April 6, 2026 HIR-26-03

School Bus Roadway Departure and Overturn

Millstone, West Virginia
March 4, 2024

Abstract: On Monday, March 4, 2024, about 5:50 p.m. eastern standard time, a 2022 IC 77-passenger school bus occupied by a driver and 19 students and operated by the Calhoun County Board of Education was traveling south on State Highway 16 (SH-16) near Millstone in Calhoun County, West Virginia. As the driver navigated a left-hand curve, the bus departed the right side of the paved roadway and entered an earthen drainage channel with a culvert along the right side of the road. The right-front tire struck the end of the culvert; the bus then struck a fence and began to yaw counterclockwise as it reentered the roadway. The right-rear tire struck the culvert, and the bus rolled a quarter turn onto its right side before coming to rest across both lanes of SH-16. Three students on the bus sustained serious injuries, 16 students sustained minor injuries, and the driver was not injured. The safety issues identified are alcohol impairment of school bus drivers and incomplete occupant protection on large school buses. The NTSB issues new safety recommendations to the National Highway Traffic Safety Administration and West Virginia. The NTSB also reiterates a recommendation to West Virginia and classifies a recommendation to the Leander Independent School District.

NOTE: This report was reissued on May 6, 2026, with a correction to the report date on page i. The report date was changed from April 23, 2026, to April 6, 2026.

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Acronyms and Abbreviations

Abbreviation	Name
ACTS	Automotive Coalition for Traffic Safety
ANPRM	advance notice of proposed rulemaking
BrAC	breath alcohol concentration
BAC	blood alcohol concentration
BOE	Board of Education
CDL	commercial driver's license
CFR	*Code of Federal Regulations*
CISD	Consolidated Independent School District
CSRS	child safety restraint system
DADSS	Driver Alcohol Detection System for Safety
DUI	driving under the influence
DWI	driving while intoxicated
EBT	evidential breath test
EMS	emergency medical services
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
FMVSS	Federal Motor Vehicle Safety Standard
g/dL	grams per deciliter
GVWR	gross vehicle weight rating
ISD	Independent School District
mph	miles per hour
MUTCD	*Manual on Uniform Traffic Control Devices*
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SH-16	State Highway 16
SH-21	State Highway 21
SUV	sport utility vehicle

Abbreviation	Name
USDOT	US Department of Transportation
WVDE	West Virginia Department of Education
WVSP	West Virginia State Police

Executive Summary

What Happened

On Monday, March 4, 2024, about 5:50 p.m. eastern standard time, a 2022 IC 77-passenger school bus occupied by a driver and 19 students was traveling south on State Highway 16 (SH-16) near Millstone in Calhoun County, West Virginia, to take students home from after-school activities. The bus departed the right side of the roadway, returned to the roadway, and rolled over onto its right side, coming to rest across both lanes of SH-16. As a result of the crash, 3 students on the bus sustained serious injuries, 16 students sustained minor injuries, and the driver was not injured. In addition, the National Transportation Safety Board conducted a limited investigation of a multivehicle crash involving a school bus that occurred in Dale, Texas, to examine occupant protection safety issues. In that crash, a 5-year-old bus occupant was fatally injured and 43 other preschool students, 10 chaperones, and the school bus driver sustained injuries of varying degrees.

What We Found

At the time of the crash, the Millstone school bus driver was impaired by alcohol, which resulted in his loss of control. We found that implementing alcohol detection systems on school buses can prevent alcohol-impaired driving by school bus drivers.

We also found that unbelted bus passengers were injured from impacting other occupants and the school bus interior during the rollover sequence. Lap/shoulder belts, had they been installed and properly worn, would have provided the best protection for the students by keeping the occupants within the protective seating compartment.

The National Transportation Safety Board determines that the probable cause of the Millstone, West Virginia, crash was the school bus driver's alcohol impairment resulting in his loss of vehicle control and the school bus's roadway departure and rollover. Contributing to the severity of the passenger injuries was the lack of passenger lap/shoulder belts on the large school bus.[1]

[1] The National Highway Traffic Safety Administration defines a large school bus as having a gross vehicle weight rating of more than 10,000 pounds. *Gross vehicle weight rating* is the total maximum weight that a vehicle is designed to carry when loaded, including the weight of the vehicle itself plus fuel, passengers, and cargo.

What We Recommended

As a result of the investigation, we recommended that the National Highway Traffic Safety Administration require all new school buses to be equipped with a vehicle-integrated alcohol detection system that prevents or limits vehicle operation if driver impairment by alcohol is detected.

We reiterated Safety Recommendation H-18-10 to West Virginia to enact legislation that requires new large school buses to be equipped with passenger lap/shoulder belts. We issued new recommendations to West Virginia to enact legislation to require all passengers to wear school bus seat belts when they are available, and to establish enforceable policies and procedures for all school districts to ensure students properly use passenger seat belts. Finally, we classified Safety Recommendation H-25-26 Open—Acceptable Response for the Leander Independent School District issued as a result of a 2025 school bus crash in Leander, Texas.

1 Factual Information

1.1 Crash Narrative

On Monday, March 4, 2024, about 5:50 p.m. eastern standard time, a 2022 IC 77-passenger school bus occupied by a driver and 19 students and operated by the Calhoun County Board of Education (BOE) was traveling south on State Highway 16 (SH-16) near Millstone in Calhoun County, West Virginia.[2] In this area, SH-16 is a two-lane, two-way roadway with a 55-mph speed limit.

