August 11, 2026 HIR-26-07

Motorcoach Tire Failure, Roadway Departure, and Overturn

Vicksburg, Mississippi
August 31, 2024

On August 31, 2024, about 12:33 a.m. central daylight time, a motorcoach operated by Transportes Regiomontanos was traveling west on Interstate 20 (I-20) near Vicksburg, Mississippi, when its front-left steer axle tire failed.[1] The motorcoach departed the roadway to the left, entered the median, and overturned onto its left side. The motorcoach was occupied by a 54-year-old driver, a co-driver, and 42 passengers. Seven passengers died, 8 sustained serious injuries, and 13 sustained minor injuries. The driver sustained minor injuries, and the co-driver sustained serious injuries (see figure 1).

Figure 1. Side view of motorcoach during postcrash recovery phase. (Source: Mississippi Highway Patrol)

[1] In this report, all times are central daylight time. (b) Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. HWY24MH016). Use the CAROL Query to search safety recommendations and investigations.

Location	I-20 westbound, near mile marker 9.5, Vicksburg, Mississippi
Date	August 31, 2024
Time	12:33 a.m.
Involved vehicles	1
Involved people	44
Injuries	7 fatal (passengers), 9 serious (8 passengers and the co-driver), and 14 minor (13 passengers and the driver)
Weather	Dry, clear, and nighttime
Roadway information	Rural, limited-access highway with two westbound and two eastbound lanes separated by a depressed grassy and wooded median; roadway lighting present[2]

1. Factual Information

1.1 Event Sequence

On August 31, 2024, about 12:33 a.m., a 2018 Volvo 9800 Grand L motorcoach, operated by Transportes Regiomontanos, was traveling west in the right lane of I-20 near Vicksburg, Mississippi. The motorcoach, occupied by a 54-year-old driver, a co-driver, and 42 passengers, was traveling from Reading, Pennsylvania, to Monterrey, Mexico, on a regularly scheduled route.

At this location, I-20 was a four-lane divided highway with two travel lanes in each direction separated by a grassy and wooded median about 275 feet wide. The westbound roadway consisted of a left and a right lane as well as an acceleration lane for commercial motor vehicles (CMV) re-entering the highway from a nearby weigh station that merged with the right travel lane. The westbound roadway had an approximately 3-foot-wide left shoulder and a right shoulder varying between 6 and 14 feet wide. Both shoulders featured milled rumble strips. The posted speed limit was 70 mph.

As the motorcoach approached mile post 9.5 just before the location where the acceleration lane ended, its left steer axle tire experienced a sudden and catastrophic deflation, or "blowout."[3] The tire failure occurred on a 1.2-mile-long, straight section of

[2] The lighting included three high-mast lights (each with four luminaires) spaced at approximately 500-foot intervals and four standard-mast lights (each with one luminaire) spaced at approximately 240-foot intervals.

[3] 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 referred to as the *tag axle*.

roadway with a downhill grade of 1.6%. This event and the subsequent crash sequence were captured by two cameras that were installed on the motorcoach.[4]

Video footage from the cameras on the motorcoach and physical evidence on the roadway showed that the motorcoach departed the roadway about 3.1 seconds after the tire failure (see figure 2).[5]

Figure 2. Orthomosaic image of crash area.

The onset of physical roadway evidence—a tire friction mark created by the deflated left steer axle tire originating in the right lane—was located about 351 feet from the point where the motorcoach departed the roadway. The mark extended west across the left lane and continued onto the shoulder.

Upon crossing onto the grassy median, the tire friction mark transitioned to a soil furrow that arced leftward, following the median's downward foreslope. The furrow extended about 237 feet into the median, where it terminated. At this point, the motorcoach tipped onto its left (driver) side and then slid a short distance down the slope before coming to rest about 26 feet south of the westbound roadway edge.

In the area of the motorcoach's departure from the roadway, the median had an approximately 30- to 35-foot-wide clear zone, an unobstructed area beyond the edge of the road designed to allow drivers who depart the roadway to stop or return safely. Trees were present in the median beyond the clear zone. At the location where the motorcoach departed the roadway and continuing about 200 feet west, the foreslope running parallel to the south edge of westbound I-20 was characterized as recoverable based on American Association of State Highway and Transportation Officials (AASHTO) guidelines, which are based on the characteristics of passenger cars, light trucks, and

[4] Cameras on the motorcoach were part of the fleet management and driver monitoring system, and consisted of a forward-facing camera and an inward-facing camera pointed toward the driver and front-row passengers.

[5] The video was recorded as an MP4 file with 960-by-1080-pixel resolution at a rate of 29.87 frames per second.

sport utility vehicles.[6] At the location where the motorcoach came to rest, the foreslope was considered non-recoverable by AASHTO guidelines.[7]

Although the engine control module on the motorcoach did not capture the tire failure and subsequent crash event, the fleet management and driver monitoring system recorded the motorcoach's speed, which was overlaid on the video footage. At the moment of tire failure, the motorcoach was traveling 71 mph.[8] As its left wheel exited the roadway, the motorcoach was traveling 58 mph.

1.2 Injuries, Occupant Protection, and Emergency Response

As a result of the crash, 7 passengers died, 8 sustained serious injuries, and 13 sustained minor injuries; 14 passengers were uninjured. The driver sustained minor injuries, and the co-driver sustained serious injuries. Based on Mississippi Highway Patrol (MHP) postcrash scene photographs and interviews with first responders, all seven fatally injured passengers were ejected during the crash sequence, as were three of the seriously injured passengers. The seating positions of the motorcoach passengers could not be determined from the available evidence. Due to its orientation, the video footage from the inward-facing camera showed only two passengers sitting on each side of the aisle in the first row behind the driver.

The motorcoach was equipped with 13 rows of two-person seats on the left (driver) side and 10 rows of two-person seats on the right (passenger) side. A retrofitted sleeper berth was located on the right side behind row 10 and in front of the lavatory, which was positioned at the rear of the motorcoach.

The motorcoach was equipped with lap/shoulder belts at the driver's and co-driver's seats; both belts were operational.[9] Video footage from the inward-facing camera confirmed that the driver was wearing his lap/shoulder belt at the time of the

[6] (a) For more information, see AASHTO 2011, section 3.2.1, "Foreslopes," pp. 3-4 and 3-5. (b) At the location of roadway departure and continuing about 200 feet west, the foreslope ratio was 1 foot of vertical distance for every 4 feet of horizontal distance or flatter, which is considered recoverable by AASHTO guidelines.

