westbound travel lanes were adjoined by 6.7-foot-wide shoulders equipped with rumble strips and guardrails. The guardrails conformed with appropriate guidelines for this type of roadway. Cable barriers positioned outside the shoulders consisted of S-beams supporting three cables;

[2] The vertical rise and horizontal distance of the slope was 2V:3H, or about 32 degrees.

each beam stood about 31 inches above ground level, with cables measuring 0.75 inches in diameter.[3] In the vicinity of the crash location, the westbound travel lanes followed a gradual leftward horizontal curve with an estimated radius—based on the aerial images—of 9,700 feet.

At the time of the crash, the weather was clear, the roadway was dry, and visibility was good.

## 1.2 Event Sequence

Just beyond mile marker 12, as the motorcoach was negotiating a gradual leftward horizontal curve, the left steer axle tire experienced a sudden and catastrophic deflation, or "blowout."[4] Video footage showed that immediately after the tire failure, the motorcoach veered leftward, and about 2 seconds later, it had crossed onto the left shoulder (see figure 3).[5]

[3] According to the New York Department of Transportation, when a vehicle impacts the system, the posts bend and the cables detach from their connectors. The vehicle's lateral movement is arrested by the combination of bending posts and cable tension. However, buses and large trucks typically cannot be effectively contained by cable barrier systems because of their mass and dimensions.

[4] The front axle of a motorcoach is referred to as the *steer axle*, and it is where steering input is applied. The second axle is referred to as the *drive axle*; it is a dual-wheel axle where torque from the engine is transferred to the wheels. The third axle is a load-bearing, undriven axle, and it is referred to as the *tag axle*.

[5] The video was recorded as an MP4 file with 1920 x 1080-pixel resolution at a rate of 15 frames per second.

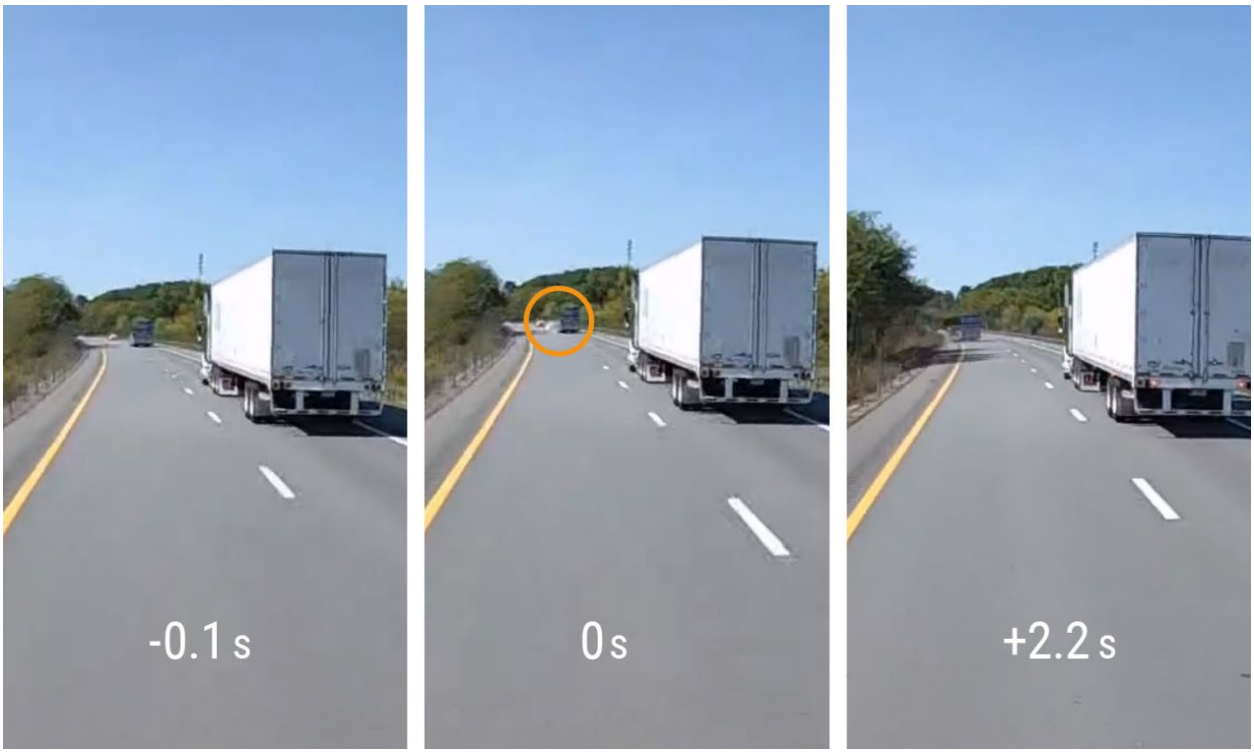


**Figure 3**. Video sequence from the trailing motorcoach's forward-facing camera (with annotations by the NTSB) showing the moment before tire failure (left image), the moment of tire failure (center image), and the point of roadway departure (right image). The yellow circle highlights the point at which the tire burst, releasing air and depressurizing the tire.[6]

After crossing the left shoulder, the motorcoach breached the roadside cable barrier on the left shoulder's edge and descended into the depressed earthen median separating the eastbound and westbound lanes of I-84. During its descent down the median slope, the motorcoach rolled and came to rest at the bottom of the median, resting on its left side with the front of the motorcoach rotated slightly so that it was facing toward westbound I-84. Vehicle damage characteristics, along with damage and debris about the passenger side including upper window frames, indicated the vehicle rolled 1.25 times.

The initial crash sequence was captured by cameras on the crash-involved motorcoach: a forward-facing camera as well as an inward-facing camera pointed toward the driver and front-row passengers. The sequence was also captured by a forward-facing camera on the nearest trailing motorcoach in the convoy. The inward-facing camera on the crash-involved motorcoach recorded the driver's actions leading

[6] The exact nature of the white puff visible in the footage could not be determined. Possible explanations include road dust from the wheel well or condensation forming when hot air inside the tire suddenly depressurizes during a blowout. Regardless of its specific nature, the puff indicates rapid and catastrophic tire failure.

up to and during the initial moments of the crash, as well as the movement of the front-row passengers.