The crash occurred on the driver's third bus trip (the activity run) of the day.[3] According to video footage from the school bus, the driver began the run at 5:44 p.m. He arrived at the middle/high school at 5:45 p.m. to pick up students and left the school about 5:47 p.m. after the students boarded the bus.[4] About 3 minutes after the bus left the school, the video footage showed the school bus as it approached a left-hand curve while traveling at a speed of around 42 mph. As the driver executed the curve, the bus departed the right side of the paved roadway. Video from the bus showed that the bus's speed was 39 mph when it departed the road. According to the police report and as shown in figure 1, after departing the road, the bus continued to follow the curve, struck the end of the culvert with its right-front tire, continued south, and then struck a wooden fence. The bus began to yaw counterclockwise as it reentered the roadway. The bus's right-rear tire struck the culvert end, and the bus rolled a quarter turn onto its right (loading door) side. The bus came to rest on its right side across both lanes of SH-16; it completely blocked the southbound lane and partially blocked the northbound lane (see figure 2).

[2] Visit ntsb.gov to find additional information in the public docket for this NTSB accident investigation (case number HWY24FH004). Use the CAROL Query to search safety recommendations and investigations.

[3] On the day of the crash, the driver had completed two school bus trips: the morning run transporting students from home to school, and the afternoon run transporting students from school to home. The crash took place during the activity run to transport students participating in after-school activities from school to home.

[4] The school bus was equipped with two outward-facing cameras and five inward-facing cameras. See section 1.5 for additional information on the cameras and section 1.9.1 for additional observations about the video footage.

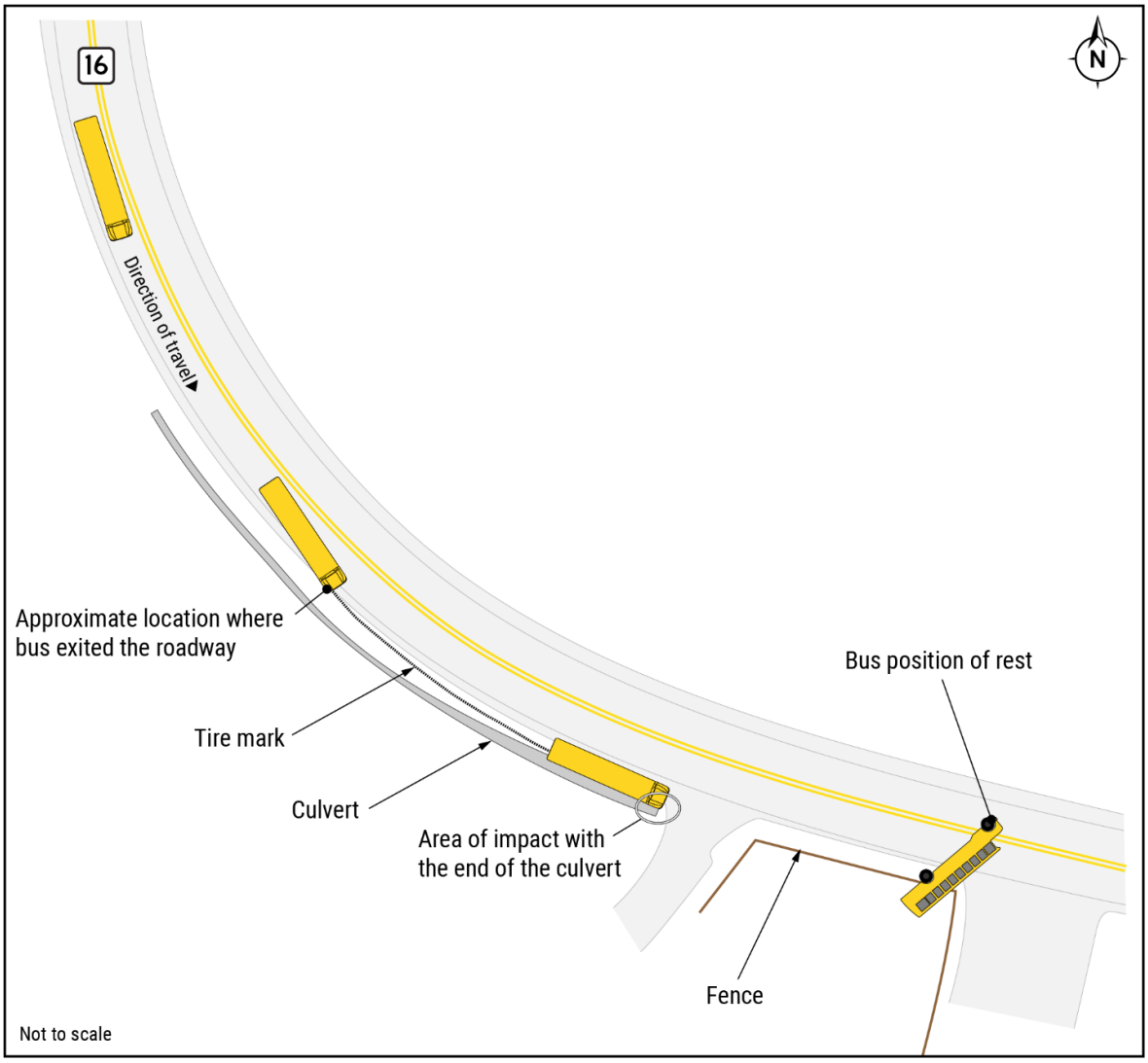

Figure 1. Diagram showing the sequence of events of the bus crash. (Source: State of West Virginia Uniform Traffic Crash Report; adapted by the National Transportation Safety Board [NTSB])