[7] At the location where the motorcoach came to rest, the foreslope ratio was 1 foot of vertical distance for every 3 feet of horizontal distance, which is considered non-recoverable by AASHTO guidelines.

[8] One second after the tire failure, the motorcoach's speed was 70 mph. Two seconds after the tire failure, its speed was 64 mph.

[9] The co-driver seat was a fold-up jump seat, located in the stairwell area and mounted to the front of the right-side modesty panel.

crash. The driver's seat belt showed evidence of minor cupping and heat abrasion to the webbing. The co-driver was in the sleeper berth at the time of the crash.[10]

The passenger seats were equipped with lap-only belts, but nearly all were inaccessible—either hanging below the seat pan or lodged between the seat cushions—and could not be properly extended to latch into a buckle. At the time of the postcrash inspection, only two passenger seats—the aisle and window seats on the left side of row 2—had lap belts extended over the seats, and of these, only one was operational.[11] None of the six passengers interviewed by the NTSB reported wearing a lap belt or receiving a pretrip safety briefing. Two passengers stated that they asked the driver and co-driver about seat belt availability and were told the motorcoach had none.

At the time of the crash, Mississippi maintained primary enforcement laws for seat belt use that applied to all seating positions in passenger vehicles and vehicles designed to carry 15 or fewer passengers; these laws did not apply to motorcoaches.[12] Federal law for seat belt use in CMVs applies only to drivers and requires them to use seat belts.[13]

A 911 call at 12:36 a.m. notified Warren County Sheriff's Office (WCSO) dispatchers of the crash. The first WCSO deputy arrived on scene at 12:50 a.m. and assumed initial incident command (IC), declaring a mass casualty incident 2 minutes later. At 12:55 a.m., the WCSO closed westbound I-20 in the area of the crash.

Upon arrival, the Chief of the Warren County Fire Department assumed IC. Additional responding agencies included the Vicksburg Fire Department, which dispatched seven advanced life support medical units, and Hinds County, which dispatched two basic life support units. Units from the MHP and the Mississippi Department of Transportation also responded to the scene.

First responders extricated 11 motorcoach occupants who were trapped under and between the seats of the motorcoach, and 3 surviving occupants who were found

[10] (a) Sleeper berths on CMVs must comply with 49 *Code of Federal Regulations* 393.76, which establishes equipment and performance requirements for sleeper berths including dimensions, location, ventilation, and occupant restraint systems (designed to prevent ejections). These requirements apply to manufacturer-installed and carrier-retrofitted sleeper berths. (b) The length of the sleeper berth on the crash-involved motorcoach was about 10 inches shorter than what is required by regulation.

[11] (a) The seat belt for the aisle seat was operational, but the investigation could not determine whether the aisle seat was occupied. (b) The requirements for seat belts on motorcoaches are discussed in section 1.3.4.

[12] (a) Mississippi 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. (b) See Mississippi Code 1972 Title 63-1-1 through 63-39-27.

[13] 49 *Code of Federal Regulations* 392.16 requires CMV drivers to use seat belts when operating a CMV equipped with seat belt assemblies.

under or partially under the motorcoach. The last injured occupant, the driver, was transported to a local hospital at 3:45 a.m. Westbound I-20 was reopened at 6:07 a.m.

1.3 Additional Information

1.3.1 Driver Information

The 54-year-old motorcoach driver had been employed by Transportes Regiomontanos since October 2020. At the time of the crash, he held a current Mexican Class A international commercial driver's license (CDL), which is recognized as valid for operation in the United States and is equivalent to a US Class B CDL with passenger endorsement.[14] His most recent medical certificate, obtained in Mexico in October 2023, was valid for 2 years and indicated that he was required to wear corrective lenses when operating a commercial vehicle.[15]

A review of the CDL Information System (CDLIS) indicated no convictions, violations, or crashes on the driver's record, and a query of the Federal Motor Carrier Safety Administration (FMCSA) drug and alcohol clearinghouse showed no violations.[16] The driver reported receiving 4 days of training upon hire, covering hours-of-service (HOS) regulations, driving in inclement weather, and security. He had been driving the crash-involved route between Monterrey, Mexico, and Reading, Pennsylvania, for about 20 months, 1 to 2 times per month. The carrier's training records did not document the specific courses provided to the crash-involved driver, and the driver reported that his training did not include response to sudden tire failure.

Postcrash toxicology testing, conducted in accordance with US Department of Transportation (USDOT) requirements specified in 49 *Code of Federal Regulations* (*CFR*) 382.203, was negative for tested-for drugs.[17] The same regulation also requires that a postcrash alcohol test be administered within 8 hours of a crash. However, this test was not performed by the carrier, and the carrier did not submit documentation stating the reasons for not meeting this requirement.

---

[14] (a) Documentation from the Mexican Department of Communications and Transportation indicated that his license was valid in the United States and Canada for travel and tourism. (b) As a result of a 1991 U.S.-Mexico CDL memorandum of understanding, Mexican international CDLs are recognized as valid for operation inside the United States. See 57 *Federal Register* 31454, July 16, 1992. The memorandum was amended in 2017.

[15] For a description of the medical certification process, see the Motor Carrier and Human Performance Group Chairs' factual reports in the public docket for this investigation.

[16] The CDLIS is a nationwide computer system, administered by the FMCSA, that enables state driver licensing agencies to ensure that each commercial driver has only one driver's license and one complete driver record. The CDLIS includes Mexican CDL drivers operating in the United States.

[17] As required by 49 *CFR* 382.303, the USDOT urine drug test must be administered within 32 hours of the crash, and it must test for amphetamines, marijuana, phencyclidine, cocaine, opioids, MDA analogues, oxycodones, and 6-Acetylmorphine.

At the time of the crash, the driver had been on duty for about 3.5 hours, following about 14 hours in the sleeper berth.[18] Cell phone records indicated that the driver used his cell phone while on duty, including during driving periods. The records and the inward-facing camera video showed that the driver was not using his cell phone at or around the time of the crash.[19]

The video footage from the forward-facing camera showed the motorcoach traveling uneventfully before the tire failure occurred. The inward-facing camera showed that at the time of the tire failure, the driver was wearing glasses, was restrained by the lap/shoulder belt, had his left hand on the steering wheel, and was looking ahead. When the steering wheel rotated rapidly to the left, the driver grasped it with both hands. In his interview with NTSB investigators, the driver reported braking only lightly because he believed braking harder could cause the motorcoach to lose control and overturn.