Physical evidence on the roadway revealed marks and scrapes originating in the right lane, extending across the left lane, and continuing into the shoulder (see figure 4). Investigators identified the onset of roadway evidence, a tire friction mark created by the deflated left steer axle tire, about 260 feet from the point where the motorcoach departed the roadway.[7]

The motorcoach engine control module (ECM) captured data triggered by a rapid deceleration event associated with the crash.[8] At the recording trigger point (when the rapid deceleration threshold was met), the ECM recorded a vehicle speed of 70.8 mph, 89% throttle application, no brake activation, and cruise control in the "off" position.

[7] The New York State Police report states that the motorcoach came to final rest 541 feet from the point at which the tire failed. The motorcoach traveled about 260 feet on the pavement before it departed the roadway; it then traveled about 280 feet into the median. Based on the video footage from the trailing motorcoach, approximately 2.2 seconds passed between tire failure and the vehicle crossing onto the left shoulder.

[8] The ECM triggers a rapid deceleration/acceleration event when it detects a speed change of 5 km/h (3.1 mph) or greater within a 1-second interval.

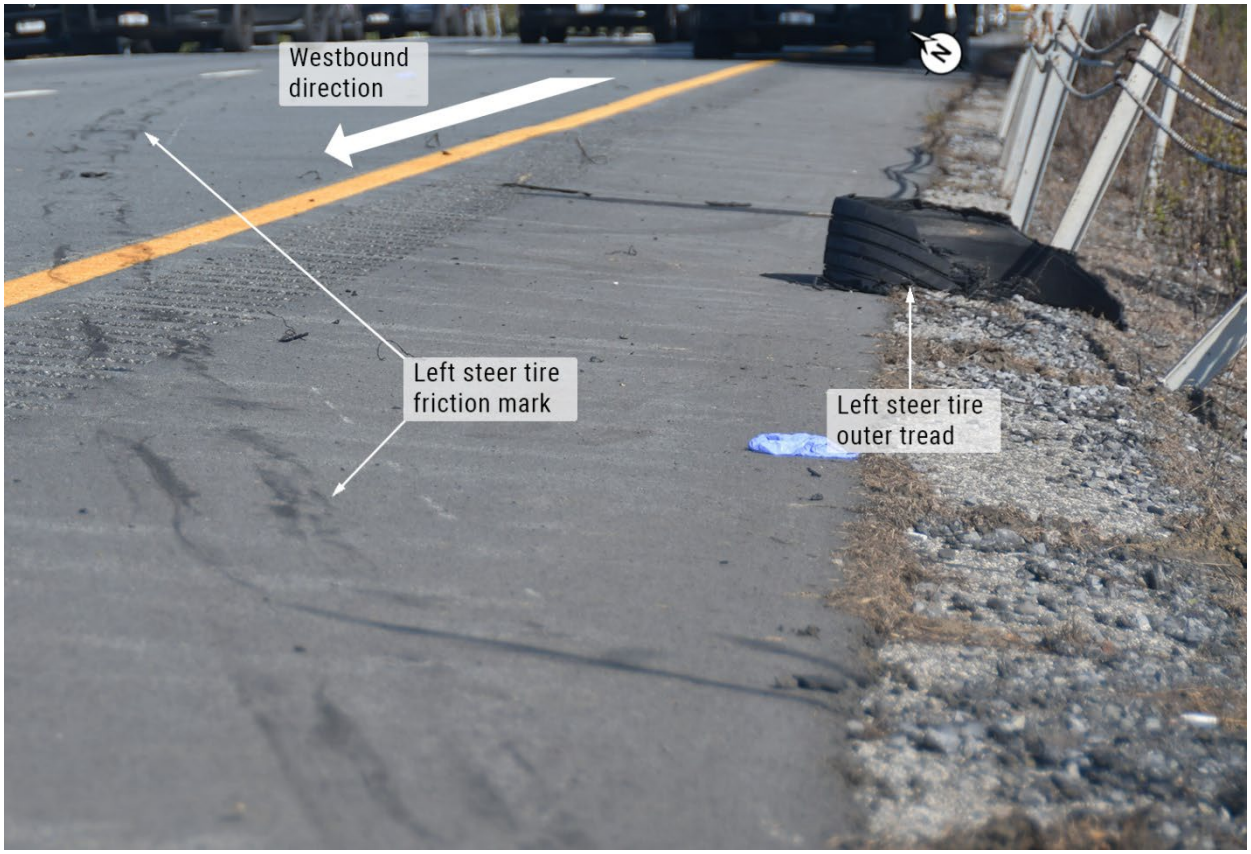


**Figure 4**. Left steer axle tire friction mark showing the motorcoach's abrupt path of departure from the roadway. The view is from the departure location looking back along the vehicle's travel path toward where the tire failed. The tire's outer tread is shown on the shoulder. (Source: New York State Police; annotated by the NTSB)

The rollover caused extensive damage to the motorcoach structure (see figure 5). The upper front section, including the windshield and side windows, separated from the vehicle body. All side windows lost their window glazing. The left-side roof rail was displaced inward toward the vehicle's centerline, and the supporting pillars were bent into the occupant space, resulting in lateral crush measurements between 21 and 29 inches. The roof rail on the right side was displaced outward from the vehicle's centerline during the roll.


**Figure 5**. Left-front view of the motorcoach after the motorcoach was righted.

## 1.3 Injuries, Occupant Protection, Egress, and Emergency Response

As a result of the crash, two adult chaperones seated in the front row (left-side aisle seat and right-side window seat) were ejected from the motorcoach and sustained fatal injuries (see seating chart in figure 6).[9] The driver was also ejected and sustained serious injuries. Based on the information provided by student passengers, as well as postcrash video footage from Orange County Sheriff's Office (OCSO) officers' body cameras, 10 additional passengers (all students) were ejected; 4 sustained serious injuries and 6 sustained minor injuries. The interviews also revealed that two additional passengers (one adult chaperone and one student) may also have been ejected.[10]

According to NTSB interviews, several occupants were able to exit the motorcoach, which came to rest on its side, by crawling through the broken windows on the left side of the motorcoach (the side resting on the ground). Other occupants could

[9] These ejections were observed in the video footage from the inward-facing camera on the motorcoach.