Figure 2. The school bus at final rest position across the southbound lane of SH-16; view is looking north. (Source: West Virginia State Police [WVSP])

1.2 Occupant Injuries

The school bus was occupied by the driver and 19 students. The driver was restrained by a lap/shoulder belt, but the school bus was not equipped with seat belts for the passenger seats.[5] Three students seated in rows 12 and 13 sustained serious injuries including broken bones (see figure 3). The passenger in row 13 on

[5] Buses with a GVWR greater than 10,000 pounds (the GVWR of the school bus involved in this crash was 31,000 pounds) are considered large school buses and are not required to be equipped with lap or lap/shoulder belts for the passenger seats. Federal regulations for small school buses, or those with a GVWR less than or equal to 10,000 pounds, require passenger lap/shoulder belts at all seating positions. See 49 *Code of Federal Regulations (CFR)* Part 571.222, Standard No. 222: School bus passenger seating and crash protection and Part 571.208, Standard No. 208: Occupant crash protection, subsection S4.4.3.2.2.

the left side sustained serious injuries ultimately resulting in a lower leg amputation. The remaining 16 students seated throughout the bus sustained minor injuries. The driver was uninjured.

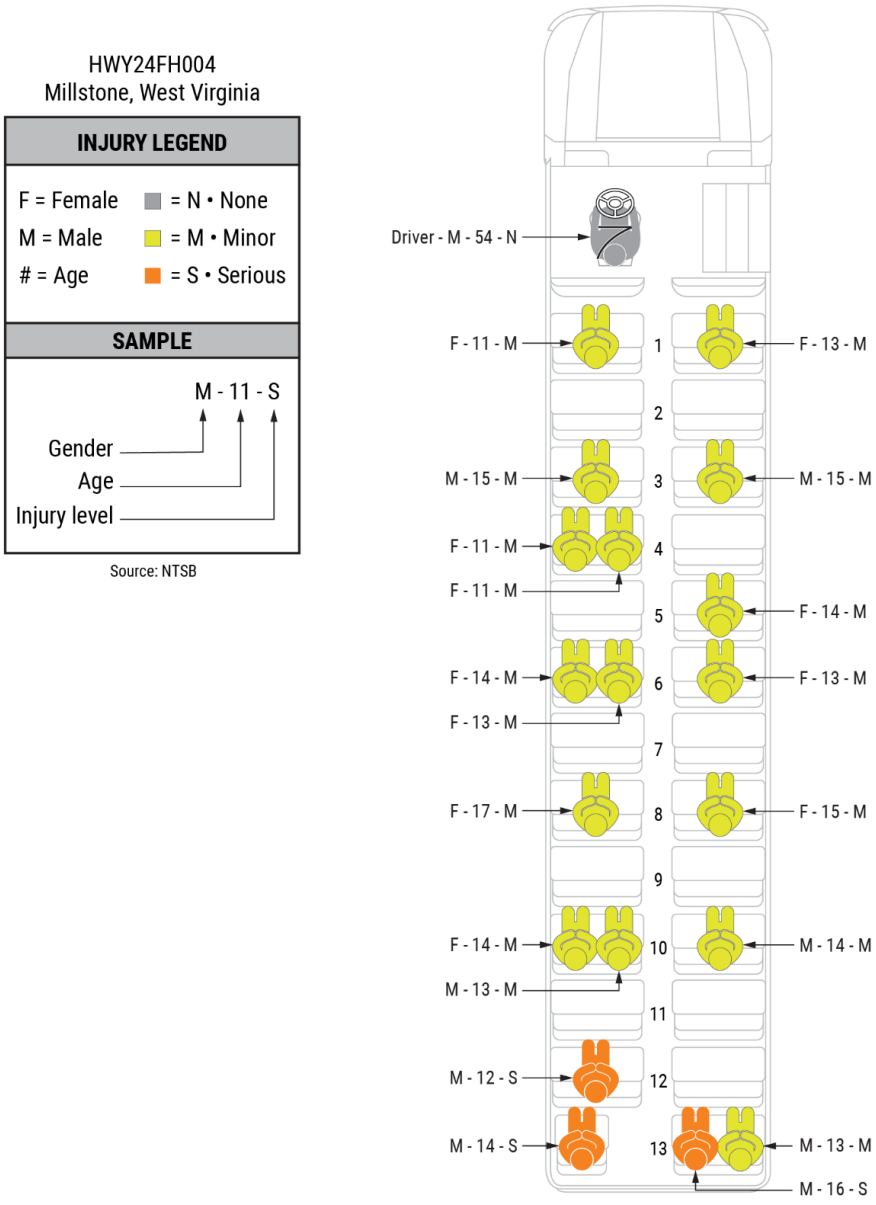

Figure 3. Seating chart with gender, age, and injury severity.

The video footage from the inward-facing cameras showed that the students were seated within the seating compartments and facing forward. During the crash sequence, the students on the left side were thrown initially to the right and then upward toward the interior of the roof. The upward motion was more pronounced for

those seated toward the back of the bus. The students, all of whom were unbelted, struck seats, other passengers, and the windows and the sidewall on the right side of the bus.