In the interview, he also stated that he had never experienced a steer axle tire failure and had not received training on how to respond to one. Further, the driver reported that he conducted a pretrip inspection on the day of the crash and did not identify any tire issues. Additionally, he reported that the motorcoach was operating normally up to the time of the tire failure.

1.3.2 Motor Carrier Information

Transportes Regiomontanos, with its principal place of business in Laredo, Texas, was a for-hire interstate passenger motor carrier that obtained USDOT authorization to operate in April 2005. The carrier operated two fixed routes, both originating in Monterrey, Mexico: one to Cleveland, Ohio, and the other to Reading, Pennsylvania. Federal and state oversight of US-domiciled carriers operating vehicles registered in Mexico is discussed in section 1.3.4.

The carrier maintained a USDOT-required drug and alcohol testing program and kept driver qualification files as required by regulations.[20] The carrier's fleet was equipped with a fleet management and driver monitoring system, which featured forward- and inward-facing cameras and provided electronic logging device

[18] According to 49 *CFR* 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."

[19] (a) The driver reported using a hands-free device when he was driving and needed to talk to the carrier. According to 49 *CFR* 392.82 and the FMCSA's final rule published at 76 *Federal Register* 75470 (December 2, 2011), calls may be made while driving if the driver is using a hands-free device. (b) Regular phone calls are telephone calls using the traditional telephone network and not including phone calls through the internet. Regular text messages are text messages sent/received via mobile carriers using Short Message Service (SMS) or Multimedia Messaging Service (MMS) protocols, and do not include any text messages sent/received via software applications, which use mobile data via the internet.

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

functionality. The carrier did not have a written safety plan or dedicated policies for pretrip safety briefings or performance-based driver incentives.

At the time of the crash, the FMCSA's Safety Measurement System indicated that Transportes Regiomontanos had one alert in the Behavior Analysis and Safety Improvement Categories (BASIC); the Crash Indicator category had been in alert status since July 2024.[21] According to the FMCSA's Motor Carrier Management Information System, the carrier had four crashes in the 4-year period before the Vicksburg crash, one of which was fatal.[22]

After the Vicksburg crash, the FMCSA conducted a compliance review and identified seven violations, none of which were classified as critical or acute; the postcrash compliance review was rated as satisfactory.[23] After the crash, Transportes Regiomontanos was unable to renew its insurance or obtain a policy with another provider and (as of the date of this report) has ceased operations.

1.3.3 Vehicle Information

General. The 2018 Volvo 9800 Grand L motorcoach was manufactured in April 2017 and had a gross vehicle weight rating (GVWR) of 54,564 pounds. The motorcoach was equipped with an antilock braking system but was not equipped—nor was it required to be equipped—with an electronic stability control system.[24] The motorcoach was also equipped with a central tire inflation system (CTIS), which is discussed later in this section. The steer axle tires were designed for a maximum load pressure of 123 pounds per square inch (psi) at 7,830 pounds load on the tire; neither the motorcoach manufacturer nor the tire manufacturer provided a recommended operating tire

[21] (a) The FMCSA uses data from roadside inspections—including all safety-based violations, state-reported crashes, and the Federal Motor Carrier Census—to quantify a carrier's performance in seven BASICs. These BASICs are (1) Unsafe Driving, (2) HOS Compliance, (3) Driver Fitness, (4) Controlled Substances/Alcohol, (5) Vehicle Maintenance, (6) Hazardous Materials Compliance (if applicable), and (7) Crash Indicator. (b) The carrier's only other BASIC score was in the Vehicle Maintenance category; the score was below the alert threshold.

[22] The fatal crash occurred in 2023 and involved a truck-tractor in combination with a trailer striking a traffic queue that included a motorcoach operated by the carrier. The motorcoach was reported not to be at fault.

[23] (a) None of the seven violations were related to maintenance of the crash-involved motorcoach. (b) 49 *CFR* 385(b) defines *acute* regulations as occurring when "noncompliance is so severe as to require immediate corrective actions by a motor carrier regardless of the overall safety posture of the motor carrier." 49 *CFR* 385(c) defines *critical* regulations as occurring when "noncompliance relates to…breakdowns in a carrier's management controls." (c) A *satisfactory* safety rating "means that a motor carrier has in place and functioning adequate safety management controls to meet the safety fitness standard prescribed in 49 *CFR* 385.5."

[24] 49 *CFR* 571.136 requires motorcoaches manufactured after August 1, 2019, to be equipped with electronic stability control.

pressure.[25] According to Volvo, the motorcoach was manufactured for the Mexican market.

Damage. The overturn caused damage to the entire left side of the motorcoach, including scrapes and deformation to the exterior panels and an inward bend of about 18 inches to two roof-support pillars. All eight main windows on the left side were displaced and missing; the windows on the right side remained intact (see figure 3). The interior sustained minor damage with no measurable structural intrusion from the overturn. All passenger seats and the overhead luggage compartments remained in place.

Figure 3. Front-left view of damage to motorcoach (left image) and view of motorcoach interior, looking from front to rear (right image).

Vehicle Maintenance and Postcrash Examination. Transportes Regiomontanos performed most of its maintenance at a facility in Mexico. Carrier maintenance records indicated that the motorcoach underwent routine maintenance, periodic service, and repairs, including 41 scheduled and unscheduled maintenance events in the year before the crash, the last of which was on August 22, 2024 (9 days before the crash). Although the records showed that standard practice included checking tires and tire pressure, including on August 22, the records did not provide details such as measured tire pressure values.

The steer axle tires were replaced on February 3, 2024. Carrier maintenance personnel told the NTSB that they were unaware of any prior damage to the steer axle tires on the crash-involved motorcoach, and the maintenance records contained no documentation of such damage.

A postcrash examination by NTSB investigators found no preexisting damage or defects in the motorcoach's steering, suspension, brake, or engine systems.

[25] (a) The motorcoach had a GVWR of 54,564 pounds. The gross axle weight rating for the steer axle was 16,536 pounds. (b) The weight of the loaded motorcoach (with passengers and luggage) was not recorded.