[10] The determination of these two possible ejections was based on information from their medical records (indicating possible ejections) and secondhand information from interviews with other vehicle occupants.

not recall how they exited the vehicle.[11] The motorcoach was equipped with passenger lap/shoulder belts in all seating positions.[12]

Seat belt signage was posted on the forward bulkhead walls and interior surfaces of the pillars between the windowsill and roof rail. The motorcoach driver stated that she had not provided a pretrip safety briefing and that the school had not requested one. She indicated that drivers gave safety briefings if the school requested them. The driver stated that before the trip, she announced that the motorcoach was equipped with seat belts. Only one of the students interviewed by the NTSB reported being reminded by the chaperones to use the seat belts.

Physical evidence—stretching of the belt webbing—indicated that only one passenger (row 2, left-side window seat) was wearing a lap/shoulder belt when the crash occurred. The occupant of this seat, a student who sustained minor injuries, also reported being belted during the crash.

Three additional passengers stated they were restrained, but the belts at their seating positions showed only normal wear patterns without evidence of occupant loading (the stress a seat belt undergoes to restrain a passenger during a crash or rapid deceleration). The lap/shoulder belt at the driver's position exhibited no evidence of loading on the latch plate or buckle and no significant stretching of belt webbing fibers. Inward-facing camera footage confirmed that the driver was unbelted, a fact she acknowledged during her interview with the NTSB.

At the time of the crash, the state of New York maintained primary enforcement of seat belt use laws applicable to all seating positions in passenger vehicles, and for drivers of all vehicles, including commercial motor vehicles such as motorcoaches.[13] Federal law applies only to commercial motor vehicle drivers and requires them to use seat belts.[14]

[11] Due to the slope and irregular terrain of the median, the left side of the motorcoach was not lying completely flat against the ground, creating sufficient space for occupants to exit underneath the motorcoach through the left side windows.

[12] When this motorcoach was manufactured, Federal Motor Vehicle Safety Standards did not require it to be equipped with passenger lap/shoulder belts.

[13] Primary enforcement seat belt laws authorize law enforcement officers to issue citations solely for seat belt non-compliance, without requiring another traffic violation. In contrast, secondary enforcement laws permit seat belt citations only after a vehicle has been stopped for a separate offense.

[14] Federal Motor Carrier Safety Regulations (49 *Code of Federal Regulations* [*CFR*] Part 392.16) require commercial motor vehicle drivers to use seat belts when operating a commercial motor vehicle equipped with seat belt assemblies.

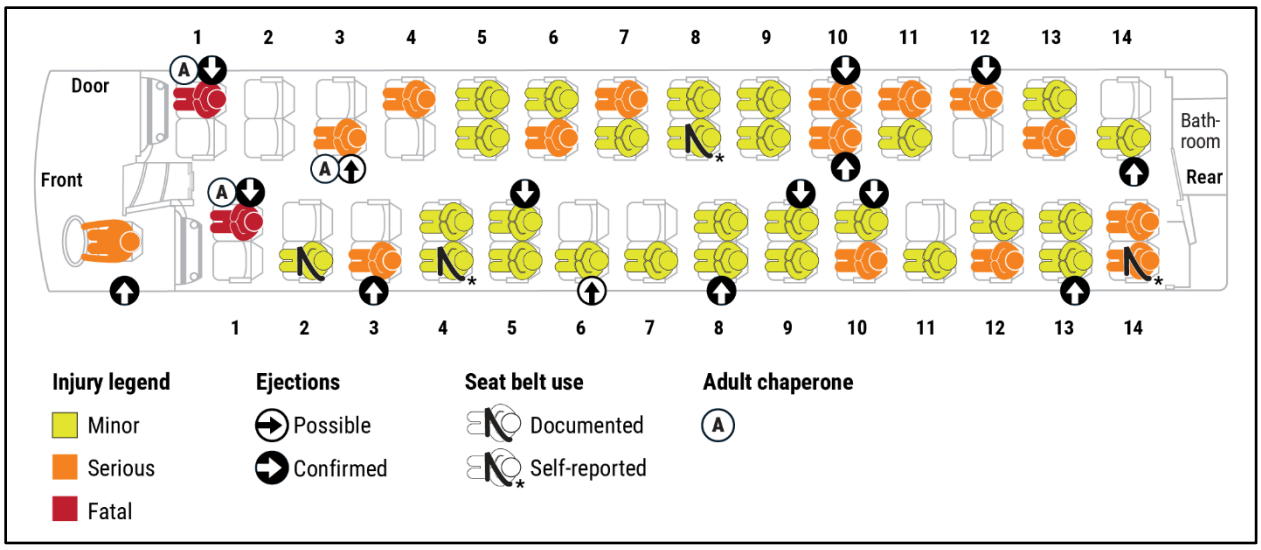


**Figure 6**. Motorcoach occupant seating chart showing injury severity and seat belt use.

The OCSO dispatcher was notified of the crash at 1:13 p.m. through multiple 911 calls. The first police unit was dispatched at 1:15 p.m. and arrived at the scene at 1:20 p.m., about 7 minutes after the crash notification. The dispatcher also notified the New York State Police (NYSP), Slate Hill Fire Department, and Orange County Division of Emergency Medical Services (EMS).

Emergency response to the crash included personnel and equipment from the NYSP, OCSO, Slate Hill Fire Department, Orange County Division of EMS, and multiple surrounding fire rescue and ambulance services.

The first EMS unit arrived at 1:22 p.m., and the first fire rescue unit arrived at 1:23 p.m. Upon arrival, the incident commander established a unified command post and requested the first medevac helicopter. First responders set up rope lines to assist with moving victims up the median's steep slope. Three helicopters and about 25 ambulances transported injured occupants to five area hospitals. The last patient left the scene at 3:25 p.m.

## 1.4 Additional Information

### 1.4.1 Driver Information

The motorcoach driver had a commercial driver's license (CDL) with passenger and school bus endorsements and a corrective lens restriction. Her license was valid until September 2028, and her medical certification was current, having been renewed in November 2021 with an expiration date of November 2023. She had held a CDL since 2007 and had been employed by Regency Transportation since 2017.

The driver was operating within the federal hours-of-service limitations at the time of the crash.[15] She had been on duty for nearly 5 hours and had logged about 26 total on-duty hours during the previous 7-day period. She had also been off duty for the 2 days immediately preceding the crash (September 19–20).