Students on the right side were thrown forward into the back of the seats in front of them, then were struck by students and personal items from the left side as the bus rolled. The students on the right side in the rear were also thrown upward into the roof area before being thrown into the right sidewall and windows. At final rest, students were on top of each other on the right (loading door) side of the bus.

Video footage also showed that during the crash sequence, the lap/shoulder-belted bus driver was jerked side to side but remained in his seat. Once the bus came to final rest, the driver released his seat belt and fell to the loading doors.

1.3 Emergency Response

The Calhoun County Emergency Management Center received multiple calls about the crash at 5:53 p.m. An Arnoldsburg Volunteer Fire Department unit and a Minnie Hamilton Health System rescue unit were the first to arrive on scene at 6:04 p.m. The West Virginia State police arrived on scene at 6:11 p.m. and a Calhoun County Sheriff's deputy arrived at 6:43 p.m. Three ambulances transported injured students to the hospital and the last ambulance left the crash site at 6:52 p.m. The Calhoun County Sheriff's Office was the last to leave the scene at 11:15 p.m. A total of 15 units assisted in the emergency response.[6]

1.4 Highway Factors

The crash occurred on SH-16, about 1.1 miles south of the middle/high school. In the area of the crash, SH-16 was a two-lane asphalt roadway with one 12-foot-wide lane in each direction (northbound and southbound). A 2-foot-wide paved shoulder was adjacent to each of the travel lanes. The northbound lane was separated from the southbound lane by a double yellow line, and both travel lanes were separated from the shoulders by a 6-inch-wide solid white line. Next to the southbound paved shoulder was an earthen grassy drainage channel with a culvert ending at a driveway (see figure 4).

[6] Two units from the Arnoldsburg Volunteer Fire Department, three units from the Grantsville Volunteer Fire Department, one unit from the Calhoun County Sheriff's Office, two units from the West Virginia State Police, five units from the Minnie Hamilton Health System, one unit from the Roane County Emergency Squad, and one unit from HealthNet Aeromedical Services were dispatched to the crash.

Figure 4. Postcrash photo of the area where the school bus left the roadway. (Source: WVSP; annotated by NTSB)

Consistent with guidance from the Federal Highway Administration's (2023) *Manual on Uniform Traffic Control Devices* (MUTCD), a large arrow sign (called a one-direction arrow in the MUTCD), pointing to the left in the direction of the road curvature, had been posted before the curve the bus was traversing. The posted speed limit of the roadway was 55 mph.

1.5 Vehicle Factors

The 2022 IC Bus was a 77-passenger, conventional (Type C) school bus with a gross vehicle weight rating (GVWR) of 31,000 pounds.[7] The bus was equipped with cruise control and Bendix antilock brake, auto traction, and electronic stability control systems.

[7] A Type C bus is constructed with a hood and front fender assembly. The entrance door is behind the front wheels and the engine is positioned in front of the windshield. It also includes a cutaway truck chassis or truck chassis with cab with or without a left side door and a GVWR greater than 21,500 pounds. (For details, see the National Congress on School Transportation's May 2025 *National School Transportation Specifications and Procedures*.)

The Calhoun County BOE Office of Transportation is responsible for the daily maintenance of the school buses. Scheduled preventive maintenance was performed on the day of the crash. As part of the standard preventive maintenance checklist, the loading doors were inspected and found to be "OK."[8] Tire pressure and tread depth were measured and found to be within standards. The bus passed an annual West Virginia Department of Education (WVDE) inspection in December 2023.[9]

During the crash, the bus's undercarriage sustained a fractured driveline and broken rear axle shackles.[10] The bus also sustained damage on its right side to the bumper at the rear corner, the roof, and the loading doors (see figure 5). Minimal damage was noted to the interior seats, sidewall structure, windows, and roof. The Public Service Commission of West Virginia performed a level 5 postcrash inspection that did not find any precrash defects on the bus.[11]

Figure 5. Damage to the bus's right (loading door) side; an interior photograph showing lack of intrusion into the passenger compartment. (Source: WVSP)

[8] The video footage from the onboard video camera showed the loading doors occasionally malfunctioning. See section 1.9.1.

[9] West Virginia law requires that all school buses be inspected by a qualified West Virginia Public Service Commission bus inspector annually. See West Virginia 126-92-26.1.c.

[10] Shackles are a U-shaped component of the suspension that links the springs to the frame. They allow for articulation, length adjustment, and load distribution.

[11] A level 5 inspection includes brake systems; cargo securement; coupling devices; driveline/driveshaft; exhaust systems; frames; fuel systems; lighting devices (headlamps, tail lamps, stop lamps, turn signals, and lamps/flags on projecting loads); steering mechanisms; suspensions; tires; van and open-top trailer bodies; wheels, rims and hubs; windshield wipers; emergency exits; electrical cables and systems in engine and battery compartments; and seating. See All Inspection Levels - CVSA | Commercial Vehicle Safety Alliance.

The school bus was equipped with an AngelTrax V12 Vulcan series mobile digital video recorder. The system had seven cameras: two were outward-facing and captured the road, and five were inward-facing and showed the students and driver. The system also provided information on bus speed, braking, stop arm use, and directional signal activity. NTSB investigators reviewed the bus's video footage from the day of the crash for the morning, after-school, and activity runs to document school bus, driver, and student actions (see section 1.9.1).