Postcrash Tire Examination. During the postcrash examination, the NTSB noted that all tires had at least 8/32-inch tread depth, which exceeded the minimum required 4/32 inch for steer axle tires and 2/32 inch for all other tires.[26]

The failed left steer axle tire was further examined at the NTSB laboratory. The examination revealed damage consistent with a tread/belt separation and multiple indicators of previous impact damage to the tire's internal structure.[27] The radial ply was exposed over about 25% of the tire's circumference, showing numerous separations between radial steel cords and areas where steel cord wires had broken (see figure 4). Examination of the fractured wire ends revealed necking consistent with tensile overstress fracture. The inner liner exhibited numerous splits in this area and appeared loosened from the radial ply.[28]

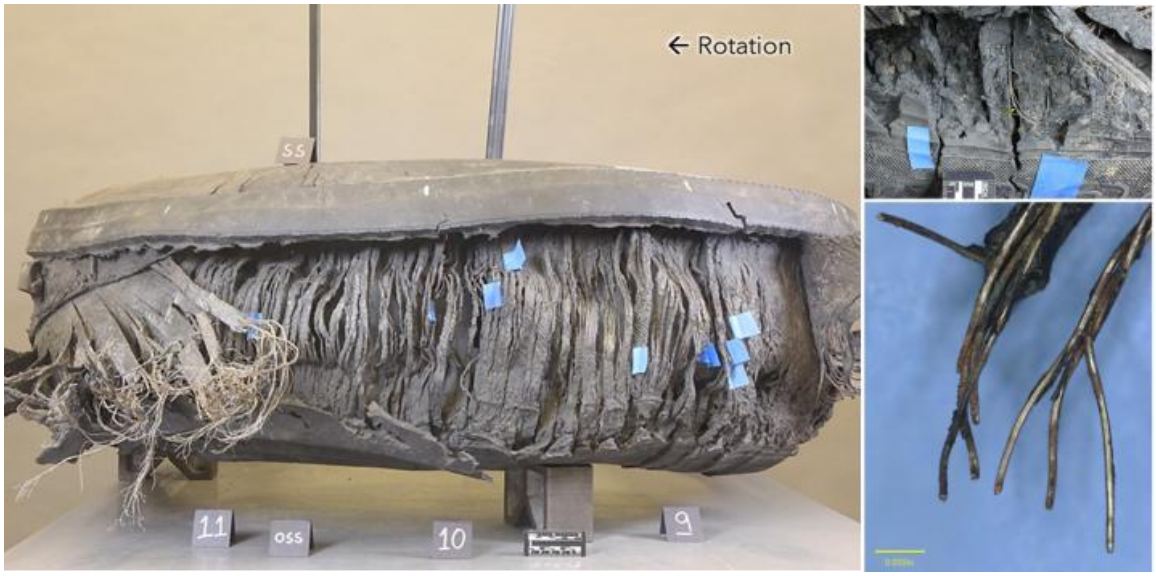

Figure 4. Images of failed steer axle tire showing exposed radial ply and indicators of impact damage. Blue markers in the left image indicate locations of broken radial cord wires, shown more closely in the right images.

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

[27] (a) All tires on the motorcoach were constructed with a single radial ply—cords oriented perpendicular to the direction of travel—forming the structural body (carcass) of the tire. The radial ply was topped by four belt plies running circumferentially—cords biased relative to the direction of travel—beneath the tread to provide rigidity and puncture resistance. (b) The tire body, or *carcass*, refers to the tire's rubber-bonded cord structure, except for the tread and sidewall rubber and the belt package. *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 and seal against the rim.

[28] *Necking* refers to the localized reduction in cross-sectional area of a material such as steel wire when subjected to tensile stress beyond its designed capability. *Inner liner* refers to the layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

A curvilinear feature was observed on the outer surface of ply 3, showing progressive fracture patterns between plies 3 and 4 (see figure 5). These fractures originated from the belt edges at the tire shoulder and propagated circumferentially (around the tire, parallel to the tread) and across the tire until the tread and portions of the belt rapidly detached. Near the origin area of the curvilinear region at the shoulder opposite the side of the tire marked with the serial number, continuous radial splits were observed through the inner liner, radial ply cords, tire sidewall, and mating side of the shoulder.