The inward-facing video showed that although the driver was not belted and had only one hand on the steering wheel at the time of the tire failure, she appeared alert with no overt signs of drowsiness. She was not using her cell phone at the time of the crash and did not appear distracted by passengers. Postcrash toxicology testing conducted independently by Regency Transportation and the NYSP was negative for alcohol and other drugs.[16] The driver's history showed negative results on all prior toxicological tests, including her pre-employment screening and three subsequent random tests during her employment at Regency Transportation.

During interviews with investigators, the driver acknowledged she was not wearing her seat belt because the shoulder portion of the belt caused neck discomfort. She reported requesting that the carrier modify her restraint to a lap belt configuration but stated "they hadn't gotten around to it." When asked by NTSB investigators, the carrier stated it had no prior knowledge of the driver's seat belt non-compliance or her request for a modified restraint system. Review of video evidence from other motorcoaches in the convoy revealed that three other drivers were also driving without wearing a seat belt.

The inward-facing camera footage showed the driver vaping about 17 seconds before the tire failure.[17] At the moment of tire failure, she was driving with only her right hand on the steering wheel. Analysis of the 2 minutes and 17 seconds of available footage (which includes about 5 seconds after the tire failure) showed the driver maintained two hands on the steering wheel for 34% of the recorded time and operated with a single hand during the remaining time. The recording also showed that within 1 second after the tire failure, the driver had placed both hands on the steering wheel.

Driver qualification and oversight in New York falls under the jurisdiction of the New York Department of Motor Vehicles (NY DMV), which regulates both intrastate and

[15] According to 49 *CFR* Part 395.5, a carrier cannot permit a driver to operate a passenger-carrying commercial vehicle for "more than 10 hours following 8 consecutive hours off duty" or after "having been on duty 70 hours in any 8 consecutive days if the employing motor carrier operates commercial motor vehicles every day of the week."

[16] Regency Transportation conducted postcrash drug and alcohol testing in accordance with US Department of Transportation requirements (49 *CFR* Part 382.303). The NYSP obtained a voluntary blood sample from the driver for independent toxicology analysis.

[17] Video footage showed the driver retrieving an object with her left hand and bringing the hand to her mouth. This object was subsequently identified as a vape pen.

interstate commercial passenger operations.[18] Regulatory requirements include an annual defensive driving test and a biennial performance road test, both of which must be witnessed by a certified examiner. Carrier records confirmed that the crash-involved driver had completed these mandated evaluations on August 11, 2023. However, these evaluations do not include tire blowout scenarios.

### 1.4.2 Carrier Information

At the time of the crash, Regency Transportation operated a fleet of 11 motorcoaches and employed 23 drivers. The company's operations concentrated primarily in New York and throughout the eastern United States. Regency Transportation is regulated by the Federal Motor Carrier Safety Administration (FMCSA), New York Department of Transportation (NYDOT), and NY DMV. At the time of the crash, the FMCSA's Safety Measurement System indicated that Regency Transportation was not under alert status in any of the Behavior Analysis and Safety Improvement Categories (BASIC).[19] The carrier maintained a vehicle out-of-service rate of 2.2%, compared to the national average of 21.4%.

Regency Transportation maintained the US Department of Transportation (USDOT)-required drug and alcohol testing program and kept driver qualifications files as required by regulations.[20] The carrier's fleet was equipped with a fleet management system, which featured forward- and inward-facing cameras that alerted the carrier about certain driver actions, such as hard braking events. The fleet management system also provided electronic logging device functionality. However, the carrier did not have a written safety policy or dedicated policies regarding vaping while driving, seat belt use requirements, or general safe driving.

Before the crash, the carrier underwent two FMCSA compliance reviews, in 2016 and 2019, both resulting in satisfactory ratings.[21] Following the crash, the FMCSA conducted a compliance review and identified 10 violations, including allowing a driver to operate a commercial motor vehicle without being properly restrained by a seat belt,

[18] Drivers for motor carriers operating buses in New York must qualify under Article 19-A and Part 6 of the State Commissioner's Rules and Regulations. These requirements apply when vehicles carry more than 10 passengers (NYDOT threshold) or 15 passengers (NY DMV threshold).

[19] The FMCSA organizes carrier data into seven BASICs: unsafe driving, crash indicator, hours-of-service compliance, vehicle maintenance, controlled substances/alcohol, hazardous materials compliance, and driver fitness.

[20] The USDOT drug and alcohol testing program is required by 49 *CFR* Part 382 Subpart C. Driver qualification files are required by 49 *CFR* Part 391.51.

[21] The purpose of a compliance review is to "determine whether a motor carrier meets the safety fitness standard" in 49 *CFR* Part 385. It may result in the initiation of an enforcement action.

but none of the violations were classified as acute or critical, and the compliance review was rated as satisfactory.

### 1.4.3 Vehicle Information

**Tire Maintenance and Inspections.** Regency Transportation purchased the motorcoach on July 7, 2023. The NTSB obtained maintenance records from the current owner (Regency Transportation) and previous owners (Bus Supply Charters and Legacy Luxury Transportation).

Documentation from Bus Supply Charters, which owned the motorcoach from 2014 to 2022, indicated new steer axle tires were installed on June 29, 2022, when the vehicle's odometer read 415,316 miles. At the time of the crash, the odometer reading was 447,793 miles. Maintenance records from the most recent owner, Legacy Luxury Transportation, contained no documentation of tire replacements during its ownership period for this vehicle (2022 to 2023). Similarly, Regency Transportation records did not indicate any tire replacements or rotations, but the carrier told the NTSB it had replaced the tag axle tires before the August 10, 2023, inspection by NYDOT.[22] An additional inspection was performed by NYDOT on August 26, 2023, with no violations noted.[23] Neither inspection required documenting tire pressure readings with a gauge unless visual inspection indicated underinflation.

Regency Transportation performed a preventive maintenance inspection on the motorcoach on September 19, 2023, 2 days before the crash. During this inspection, the tires were checked and documented as "OK"; however, the inspection checklist did not contain a field for manually checked tire pressure.[24] On the day of the crash, before departure, the driver conducted her pretrip inspection, which included a visual examination of the tires. She reported having no issues with this vehicle during this trip or during previous trips.