1.6 Driver Factors

The 54-year-old driver held a class A West Virginia commercial driver's license (CDL) that was issued in July 2017 and had an expiration date of September 2024.[12] He held passenger, school bus, and double/triple trailer endorsements and was restricted to class B or class C buses.[13] Records from the Commercial Driver's License Information System (CDLIS) indicated that in the 10 years before this crash, the school bus driver had one conviction in 2016 for failure to obey a stop sign. West Virginia Division of Motor Vehicles driver records for the 5 years before the crash indicated no convictions.

The driver began driving for Calhoun County in 2017. He worked a split-shift schedule. He transported students from home to school on a morning run and then returned to work around 3:00 p.m. for the afternoon run to transport students home from school. Additionally, he regularly drove an activity run to transport students home who had been participating in after-school activities. On the day of the crash, he drove his assigned bus, number 5, on the three runs.

He had completed all training required by the WVDE, including a minimum of 40 hours of nondriving instruction and 12 hours of on-the-road training with a WVDE-certified operator that he completed in 2017.

The school bus driver declined to be interviewed by the NTSB; therefore, the information on his activities before the crash, including his sleep history and his medical history, is limited. Payroll records indicate that he had worked 33.5 hours the week before the crash. He was off duty on Saturday, March 2, and Sunday, March 3. On Monday, March 4, the day of the crash, the bus video began at 5:47 a.m. for the morning run. The driver's activities for the 7-hour period between the morning and

[12] A class A CDL is required for any combination of vehicles with a gross combined vehicle weight rating of 26,001 or more, provided the GVWR of the vehicle being towed is in excess of 10,000 pounds. See *West Virginia Code* Chapter 17E: Uniform Commercial Driver's License Act.

[13] A class B vehicle has a GVWR of 26,001 pounds or more. A class C vehicle has a GVWR or a gross combined weight rating less than 26,001 pounds and is designed to transport 16 or more passengers including the driver.

afternoon runs as well as the 20-minute period between the afternoon and activity runs are unknown (see section 1.9.1 for additional video information).

Cell phone records for the driver indicated that the last activity before the crash was a text message received about 2:26 p.m., more than 3 hours before the crash. Based on the video footage, the driver was not using a cell phone or other electronic device while driving. In the 3 days before the crash (March 1 to March 3), all texting activity occurred between 4:00 p.m. and 6:00 p.m., and no phone calls occurred.

The only information available on the driver's health was obtained from records connected with his commercial driver medical certificate exams. He had a 1-year medical certificate issued in June 2023.[14] At the time of that exam, the driver reported a medical history including high blood pressure. He reported taking medication used to treat high blood pressure that is not generally considered impairing.

The results of the school bus driver's pre-employment controlled substance and alcohol test administered on February 6, 2017, were negative.[15] The driver's test results for random drug and alcohol tests were negative, including the most recent test performed on January 17, 2024.[16]

After the crash, law enforcement personnel detected an odor of alcohol from the bus driver, and the bus driver admitted consuming alcohol that day. Law enforcement personnel administered a preliminary breath test at 6:40 p.m., which registered a blood alcohol concentration (BAC) reading of 0.161 grams per deciliter (g/dL). The bus driver was arrested and transported to the WVSP detachment, where

[14] *West Virginia Code* 126-92-19 requires school bus drivers to undergo an annual physical examination performed by a medical examiner. It is preferred that the examiner be in the Federal Motor Carrier Safety Administration's National Registry of Certified Medical Examiners. The driver's June 2023 medical exam was performed by a medical professional listed in the FMCSA registry.

[15] School districts must comply with the US Department of Transportation Controlled Substances and Alcohol Use Testing requirements in 49 *CFR* 382—Controlled Substances and Alcohol Use and Testing.

[16] The driver's random drug and alcohol tests were October 10, 2017, November 5, 2019, January 17, 2020, and January 17, 2024.

he was given a second evidential breath test at 7:28 p.m. That test registered a reading of 0.127 g/dL BAC.[17]

The WVSP Forensic Laboratory performed toxicological testing for substances other than alcohol, using a blood sample taken from the driver at 8:20 p.m. Results were negative for tested-for substances.[18]

1.7 Motor Carrier Factors

The Calhoun County BOE is responsible for about 860 students at two elementary schools and one middle/high school. The Calhoun County BOE owns and operates 22 school buses and employs 18 drivers with CDLs. It provides school bus transportation on 14 morning and afternoon runs and 2 activity runs at the middle/high school for students who participate in after-school activities.

The Calhoun County BOE has incorporated West Virginia guidance to county board transportation systems related to school bus operations, school bus driver requirements, and school bus maintenance into its operational and administrative policies. Controlled substance and alcohol testing requirements are contained in the *West Virginia Code* and include pre-employment, random, postaccident, and reasonable suspicion testing.[19]

School districts must comply with 49 *CFR* Part 382 (Controlled Substances and Alcohol Use and Testing) and 49 *CFR* Part 383 (Commercial Driver's License Standards; Requirements and Penalties). After the crash, the Federal Motor Carrier Safety Administration (FMCSA) performed a focused compliance review to examine the Calhoun County BOE's compliance with these regulations.[20] The FMCSA issued the Calhoun County BOE a Notice of Violation for failing to perform annual drug and

[17] Federal regulations prohibit drivers, including school bus drivers, with an alcohol concentration of 0.04 or greater from operating a commercial motor vehicle (49 *CFR* 382.201). In West Virginia, commercial drivers are prohibited from driving with a BAC of 0.04 or greater (*West Virginia Code* Chapter 17E, Section 1-14). They must also be placed out of service for 24 hours if they have any measurable level of alcohol. For operating a passenger vehicle, drivers are presumed impaired if their BAC is 0.08 or more (*West Virginia Code* Chapter 17C, Section 5-2).