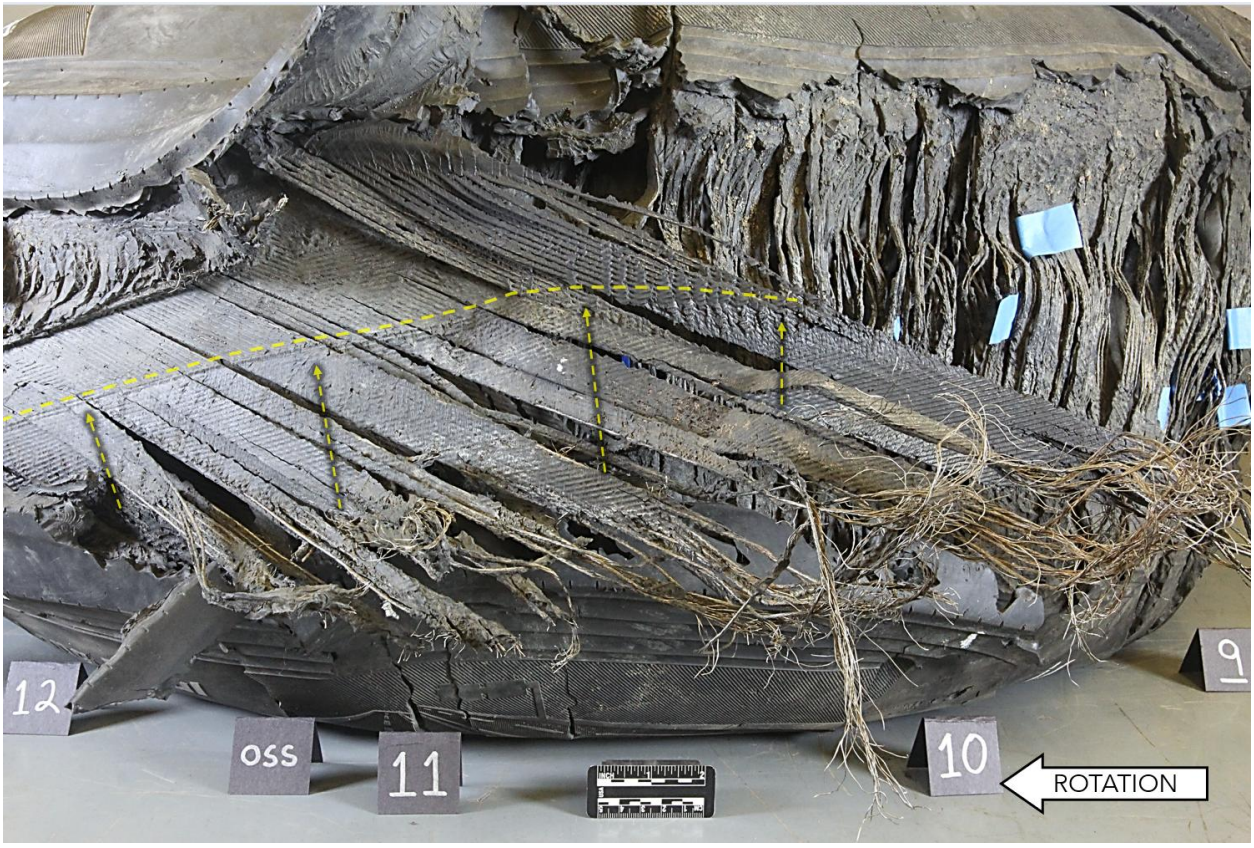

Figure 5. Image of failed left steer axle tire showing a portion of the tread/belt separation initiation region on the top side of ply 3, bounded by a dashed yellow line. Progressive fracture propagated from the tire shoulder region toward a curvilinear demarcation, as indicated by yellow arrows, leading to the final separation.

The failed tire also exhibited indicators of overdeflection, a condition in which the tire bends or distorts excessively where it contacts the road, typically resulting from underinflation, excessive load, or a combination of the two. These indicators included chafing along the bead seat interface, a compression groove along the rim flange

interface, and partially worn radial vents.[29] The examination found corresponding overdeflection damage on the left steer axle tire, which also showed evidence of shoulder step or chamfer wear around the entire circumference of both shoulders.[30] Overdeflection can cause excessive heat buildup in tires, which can deteriorate the rubber and accelerate the progression of preexisting damage, leading to tire failure.

The NTSB also examined the right steer axle tire and wheel, which showed similar indicators of overdeflection. A shearography inspection of the right steer axle tire showed no anomalies indicating existing internal separation or damage.[31]

CTIS: General Information and Postcrash Examination. The motorcoach was equipped with a CTIS, Vigia NM 253, which was designed to automatically inflate tires to maintain preprogrammed pressure and alert the driver through a warning light and auditory chime if it cannot do so.[32] This system consists of an in-vehicle control unit and external components connecting to each tire, including pneumatic hoses and valves (see figure 6). The control unit features individual axle pressure gauges, displays, and control buttons for each axle; the pressure displayed for each axle reflects the equalized pressure across all tires on that axle. The driver can deactivate the system and silence the auditory alert for individual axles through the control unit; deactivated axles will not resume inflating until manually reactivated, and the settings do not reset with the next ignition cycle.

[29] The *bead seat interface* is the contact area between the tire bead and the horizontal or slightly sloped surface of the rim that the tire bead rests on and seals against when properly mounted. The *rim flange interface* is the contact area between the tire's rim and the flared outer lip (vertical surface) of the rim that the tire's bead pushes out against to prevent the tire from slipping off the rim. A *vent* is a manufacturing and curing byproduct whereby a small rubber protrusion is left on the tire's surface when air-escape pathways in the mold are filled with liquefied rubber.

[30] *Shoulder step* or *chamfer wear* refers to a stepped or beveled wear pattern confined to the outer portion of the tire shoulder(s).

[31] *Shearography* inspection is a non-contact technique that uses laser light to image the tire at slightly different stress states. When images are analyzed and compared, surface changes can be detected and interpreted. This technique can be used to locate and size defects, such as internal separations and porosity.

[32] Federal Motor Vehicle Safety Standard 138 establishes performance requirements for tire pressure monitoring systems to warn drivers of significant underinflation of tires; however, the standard applies only to passenger cars, multipurpose vehicles, trucks, and buses that have a GVWR of 10,000 pounds or less.

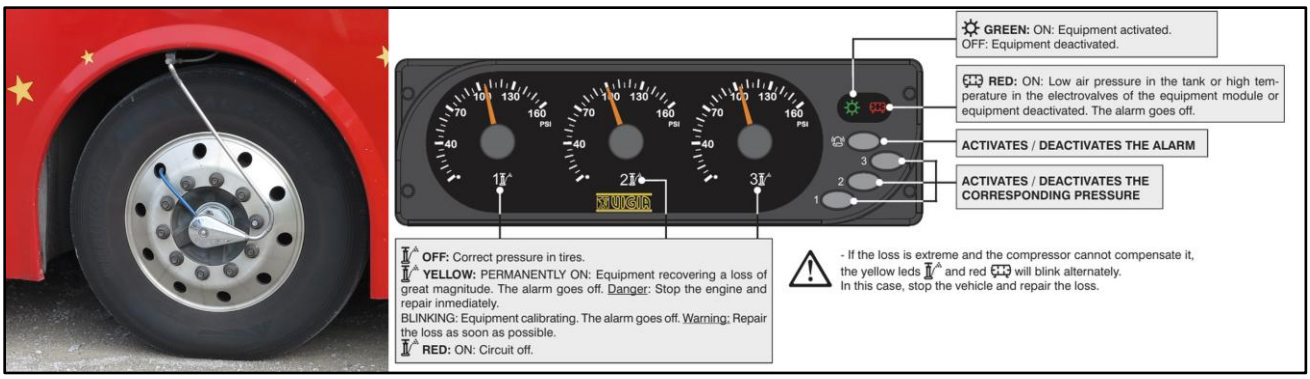

Figure 6. Outer component of CTIS as installed on exemplar motorcoach (left image) and graphic of control panel (right image). (Source of right image: Vigia manual)

At the time of the on-scene examination, all axle control buttons and the auditory alert button were in the deactivated position. NTSB laboratory examination of the supply line to the left steer axle tire revealed small leaks in the line and around the coupling, with a leak rate of about 4 psi per second; it could not be determined whether these leaks were a preexisting condition or resulted from the crash. Examination and testing of the control unit showed that the auditory alert was programmed to deactivate once pressure reached 100 to 105 psi for the steer axle, 100 to 105 psi for axle 2, and 105 to 110 psi for axle 3. Because the CTIS displays equalized pressure for each axle rather than individual tire readings and does not store data, the examination could not determine the tire pressures at the time of the crash or when the buttons were placed in the deactivated position.