[22] (a) The tag axle tires appeared new during the postcrash inspection by the NTSB. Furthermore, the previous motorcoach owner—Legacy Luxury Transportation—had no documentation indicating replacement of tag axle tires. (b) The motorcoach's tag axle was equipped with a single tire on each side rather than the dual tires on the drive axle.

[23] This inspection, a Commercial Vehicle Safety Alliance Level II inspection, is commonly referred to as a walk-around/vehicle inspection. The driver's qualifications and hours of service are inspected and a walk-around of the vehicle looking for violations is performed, but the brakes are not checked because the inspector does not go underneath the vehicle to inspect the brake system or undercarriage components.

[24] A typical tire check consists of visual inspection and a tire thump test—hitting a tire with an object—to assess its inflation based on the sound it produces. Such testing methods can be useful for identifying flat or substantially underinflated tires, but not necessarily somewhat underinflated tires.

**Postcrash Tire Examination**. During our postcrash examination, the NTSB noted that all tires had at least 10/32-inch tread depth, which is above the minimum required 4/32 inch for steer axle tires, and 2/32 inch for all other tires.[25] Tire pressure was measured on all tires except the failed left steer axle tire. The manufacturer's recommended tire pressure is 120 pounds per square inch (psi) for steer axle tires and 100 psi for drive and tag axle tires. The right steer axle tire pressure measured 100 psi.[26] The drive axle's dual tires measured 84 and 92 psi on the left side; only one of the two tires on the right side could be measured (38 psi) because the valve stem was inaccessible without removing the outside tire. The tag axle's single tires both measured 100 psi.

Following the crash, the NTSB requested that Bridgestone, the manufacturer of the steer axle tires, examine both steer axle tires.[27] The examination showed that the failed steer axle tire exhibited signs of prolonged underinflation during operation, including a compression groove at the rim flange, incipient cutting of the rubber by the rim adjacent to the compression groove, and bead heel deformation with chafing along the base (see figure 7). Most of these indicators were also observed on the right steer axle tire.

Furthermore, multiple tread fragments recovered from the crash scene displayed a blue tint on the tread fragment edges (see figure 8), indicating elevated tire temperature from extended underinflation at the time of tire failure. The left steer axle tire showed features in the rubber adjacent to the rim flange consistent with underinflation during extended operation. This tire also had evidence of precrash impact damage along the outboard-facing shoulder, covering about 21% of the tire circumference. The examination revealed notable radial splits through the tire body and liner across the tread and down the external sidewall at multiple points (see figure 8).[28]

[25] Commercial vehicle tire tread depth requirements are specified in 49 *CFR* Part 393.75(b) and (c), and 49 *CFR* Part 570.62.

[26] Due to the nature of this crash—tire failure and rollover—tire pressure loss may have occurred during the crash sequence. The postcrash examination found debris around the rim flange on the right steer axle tire, as well as on the drive axle tires; therefore, the postcrash measurement of tire pressure may not necessarily indicate the pressure at the time of the crash.

[27] The steer axle tires were Bridgestone R249 line/model, size 315/80R22.5. The left steer axle tire had a manufacture date of 4420 (44th week of 2020), whereas the right steer axle tire had a manufacture date of 1722 (17th week of 2022).

[28] The tire body, or *carcass*, refers to the tire's rubber bonded cord structure, except tread and sidewall rubber. *Tread* refers to the portion of the tire that contacts the road surface. *Sidewall* refers to the portion of the tire between the tread and the bead. *Bead* refers to the part of the tire made of steel wires, wrapped by ply cords, that is shaped to fit the rim. *Inner liner* refers to the layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

Small fractures or cracks consistent with a preexisting and progressing internal belt separation were found in the vicinity of the impact damage between the second and third tire belts. During the tire failure, a large tread piece separated from the tire, separating between the second and third belts.