[18] West Virginia State Police (WVSP) Forensic Laboratory Toxicology Section tests for additional substances in blood specimens if the officer suspects the driver is under the influence of additional substances. The toxicological drug panel and detection limits can be found at the WVSP Toxicology Section on the Forensic Laboratory website.

[19] See *West Virginia Code* Title 126-092, West Virginia School Bus Transportation Regulations, Procedures, and Specifications for the Design and Equipment of School Buses (4336).

[20] The purpose of a compliance review is to "determine whether a motor carrier meets the safety fitness standard" in 49 *CFR* Part 385. A safety rating is not typically given after a focused compliance review because not all areas of regulatory compliance are examined.

alcohol clearinghouse queries and for using a driver (in this instance, not the crash-involved driver) without a current CDL with the proper class or endorsement.[21] The BOE corrected these violations by performing the clearinghouse queries and submitting proper paperwork for the driver to the Department of Motor Vehicles before the FMCSA's compliance review was completed. Additionally, the superintendent and transportation director for Calhoun County Schools completed supervisor reasonable suspicion training and updated other documentation. The FMCSA issued an Imminent Hazard Out of Service order to the crash-involved bus driver effective March 13, 2024, in accordance with 49 *CFR* 386.72.[22]

1.8 Weather

Weather data for March 4, 2024, was obtained from the closest weather station.[23] The temperature was 72.5°F. There were no reports of precipitation or wind gusts. The roads were dry, and it was daylight at the time of the crash.

1.9 Additional Information

1.9.1 Video Evidence

School bus video footage covers all three runs the bus driver made on the day of the crash:

- 5:47 a.m.: the driver starts the bus for the morning run.
- 7:51 a.m.: the morning run ends.
- 3:00 p.m.: the driver is in his seat starting his afternoon run.

[21] (a) A Notice of Violation is a formal notice from the FMCSA that a motor carrier has violated safety standards, but the notice does not carry civil penalties. The carrier must take corrective action and provide evidence of the corrective actions as required. (b) The Drug and Alcohol Clearinghouse is a database that contains information about CDL permit holders' drug and alcohol violations.

[22] *Imminent hazard* is "any condition of vehicle, intermodal equipment, employee, or commercial motor vehicle operations that substantially increases the likelihood of serious injury or death if not discontinued immediately" (FMCSA). This order, imminent hazard number WV-2024-5000-IMH, disqualified the driver from driving a commercial motor vehicle for 1 year from the date of the order. The order was based on the driver's "failure to exercise appropriate duty of care to the motoring public when operating a CMV [commercial motor vehicle]." The driver operated a commercial motor vehicle with a BAC of 0.04 or greater, in violation of 49 *CFR* 382.201.

[23] Data came from private weather station KWVSPENC7, located about 11.6 miles west of the crash location.

- 3:18 p.m.: the driver departs the bus lot, picking up students at the middle/high school and the elementary school, dropping off students, and returning to the bus lot located near the middle/high school at 5:17 p.m.
- 5:24 p.m.: the video for the afternoon run ends.
- 5:44 p.m.: the driver begins third run of the day, the activity run, and leaves the school bus lot.
- 5:45 p.m.: the school bus arrives at the school to pick up students.
- 5:47 p.m.: the school bus leaves the school.
- 5:50 p.m.: the crash occurs.

Video footage from the morning and afternoon runs showed the driver steering at times with only his right hand while supporting his head with his left hand. During the activity run, video showed that the driver continued operating the vehicle with his right hand and resting his head on his left hand. The bus was observed in the video footage from the outward-facing camera to be moving laterally and crossing the centerline and edge line of the roadway several times. The driver was not seen drinking during the activity run, using a cell phone or other personal electronic device, or interacting with students at the time of the crash. The video footage also showed the bus's speed: 42 mph as it entered the left-hand curve, and 39 mph when it left the roadway.

Video of the afternoon and activity runs showed the loading doors occasionally malfunctioning. The doors would open and close periodically when the bus was moving.[24] The driver stopped twice to examine the doors during the afternoon run. He did not appear distracted by the doors when the bus departed the roadway during the activity run.

1.9.2 Interviews with School Personnel

The NTSB interviewed the Calhoun County Schools superintendent, the transportation director, and four school bus drivers who had contact with or observed the crash-involved driver on the day of the crash. None had any knowledge of the driver's drinking habits, had seen the driver impaired or intoxicated before the day of the crash, or were able to confirm any odor of alcohol on the day of the crash. One driver said he followed the driver out of the lot on the activity run and saw the driver

[24] The doors occasionally swung on their hinges, creating a small opening, but the doors never fully opened.

cross a yellow centerline on a curve on the way to the middle/high school. Another bus driver observed the crash-involved driver bump a parked trailer in the school bus lot with his bus between the afternoon and activity runs.