1.3.4 Additional Federal and State Oversight

US-domiciled carriers operating vehicles registered in Mexico but driven commercially in the United States, such as Transportes Regiomontanos, are subject to US federal and state oversight. At the federal level, in addition to FMCSA oversight, US Customs and Border Protection inspects all commercial vehicles entering the United States, including reviewing passenger documentation and inspecting for contraband; vehicles are examined for compliance with the Federal Motor Vehicle Safety Standards (FMVSS) only when being formally imported into the country. The National Highway Traffic Safety Administration (NHTSA) oversees FMVSS compliance for vehicles operated in the United States and maintains databases of vehicles eligible for importation. The crash-involved motorcoach, having been manufactured for the Mexican market and never formally imported, did not have a USDOT certification label as required by 49 *CFR* 567 and did not appear in NHTSA's databases of eligible or pending imported vehicles.[33]

[33] See NHTSA's list of eligible vehicles imported from other countries (non-Canadian) and the status of pending vehicle import eligibility petitions, both available at https://www.nhtsa.gov/importing-vehicle.

Because Mexico does not participate in the International Registration Plan—a registration reciprocity agreement among US states and Canadian provinces—US-domiciled carriers operating vehicles with Mexican plates are generally required to obtain temporary trip permits for each state through which they travel.[34] Several states along the crash-trip route—including Texas, Mississippi, Louisiana, and Alabama—require such permits. NTSB investigators determined that the crash-involved motorcoach had not been issued a valid Texas travel permit since October 2022, and the carrier had not obtained permits for any other state on this trip.[35]

Because the motorcoach was manufactured for the Mexican market and never certified for use in the United States, it did not comply with at least two FMVSSs applicable to model year 2018 motorcoaches operating in the United States. FMVSS 208 requires that over-the-road buses manufactured after November 28, 2016, with a GVWR greater than 26,000 pounds, be equipped with lap/shoulder belts in all passenger seating positions. The crash-involved motorcoach was equipped with lap-only belts on the passenger seats.[36] FMVSS 217 requires that emergency exits, including the roof exit hatches, and window retention release instructions be labeled in English. The instructions on the motorcoach's roof exit hatches were labeled only in Spanish.[37]

During the investigation, the NTSB identified several motor carriers with ownership, management, and/or operational elements in common with Transportes Regiomontanos, raising concerns about the activities of the carrier under a new USDOT number.[38] The NTSB shared this information with the FMCSA.

1.4 Postcrash Actions

1.4.1 Updates to Roadside Inspection Procedures

Commercial Vehicle Safety Alliance (CVSA) Level I inspection procedures for passenger-carrying commercial vehicles include items pertaining to the driver, the

[34] (a) Commercial vehicles that travel between two or more jurisdictions (states), transport passengers or property, have three or more axles, and/or have a combined GVWR of 26,000 pounds or more are required to have apportioned tags. (b) The temporary trip permits are a state-level rather than a federal requirement.

[35] The Texas Department of Motor Vehicles issues the temporary (72- and 144-hour) and annual permits under the North American Free Trade Agreement.

[36] See 49 *CFR* 571.208.

[37] See 49 *CFR* 571.217 and 49 *CFR* 393.62. Although FMVSS 217 also sets performance requirements for window glazing, the extent to which this motorcoach could have complied with this standard was not explored.

[38] Carriers "with common ownership, common management, common control or common familiar relationship" that evade FMCSA oversight "to avoid compliance, or mask or otherwise conceal non-compliance, or a history of non-compliance" are considered *reincarnated*. See 49 *CFR* 385.1003 and 49 *CFR* 385.1005 for a complete definition of a reincarnated carrier.

vehicle, and the general passenger area, including emergency exits, windows, and hatches. However, these procedures do not include checking the functionality and accessibility of passenger seat belts, which are required safety equipment on motorcoaches manufactured on or after November 28, 2016; the procedures only prescribe that the driver's seat belt should be inspected.

After the crash, NTSB investigators met with CVSA representatives and attended a CVSA workshop in April 2026 to describe the circumstances of the crash, including the inoperable and inaccessible passenger seat belts on the non-FMVSS-compliant motorcoach.[39] The CVSA subsequently reported that it was developing a process to ensure that the appropriate elements of FMVSS 208 are incorporated into the inspection procedures.[40] Once this process is complete, the CVSA indicated that it plans to present the updated draft to its Passenger Carrier Committee at its annual conference in September 2026 for a vote to adopt the new requirements for inclusion in the CVSA Level I inspection procedures. Under the proposed new procedures, motorcoaches manufactured on or after November 28, 2016, that are found to have inoperable or inaccessible passenger seat belts would be cited for a violation of 49 *CFR* 571.208.

2. Analysis

At the time of the crash, it was dark, the weather was clear, the roadway was dry, and visibility was unobstructed. The highway design, including the characteristics of the median, was consistent with existing standards.

The investigation found no evidence of impairment or fatigue in the motorcoach driver's performance and no evidence of cell phone use at or around the time of the crash. The driver was properly licensed, had sufficient experience operating motorcoaches, and was familiar with the route.

Emergency medical services' response to the crash was timely and effective. First responders arrived within 14–23 minutes of notification; while the response time reflected the rural location of the crash, it did not adversely affect the survivability outcome for the vehicle occupants.

2.1 Tire Failure and Countermeasures

The NTSB's postcrash examination revealed that the left steer axle tire suffered tread/belt separation, as evidenced by a region of progressive tearing between the belt plies that was initiated at the belt edges. Once the belt had detached, the radial ply could no longer contain the internal tire pressure, resulting in a blowout and rapid air loss. The most likely cause of the tread separation was previous impact damage to the

[39] The CVSA workshop occurred in Chicago, Illinois, April 19–23, 2026.

[40] Disbrow, J., CVSA. Correspondent, email message to M. Fox, NTSB, April 27, 2026.

tire's internal structure, evidenced by broken radial cord wires and discontinuous tear patterns across radial splits through the inner liner, radial ply, shoulder, and sidewall near the separation origin. The examination could not determine when or how the impact damage occurred, and carrier maintenance records contained no documentation of such damage.