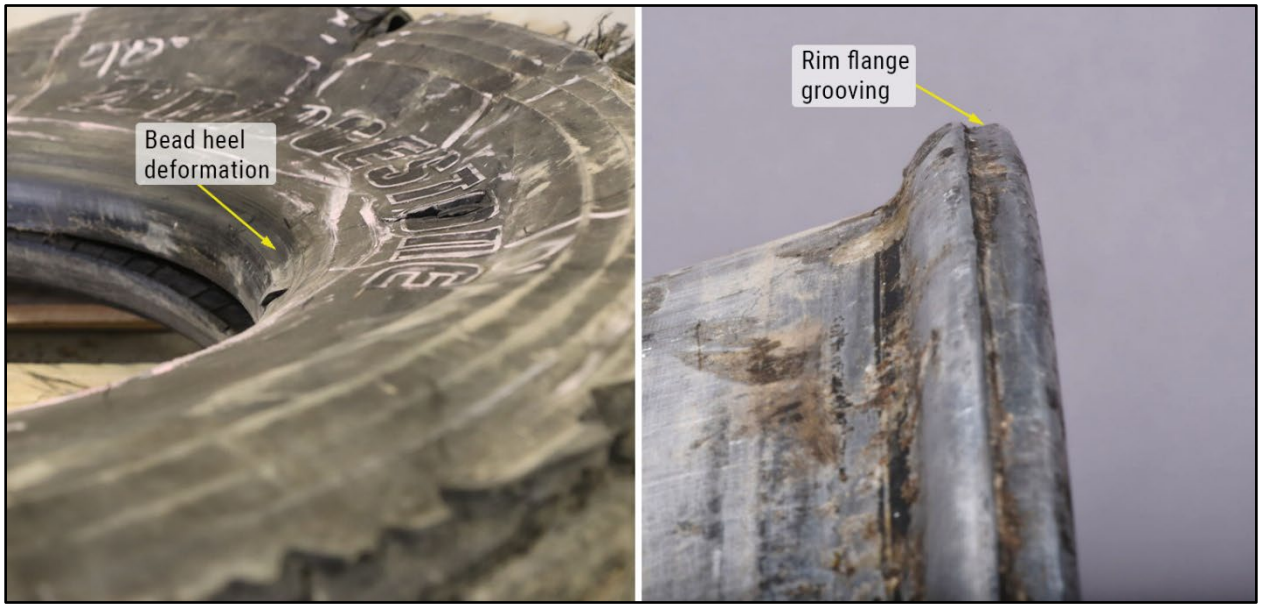


**Figure 7**. Images of the failed left steer axle tire showing indicators of underinflation.

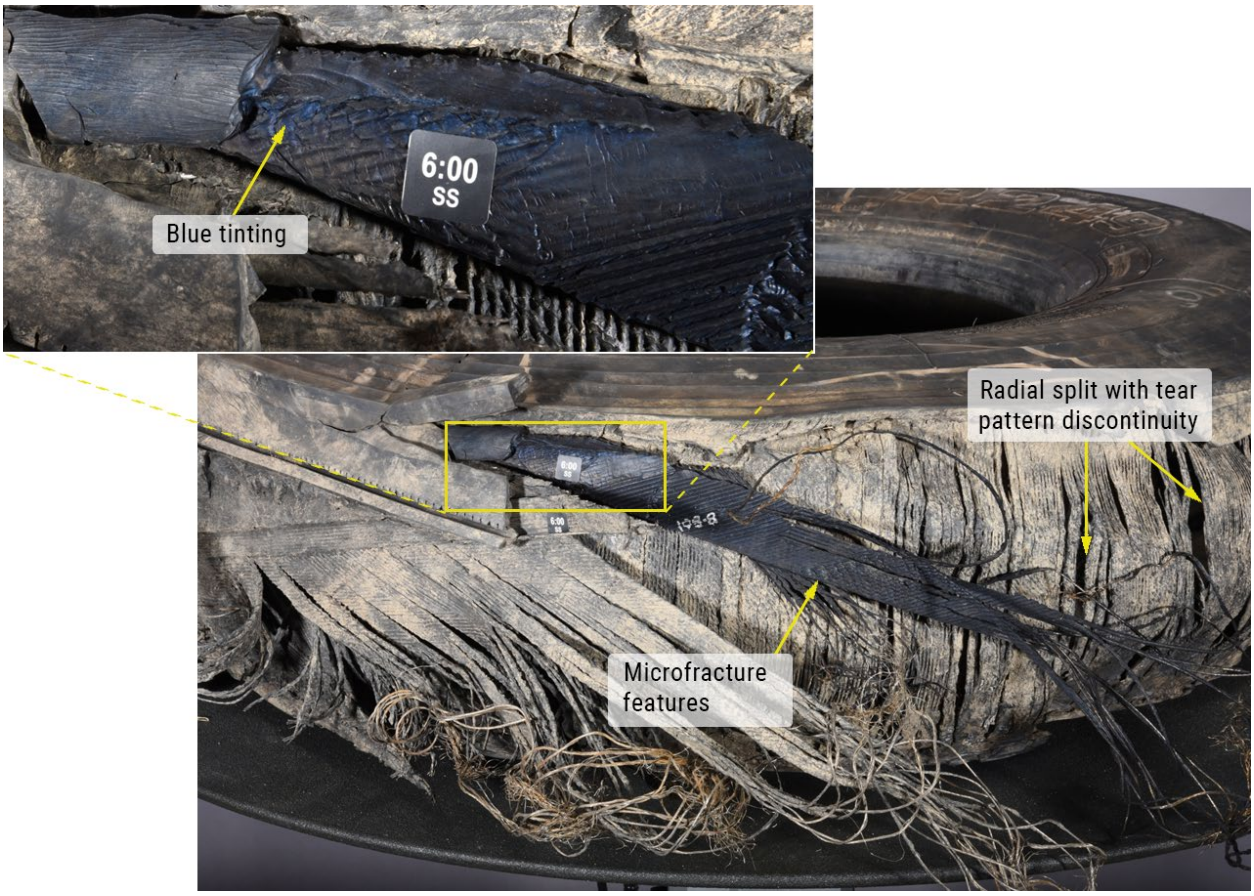


**Figure 8.** Images of the failed left steer axle tire showing indicators of underinflation and impact damage.

**Tire Pressure Monitoring System**. The motorcoach was equipped with a tire pressure monitoring system (TPMS), manufactured by Beru/Huf, that uses electronic sensors in the valve base of each tire to communicate with a dashboard display.[29]

The TPMS requires each tire sensor to be manually configured to its assigned position on the vehicle; if the tires are moved (such as from the steer axle to the drive axle), the position must be reprogrammed to reflect the correct recommended tire pressure for that axle. The system's inflation warning thresholds can also be reprogrammed by maintenance personnel and may be set to custom values that differ from those recommended by the tire and vehicle manufacturers.

[29] *Tire pressure monitoring system*, as defined in Federal Motor Vehicle Safety Standard No. 138, is a system that detects when one or more of a vehicle's tires is significantly underinflated and illuminates a low tire pressure warning ("telltale"). The standard specifies performance requirements for the system to warn drivers of significant underinflation of tires and applies to vehicles with a gross vehicle weight rating of 10,000 pounds or less. Therefore, in the United States, motorcoaches are not required to have a TPMS.

Due to electrical system damage, investigators were unable to power the TPMS display to verify functionality after the crash. The display/control panel does not store tire pressure or alert data. The plastic-bodied TPMS sensor in the left steer axle tire was missing, with only the metal screw and valve remaining attached to the wheel.

Maintenance records from Regency Transportation and the previous owners contained no documentation of TPMS maintenance or reprogramming. In response to follow-up questions by the NTSB, the carrier owner provided only cursory confirmation that the TPMS on the motorcoach was functional and that the carrier had verified tire pressures were correctly programmed in the TPMS.

During the NTSB interview, the driver did not mention TPMS alerts or any other vehicle alerts during the crash trip, despite having operated the same motorcoach on previous trips.[30]

## 1.5 Postcrash Actions

### 1.5.1 State of New York

Following the crash, the New York Legislature passed Assembly Bill A8557 requiring charter buses be equipped with seat belts and mandating their use.[31] The law took effect in April 2025, applies to minor and adult passengers in charter buses, and provides different penalty structures based on passenger age.[32] The law does not include requirements for pretrip safety briefings.

[30] Several days prior to this crash, the driver had operated the same motorcoach on a trip from Fort Drum, New York, to Fort Stewart, Georgia.