Although the superintendent said he sees the school bus drivers every day, neither he nor the transportation director interacted with the school bus driver before the activity run on the day of the crash.

1.9.3 Witness Statement

After the crash, a witness called 911 at 8:24 p.m. and stated that, around 5:00 p.m. earlier that day, she had been driving behind bus number 5 (the crash-involved bus) and saw it swerve. She said that the bus had crossed the centerline or edge line at least three times and almost struck a guardrail as it navigated a curve. The NTSB's review of the video footage confirmed that the school bus did cross the centerline several times during the afternoon run, including in areas with guardrails.

1.10 Other NTSB Investigation

The NTSB conducted a limited investigation of a multivehicle collision involving a school bus near Dale, Texas, focused on occupant protection.[25] The bus involved in this crash also rolled over. On March 22, 2024, around 1:58 p.m. central daylight time, a 2011 IC school bus operated by Hays Consolidated Independent School District (CISD) was returning from a school field trip and was occupied by the driver, 44 preschool student passengers, and 10 adult chaperones.[26] It was traveling west on State Highway 21 (SH-21) at a speed of 51 mph.[27] A 2000 Mack concrete cement pump truck that was traveling east on SH-21 crossed the roadway centerline and struck the bus on the left side despite the school bus's movement to the right.[28] Following the impact, the school bus yawed counterclockwise and overturned onto its right side. Between impact and final rest, the bus had rotated about 120 degrees about its yaw axis and had rolled 360 degrees, or one complete rotation, before coming to rest about 90 feet from impact on its wheels facing in a southeast direction. The truck continued traveling east and struck a sport utility vehicle (SUV) that had

[25] See the public docket for additional information on the Dale, Texas, investigation (HWY24IH007).

[26] According to the Texas Department of Public Safety crash report, the preschool children were 4 and 5 years old.

[27] The posted speed limit for SH-21 was 65 mph. The speed of the school bus was captured from video footage obtained from the bus.

[28] The truck's travel speed is not known.

been traveling behind the school bus, traveled through a guardrail and off the roadway, and rolled a quarter turn onto its right side.

As a result of the crash, a 5-year-old bus occupant was fatally injured and 43 other preschool students, 10 chaperones, and the school bus driver were treated at the scene or transported to hospitals for various injuries. The driver of the SUV was fatally injured and the driver of the concrete truck sustained minor injuries.

The bus, which was substantially damaged by the impact and rollover (see figure 6), was equipped with a lap/shoulder belt for the driver but was not equipped with passenger lap or lap/shoulder belts.[29] Video footage from the school bus's cameras showed that as the truck hit the bus on the left side, near the middle, the unbelted passengers were thrown to the left side of the bus; some passengers were thrown from their seating compartments.[30] As the bus rolled to the right, passengers were thrown back to the right side of the bus. As the rollover continued, passengers were ejected from their seating compartments and struck the roof and then the floor.[31] According to the Texas Department of Public Safety crash report, one student who was partially ejected out of a left-side window sustained non-incapacitating injuries. Other occupants came to rest on top of each other.

[29] See section 2.3.2 for details. Although Texas law required school buses purchased after 2010 to be equipped with passenger lap/shoulder belts, the 2011 school bus in the Dale crash lacked lap/shoulder belts likely because funding was not appropriated for them.

[30] The bus was equipped with four cameras providing interior views of the bus and two cameras providing exterior views.

[31] During the crash sequence, the cameras were obstructed at times by unknown objects as the occupants were thrown toward the roof and then the floor.

Figure 6. Postcrash photograph of the school bus involved in the Dale, Texas, crash. (Source: Texas Department of Public Safety)

At the time of the crash, Hays CISD operated 109 school buses used for runs (94 equipped with seat belts) and 107 support school buses (20 equipped with seat belts).[32] The district reported a goal to have 100% of its in-service school bus fleet equipped with passenger lap/shoulder belts. Since the crash, the district retrofitted 13 buses with passenger lap/shoulder belts, added 37 new school buses with passenger lap/shoulder belts to its inventory, and planned to purchase another 14 school buses equipped with passenger lap/shoulder belts.

[32] Support buses are spare buses that are used for trips outside of school routes or when a bus is unavailable because it is being repaired.

2 Analysis

2.1 Introduction

The 2022 IC school bus was occupied by the driver and 19 students on their way home from after-school activities. The bus departed the right side of the roadway, returned to the roadway, and rolled over onto its right side, coming to rest across both lanes of SH-16. As a result of the crash, 3 students on the bus sustained serious injuries, 16 students sustained minor injuries, and the driver was not injured.