Because the damage was internal, it would have been difficult to detect during routine vehicle inspections, making proper tire pressure maintenance even more critical. Both steer axle tires and wheels exhibited indicators of overdeflection. Although neither showed widespread heat damage—typically observed as a bluish tint on the tire rubber—prolonged overdeflection can accelerate the failure of a tire already compromised by impact damage. A moderate degree of overdeflection, depending on speed and other operating parameters, can initiate and propagate steel-belt edge separation and tread/belt detachments. Internal impact damage in the form of broken cords, tears between belts, and/or tears between cords may still allow for continued operation but can propagate over time and ultimately result in a tread/belt detachment (Gardner and Queiser 2006).

Tire pressure can be monitored manually or through systems such as tire pressure monitoring systems (TPMS), which the NTSB has previously recommended (NTSB 2009).[41] The crash-involved motorcoach was equipped with a CTIS, a system designed not only to alert the driver when pressure falls too low—similar to a TPMS—but also to automatically inflate tires to a preprogrammed setting. However, the investigation could not determine whether the CTIS was operational at the time of the crash because its inflation deactivation buttons were depressed during the postcrash inspection. Even if operational, the CTIS was programmed to maintain steer axle pressure at 100 to 105 psi, likely below the optimal operating pressure for tires rated up to 123 psi. Optimal tire pressure depends on vehicle load, but the weight of the motorcoach at the time of the crash or during previous trips was unknown. If the motorcoach was operating near its maximum GVWR, the load on the steer axle tires would likely have approached or exceeded their rated capacity, even at their maximum inflation pressure of 123 psi. Whether the tires were operating within their limits therefore depended on load and pressure conditions, which the carrier was not tracking. The carrier's inability to detect the impact damage and adequately monitor vehicle loads and tire pressure created the conditions under which the catastrophic tire failure occurred.

The NTSB has investigated several other crashes involving sudden catastrophic failure of a steer axle tire on a motorcoach traveling at highway speeds.[42] Most recently, a sudden left steer tire failure in Wawayanda, New York, in 2023 caused a motorcoach to

[41] 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 TPMSs: H-09-22 to the National Highway Traffic Safety Administration (classified Open—Unacceptable Response).

[42] For more information, see NTSB 2025, 2010, and 2009.

depart the roadway to the left and overturn into a median ravine, resulting in 2 fatalities and 42 injured occupants (NTSB 2025). The driver in the Wawayanda crash was not belted and had only one hand on the steering wheel at the time of the tire blowout. However, the NTSB determined that considering the severe forces generated by the tire failure and without anticipation of such an emergency, it would have been extremely challenging even for a properly belted driver with both hands on the steering wheel to maintain vehicle control and prevent roadway departure.

In the Vicksburg crash, the motorcoach driver reported that he had never experienced a steer axle tire failure and had not received training on how to respond to one. Video footage from the inward-facing camera showed that at the time of the tire failure, the driver appeared alert and had his left hand on the steering wheel. When the steering wheel rotated rapidly to the left, he placed his right hand on the steering wheel and attempted to maintain vehicle control. He reported holding the steering wheel tightly and braking only lightly, believing that harder braking could cause the motorcoach to overturn.

The driver's response was partially consistent with published guidance on responding to tire failures on CMVs. The *Texas CMV Drivers Handbook* instructs drivers to hold the steering wheel firmly and stay off the brakes until the vehicle has slowed down.[43] Although any braking departs from the handbook's instruction to stay off the brakes, the driver's braking input was slight—vehicle speed decreased by about 1 mph in the first second after the tire failure. Because the motorcoach's engine control module did not capture the event, the precise timing of the braking could not be determined.

The tire blowout and rapid air loss created an unbalanced lateral force that pulled the motorcoach rapidly to the left. Maintaining vehicle control and preventing roadway departure would have been very challenging even for a driver with both hands on the steering wheel because of the sudden and unanticipated nature of the event. Although the magnitude of the lateral force that pulled the motorcoach leftward could not be determined, the driver's suboptimal hand position on the steering wheel, along with his self-reported light braking, reduced the possibility of ameliorating the sudden steering wheel torque and leftward yaw response generated by the tire failure.

The *Texas CMV Drivers Handbook* warns that a front tire failure "can twist the steering wheel out of your hand," and that "the only way to prevent this is to keep a firm grip on the steering wheel with both hands at all times." However, training on responding to a steer axle tire failure is not federally required and is not commonly provided across the industry.

The challenges of a catastrophic steer axle tire failure are not unique to this crash. They reflect a domain where human limitations are most acute—the rapid execution of

[43] The driver's motor carrier, Transportes Regiomontanos, was domiciled in Texas. The instructions in the *Texas CMV Drivers Handbook* derive from identical guidance published by the American Association of Motor Vehicle Administrators and FMCSA.

appropriate maneuvers in response to a sudden, catastrophic, and unanticipated event—and where technological countermeasures may offer the greatest benefit. In 2022, Kodiak Robotics demonstrated that an automated driving system could handle a catastrophic steer axle tire blowout, maintaining lane position and bringing the vehicle to a controlled stop.[44] For manually operated vehicles, Volvo Trucks has developed a dynamic steering system for truck-tractors that detects sudden steering movements—such as sharp wheel rotation toward the failed tire during a blowout—and automatically limits excessive steering displacement, potentially improving the driver's ability to maintain control in the critical seconds after a failure.[45] In a 2026 meeting with the NTSB, Volvo reported that drivers in Europe noted benefits during steer axle tire failure situations. However, these systems have not yet been installed on motorcoaches.[46]

2.2 Seat Belt Availability and Use

Seat belt use is among the most effective countermeasures for preventing fatalities and serious injuries in motor vehicle crashes. Seat belts keep occupants restrained in the seating compartment and the vehicle, particularly during rollovers, reducing the risk of ejection and mitigating injury severity (NHTSA 2014). NHTSA studies of motorcoach crashes and rollovers have found that belted occupants sustained fewer injuries and were more likely to remain inside the vehicle (NHTSA 1999). Further, although NHTSA has found that properly worn passenger lap/shoulder belts provide the best protection from injury and ejection during a crash or rollover, the agency estimates that properly worn lap-only belts can also be effective at preventing fatalities in rollover crashes by keeping passengers inside the motorcoach (NHTSA 2010).[47]

The crash-involved motorcoach presented two distinct seat belt deficiencies. First, because the motorcoach was manufactured for the Mexican market and did not meet FMVSS requirements, it was not equipped with lap/shoulder belts on passenger seats as required by FMVSS 208 for motorcoaches manufactured after November 28, 2016. Second, based on the postcrash examination, even the lap-only belts that were installed were almost entirely inaccessible or inoperable; only one of the 46 passenger lap belts was functional and accessible at the time of the crash. The consequences were severe: all seven fatally injured passengers were ejected during the crash sequence, as were at least three of the seriously injured passengers. Although lap/shoulder belts provide the most complete occupant protection, lap-only belts can also be effective in preventing ejections, but only if they are properly maintained, accessible, and worn by passengers.