[31] See New York Assembly Bill A8557, signed into law on October 23, 2024. The bill defines charter buses as buses manufactured or assembled on or after November 28, 2016, that transport passengers for compensation in a "chartered party." This date was also the effective date of the National Highway Traffic Safety Administration's (NHTSA) mandate for lap/shoulder belts on motorcoaches (see Federal Motor Vehicle Safety Standards; Occupant Crash Protection," at 78 *Federal Register* 70416), amended Federal Motor Vehicle Safety Standard 208. The NHTSA mandate applies to all large buses with gross vehicle weight ratings above 26,000 pounds, but it excludes school buses, transit buses, and prison buses.

[32] The law mandates lap/shoulder belt use by passengers 8 years and older. For passengers between ages 8 and 15, parents or guardians are cited for violations of the seat belt requirement. Seat belt use for children below age 8 is mandated by New York State Vehicle and Traffic Law Section 1229-c(1), which requires all children under the age of 8 to be restrained in an appropriate child restraint system.

### 1.5.2 New York Department of Education

NTSB investigators met with staff at the New York Department of Education to discuss transportation safety policy.[33] Department officials plan to propose changes to the Board of Regents that would modify the state's transportation safety policy for charter bus trips to (1) require motor carriers to provide pretrip safety briefings, and (2) establish procedures to comply with New York Assembly Bill A8557 requirements for mandatory seat belt use for all charter bus occupants.

### 1.5.3 Regency Transportation

After the crash, Regency Transportation implemented several improvements to its safety policies and procedures. The carrier established a new policy requiring drivers to wear seat belts and prohibiting smoking or vaping while operating vehicles. Additionally, the company selected another vendor for its driver monitoring software, which provides more comprehensive driver monitoring capabilities.

The NTSB contacted Regency Transportation regarding its use of the fleet management and driver monitoring video system. The carrier reported that it now conducts spot checks of videos throughout the day to verify drivers' compliance with the new seat belt and smoking/vaping policies.

According to Regency Transportation, the updated fleet management system generates automated alerts for various driving behaviors or stability events, including hard cornering, near collisions, hard braking, speeding, and rapid acceleration, as well as hitting a pothole or curb. Although the system cannot automatically detect seat belt use or mobile device handling, the carrier's increased frequency of video reviews can help ensure compliance with safety policies.

## 2. Analysis

At the time of the crash, the weather was clear with no precipitation, the roadway surface was dry, and visibility was unobstructed.

The investigation found no evidence of driver fatigue or use of alcohol or other drugs. Furthermore, the investigation determined that the driver's licensing and driving experience were not factors in this crash; the investigation also found no evidence that the driver was using a cell phone or was distracted by passengers.

[33] On February 11, 2025, NTSB investigators met with the New York State Director of Pupil Transportation.

The emergency response demonstrated effective interagency coordination. First responders arrived within 7 minutes of notification. The medevac and ground transportation of injured motorcoach occupants to appropriate medical facilities was well-coordinated and efficient.

## 2.1 Tire Failure

The postcrash tire examination by Bridgestone, the tire manufacturer, revealed that both steer axle tires showed evidence of prolonged operation in an underinflated condition, including compression grooves at rim flanges and rubber cutting adjacent to these grooves. The failed left steer axle tire exhibited more severe underinflation indicators: recovered tread fragments had a blue tint on fracture surfaces, which is evidence of elevated operating temperatures. The left steer axle tire also showed evidence of precrash impact damage along its outboard shoulder with notable radial splits through the tire body and liner and signs of a developing tread separation. The Bridgestone examination, observed by the NTSB, showed that the left steer axle tire blowout resulted from a combination of underinflation and previous impact damage.

Underinflated tires, particularly on large vehicles such as motorcoaches, negatively impact handling and, due to higher friction and heat buildup, weaken the tire's structure, eventually causing blowout. The internal damage to the left steer axle tire accelerated that process.

The impact damage sustained by the left steer axle tire was internal and would have been difficult to detect during routine vehicle inspections, including the NYDOT inspection. This damage made proper tire pressure maintenance even more critical, whether through manual pressure checks or a functioning TPMS, which the NTSB has recommended previously.[34] However, the carrier's regular vehicle maintenance inspection process also failed to detect the underinflated steer axle tires.

Although the motorcoach was equipped with a TPMS, Regency Transportation had no documentation showing that the system was maintained and properly configured, as the carrier had operated the motorcoach for less than 2 months before the crash. A functional and properly configured TPMS should have alerted the driver about the underinflated steer axle tires. Proper configuration of the TPMS includes setting the manufacturer-recommended tire pressure for each tire on the vehicle. Our investigation found that both steer axle tires had been in an underinflated condition for

[34] In 2009, the NTSB issued two Safety Recommendations pertaining to tire pressure checks with gauges: H-09-19 to the FMCSA (classified Closed—Unacceptable Action) and H-09-27 to the American Association of Motor Vehicle Administrators (classified Closed—Acceptable Action). The NTSB also issued one Safety Recommendation pertaining to TPMS: H-09-22 to the National Highway Traffic Safety Administration (classified Open—Unacceptable Response).

an extended time, and therefore the TPMS on the motorcoach was likely not functioning as designed or had been programmed to use alert thresholds that differed from the tire manufacturer's recommendations.

Video documentation from the motorcoach's inward-facing camera confirmed that the driver was not wearing her lap/shoulder belt when the crash occurred. The footage also showed that she was controlling the vehicle with only one hand on the steering wheel at the precise moment when the left steer axle tire failed. Upon tire failure, video evidence shows the driver immediately placed both hands on the steering wheel in an attempt to maintain vehicle control. The catastrophic nature of the tire failure—characterized by tread/belt separation, rupture of the tire casing, and sudden pressure loss—created a severe leftward force on the vehicle. Video footage from the trailing motorcoach showed that 2 seconds elapsed between the tire failure and the motorcoach crossing the left shoulder line. Considering the severe forces generated by the catastrophic tire failure, without anticipation of such an emergency, maintaining vehicle control and preventing roadway departure would have been extremely challenging even for a belted driver with both hands on the steering wheel at the time of tire failure.

Video recording systems in commercial vehicles provide invaluable information for crash investigations, and the NTSB has consistently advocated for their use. Video recordings offer objective documentation that may not be obtainable through witness statements or physical evidence alone, as we demonstrated in our safety report, *Commercial Vehicle Onboard Video Systems* (NTSB 2015a). We have used video evidence in numerous previous investigations to determine crash causation factors that might otherwise have remained uncertain, including those related to roadway design issues in San Jose, California (NTSB 2017); distraction of an operator of an automated test vehicle in Tempe, Arizona (NTSB 2019); and precrash hazards in Mt. Pleasant Township, Pennsylvania (NTSB 2022).

Beyond their forensic investigative value, these recording systems function as powerful tools for proactive safety management. They enable carriers to monitor compliance with established safety policies, verify proper operating procedures, and identify potentially unsafe behaviors before they result in crashes. By documenting the event sequence, including the driver's actions, the tire failure and motorcoach's abrupt exit from the roadway, and the subsequent rollover and ejections, the Wawayanda crash provides objective evidence for how onboard video recorders can be used to improve transportation safety.

## 2.2 Seat Belt Use

Seat belt use is one of the most effective safety measures for reducing fatalities and serious injuries in motor vehicle crashes and for keeping occupants inside the vehicle, especially during rollovers, which further mitigates injuries (NHTSA 2014). In this crash, only one passenger—a student seated in the row 2 left-side window seat—was confirmed to have been wearing the available lap/shoulder belt at the time of the crash. This student sustained only minor injuries and was the only occupant from the first three rows who was not ejected. The other five occupants in this area, including the driver, were ejected and sustained fatal or serious injuries. Had the occupants been using their lap/shoulder belts, they would not have been ejected, reducing their level of injury. Their impacts inside the motorcoach would have also been reduced, further reducing their potential injuries.

The National Highway Traffic Safety Administration (NHTSA) has studied the dynamics of rollover crashes in motorcoaches by using belted and unbelted crash dummies. The belted crash dummies had fewer injuries and were more likely to remain inside the vehicle during the rollover event (NHTSA 1999). In support of the ruling mandating passenger lap/shoulder belts on motorcoaches, NHTSA referenced research showing that bus occupants had a 77% survival rate if they were belted during a rollover event (NHTSA 2013). NHTSA noted that although large bus crashes are not as common as other crashes, they can generate large numbers of fatalities or injuries because of their high occupancy, which often includes vulnerable groups such as students and seniors.

The NTSB has explored state laws as an avenue for increasing seat belt use in buses. Following the investigation of a 2014 crash in Davis, Oklahoma, involving a medium-size bus (NTSB 2015b), the NTSB issued a recommendation for primary enforcement of a mandatory seat belt use law for all seating positions equipped with a restraint system in passenger and commercial vehicles (H-15-42). This recommendation is classified as Open—Acceptable Response for the state of New York.

The recently adopted New York Assembly Bill A8557, which requires all occupants of charter buses to use seat belts on school trips, is a positive step toward enhancing occupant protection in these vehicles. To fully benefit from this law, awareness and public education, including pretrip safety briefings, are essential. Although the motorcoach driver reported making a brief announcement about the availability of seat belts, she did not provide a comprehensive safety briefing. Furthermore, the carrier had no formal policy requiring drivers to provide pretrip safety briefings, and the school did not request one.

Educational institutions can significantly increase seat belt use by ensuring that students and adult chaperones are aware of the state law. These institutions and other organizations that use motorcoach transportation have a responsibility to ensure the

safety of their students and staff. Notably, the New York Department of Education's work to modify transportation safety policy for charter bus trips is an important step in addressing this critical safety issue by requiring motor carriers to provide pretrip safety briefings and establishing procedures to comply with the new seat belt law.

# 3. Conclusions

## 3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the Wawayanda, New York, roadway departure crash was the tread/belt detachment and casing rupture of the left steer axle tire on the motorcoach due to prolonged operation in an underinflated condition combined with previous impact damage to the tire interior. Contributing to the crash was Regency Transportation's inadequate vehicle inspection process, which permitted the motorcoach to operate with underinflated tires. Contributing to the severity of the injuries was the motorcoach occupants' failure to use the available lap/shoulder belts.

## 3.2 Lessons Learned

The Wawayanda crash serves as a reminder that lap/shoulder belts should be worn by all drivers and passengers in motorcoaches and can prevent injury or ejection during collisions. Educational institutions and other organizations that use motorcoach transportation have a duty to ensure passenger safety; they can significantly increase seat belt use by making students and adult chaperones aware of state seat belt laws and implementing their own mandatory seat belt use policies for student transportation.

In addition, this crash demonstrates that proper tire pressure maintenance is critical. A properly configured tire pressure monitoring system can alert vehicle operators to under- or overinflated tires. Periodic tire pressure gauge checks—beyond visual inspection—should be undertaken as a part of a vehicle inspection in the event that a tire pressure monitoring system is not configured or functioning properly. The NTSB has previously recommended both manual tire pressure checks and tire pressure monitoring systems.

# References

NHTSA (National Highway Traffic Safety Administration). 1999. *Effectiveness of Lap/Shoulder* Belts *in the Back Outboard Seating Positions,* DOT HS 808 945. Washington, DC: NHTSA.

_____. 2013. *Federal Motor Vehicle Safety Standards; Occupant Crash Protection*. NHTSA Docket No. 2013-0121. Washington, DC: NHTSA.

_____. 2014. *Large Bus Structural Integrity; FMVSS 127—Preliminary Regulatory Evaluation*. Office of Regulatory Analysis and Evaluation, National Center for Statistics and Analysis, Washington, DC: NHTSA.

NTSB (National Transportation Safety Board). 2022. *Multivehicle Crash Near Mt. Pleasant Township, Pennsylvania, January 5, 2020*. NTSB/HIR-22/01. Washington, DC: NTSB.

_____. 2019. *Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian, Tempe, Arizona, March 18, 2018*. NTSB/HAR-19/03. Washington, DC: NTSB.

_____. 2017. *Motorcoach Collision With Crash Attenuator in Gore Area, US Highway 101, San Jose, California, January 19, 2016*. NTSB/HAR-17/01. Washington, DC: NTSB.

_____. 2015a. *Commercial Vehicle Onboard Video Systems*. NTSB/SR-15/01. Washington, DC: NTSB.

_____. 2015b. *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.

NTSB investigators worked with the **Federal Motor Carrier Safety Administration**, the **New York State Police**, and **Bridgestone Americas, Inc.**, throughout this investigation.

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 United States Code section 1154(b)).

For more detailed background information on this report, visit the NTSB investigations website and search for NTSB accident ID HWY23FH016. Recent publications are available in their entirety on the NTSB 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