[44] For additional description and video footage of the demonstration, see the Kodiak website.

[45] See "Volvo Trucks launches upgraded Volvo Dynamic Steering system to increase road safety."

[46] "Volvo/NTSB Dynamic Steering meeting." February 11, 2026, virtual. Attendees included staff from the NTSB and from several divisions of Volvo located in North America and Europe.

[47] In its Preliminary Regulatory Impact Analysis, NHTSA estimated the effectiveness of lap/shoulder belts and lap-only belts in preventing fatalities in rollover crashes to be 77% and 76%, respectively.

The NTSB has previously documented seat belt accessibility and functionality issues in motorcoach crashes. Numerous lap/shoulder belts were difficult to access on a 2013 bus transporting workers involved in a crash in Louisville, New York, as well as on a 2014 motorcoach involved in a crash in San Jose, California (NTSB 2024 and 2017). In addition, several buckles were non-functional on a 2016 motorcoach involved in a crash in Biloxi, Mississippi (NTSB 2018). These deficiencies were addressed through manufacturer actions and NTSB safety recommendations to industry associations and an involved carrier regarding the inspection and functionality of seat belts.[48]

These recurring problems suggest that seat belt condition is not consistently maintained across the motorcoach industry, in part because seat belt condition is not currently part of the roadside inspection process and detection of any deficiencies is dependent on carriers' own inspection procedures. The postcrash action by the CVSA, a proposal to amend Level I inspection procedures to include passenger seat belt inspection, is an important step toward addressing this gap. If implemented as described in section 1.4.1, the updated procedures would serve a dual purpose: identifying motorcoaches not intended for US operation, specifically those that lack the lap/shoulder belts required by FMVSS 208; and ensuring that required seat belts on FMVSS-compliant motorcoaches are accessible, functional, and properly maintained.

3. Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the Vicksburg, Mississippi, roadway departure and overturn crash was the catastrophic failure of the left steer axle tire on the motorcoach due to previous impact damage to the tire's internal structure. Contributing to the crash was the inadequate vehicle inspection process of the motor carrier, Transportes Regiomontanos, which permitted the motorcoach to operate with damaged and overdeflected tires. Contributing to the occupant ejections and the fatalities were the motor carrier's use of a motorcoach that was not compliant with Federal Motor Vehicle Safety Standards and failure to ensure that the motorcoach-equipped lap-only seat belts were operational, accessible, and properly used by passengers.

[48] In the Biloxi crash, the motorcoach manufacturer was working to reengineer the buckle or identify a new seat belt supplier. In the San Jose crash, the NTSB issued safety recommendations to the American Bus Association and the United Motorcoach Association (H-17-8) and to the crash-involved carrier (H-17-11) to establish procedures for regularly inspecting seat belts for functionality and accessibility. In the Louisville crash, the NTSB issued safety recommendations to the crash-involved carrier both to establish procedures for regularly inspecting seat belts for functionality and accessibility (H-24-33) and to establish policies requiring pretrip safety briefings and seat belt use on every bus trip (H-24-34).

3.2 Lessons Learned

The Vicksburg, Mississippi, crash demonstrates that proper tire pressure maintenance is critical, particularly when tires may have sustained internal damage that cannot be detected visually. Motorcoaches equipped with systems designed to automatically maintain and monitor tire pressure must have those systems properly configured and operational. When such systems are unavailable or deactivated, periodic manual tire pressure checks beyond visual inspection are essential. The NTSB has previously recommended both manual tire pressure checks and TPMSs for motorcoaches.

This crash is also a reminder that seat belts can protect motorcoach occupants only if they are functional, accessible, and properly worn. Motor carriers play a critical role in establishing and following procedures that ensure seat belts remain available and functional for passengers. The NTSB has previously recommended that that motorcoach carriers regularly inspect all seat belts for functionality and accessibility.

References

AASHTO (American Association of State Highway and Transportation Officials). 2011. *Roadside Design Guide*, 4th Edition. Washington, DC: AASHTO.

Gardner, J.D. and Queiser, B.J. 2006. "Introduction to Tire Safety, Durability and Failure Analysis," in *The Pneumatic Tire*, ed. A. Gent and J. Walter. Report No. DOT HS 810 561. Washington, DC: NHTSA, 2006.

NHTSA (National Highway Traffic Safety Administration). 2014. *Large Bus Structural Integrity: FMVSS No. 127*. Preliminary Regulatory Evaluation. Office of Regulatory Analysis and Evaluation, National Center for Statistics and Analysis. Washington, DC: NHTSA.

_____. 2010. *FMVSS No. 208: Motorcoach Seat Belts*. Preliminary Regulatory Impact Analysis. Washington, DC: NHTSA.

_____. 1999. *Effectiveness of Lap/Shoulder Belts in the Back Outboard Seating Positions*. NHTSA Technical Report DOT HS 808 945. Washington, DC: NHTSA.

NTSB (National Transportation Safety Board). 2025. *Tire Failure, Motorcoach Roadway Departure, and Rollover, Wawayanda, New York, September 21, 2023*. NTSB/HIR-25-04. Washington, DC: NTSB.

_____. 2024. *Box Truck Centerline Crossover Collision with Bus, Louisville, New York, January 28, 2023*. NTSB/HIR-24-08. Washington, DC: NTSB.

_____. 2018. *Collision Between Freight Train and Charter Motorcoach at High-Profile Highway–Railroad Grade Crossing, Biloxi, Mississippi, March 7, 2017*. NTSB/HAR-18-01. 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.

_____. 2010. *Run off Roadway and Rollover, Westport, New York, August 28, 2006*. NTSB/HAB-10-02. Washington, DC: NTSB.

_____. 2009. *Motorcoach Run-Off-The-Bridge and Rollover, Sherman, Texas, August 8, 2008*. NTSB/HAR-09/02. Washington, DC: NTSB.

NTSB investigators worked with the **Federal Motor Carrier Safety Administration**, **Mississippi Department of Transportation**, **Mississippi Highway Patrol**, **Volvo Group North America**, and **Hankook Tire & Technology Co. LTD.** throughout this investigation.