The analysis first examines factors that can be excluded as causal or contributory to the crash. Then, the analysis discusses the following safety issues:

- Alcohol impairment of school bus drivers (section 2.2)
- Incomplete occupant protection on large school buses (section 2.3)

As a result of its investigation, the NTSB established that the following factors did not cause or contribute to the crash:

- *Weather:* It was daylight at the time of the crash. There were no reports of precipitation or wind gusts.
- *Roadway condition and signage:* The roadway was dry at the time of the crash. The warning sign with the one-direction arrow was placed at a location consistent with MUTCD guidance.
- *Mechanical condition of the school bus:* The West Virginia Public Service Commission did not find any precrash mechanical defects on the school bus that would have contributed to the roadway departure. The bus passed a WVDE inspection in December 2023, about 3 months before the crash, and preventive maintenance had been performed on the bus on the morning of the crash.
- *School bus speed:* According to the video footage display, the school bus was traveling around 42 mph as it approached the curve and was traveling at 39 mph when it departed from the roadway; both speeds were lower than the posted 55-mph speed limit.
- *School bus driver licensing, experience, training, use of drugs tested for other than alcohol, or distraction from cell phone or personal electronic device use, the bus's loading doors, or students:* The school bus driver had a class A license with passenger, school bus, and double/triple trailer endorsements that allowed him to drive type C school buses. He

had been driving school buses for more than 7 years, completed the required training, and was familiar with the activity run. Postcrash toxicological test results were negative for drugs tested for other than alcohol. Phone records indicated the driver was not using a cell phone at the time of the crash. The video footage confirmed the driver was not using a personal electronic device and was not distracted by the loading doors or students during the activity run.

- *Calhoun County Board of Education Policies:* Calhoun County BOE's policies aligned with West Virginia's regulations for school buses, *School Bus Transportation Regulations, Procedures, and Specifications for the Design and Equipment of School Buses*.[33] Although violations with the school district's controlled substances and alcohol testing program were found in the FMCSA's focused postcrash compliance review, it is unlikely the lapses contributed to the crash because the violations pertained to other drivers or were related to postcrash actions by the school district. Furthermore, the school bus driver had passed a random drug and alcohol test 2 months before the crash. Before the compliance review was completed, Calhoun County BOE had resolved several of the violations pertaining to testing for controlled substances and alcohol, as well as commercial driver licensing.

The NTSB concludes that none of the following were factors in this crash: (1) weather; (2) roadway condition and signage; (3) mechanical condition of the school bus; (4) school bus speed; (5) school bus driver licensing, experience, training, use of drugs tested for other than alcohol, or distraction from cell phone or personal electronic device use, the bus's loading doors, or students; or (6) Calhoun County BOE policies.

The school bus driver declined to be interviewed by the NTSB; therefore, limited information was available to evaluate his medical condition and fatigue at the time of the crash. According to the driver's medical certificate exam form, he reported having high blood pressure, which he treated with a prescription medication that is not considered to be impairing. However, these forms are primarily based on self-reporting of health issues and medications. Based on the inward-facing video, the driver did not appear to have had any sort of sudden or incapacitating medical event.

The week before the crash, the driver had worked 33.5 hours and was off 2 days before returning to work on Monday, March 4, at 5:47 a.m. After completing the morning run around 8:00 a.m., he was off duty until 3:00 p.m. No information was

[33] As discussed previously, see *West Virginia Code* Title 126-092.

available on how much sleep he may have received in the days before the crash, the quality of any sleep received, or his sleep habits. Cell phone records suggest the driver had substantial opportunity for sleep because there was no cell phone activity (calling or texting) after 6:00 p.m. in the days before the crash. Although the driver was observed supporting his head with his left hand, which could indicate fatigue, this behavior may also be associated with impairment (discussed in section 2.2). Further, the driver appeared to be alert when operating the school bus. The NTSB concludes that no evidence suggests that either a medical condition or driver fatigue were factors in this crash.

The first emergency response services unit was on scene 11 minutes after the crash. Within an hour of the crash, three ambulances departed the crash site for the hospital. A total of 15 units assisted in the crash. Therefore, the NTSB concludes that the emergency response was timely and adequate.

2.2 Alcohol Impairment of School Bus Drivers

2.2.1 Crash Analysis

On the day of the crash, the school bus driver completed the morning and afternoon runs. About 20 minutes after completing the afternoon run, the driver resumed driving the 2022 IC school bus on the activity run. A little more than a mile from the school, and about 3 minutes after beginning the run, the school bus departed the right side of the roadway. The bus's right-front tire struck the end of the culvert at a driveway and the bus began to yaw counterclockwise as it reentered the roadway. The bus's right-rear tire hit the end of the culvert, triggering the bus's roll onto its right side across both lanes of SH-16.

Two postcrash toxicological tests measured the driver's BAC at 0.161 g/dL and 0.127 g/dL at 50 minutes and about 1.6 hours postcrash, respectively.[34] The effects of alcohol consumption on humans include psychomotor impairment, decreased inhibition, diminished alertness, confusion, problems with concentration, and reduced visual focus (Teutsch, Geller, and Negussie 2018). The effects of alcohol on driving performance are significant because driving requires several complex skills—a driver must maintain the correct speed and keep the vehicle in the travel lane while observing and processing the surrounding area for safety information such as traffic signage, other vehicles, and pedestrians. Alcohol impairment can occur at a BAC of about 0.02 g/dL with some loss of judgment; greater physiological effects are seen as BAC increases. NHTSA's drunk driving public resources website includes the information in table 1, which illustrates some of the physiological and driving-related

[34] The school bus driver pleaded guilty to three felony counts of DUI causing serious bodily injury and 16 felony counts of child neglect creating risk of serious bodily injury or death.

effects of alcohol. As shown, increases in BAC are accompanied by both physiological effects and predictable negative effects on an individual's driving capability, including reductions in responses to emergency driving situations, speed control, and ability to maintain lane position.

Table 1. BAC, physiological effects, and effects on driving.

BAC (g/dL)	Typical Physiological Effects	Predictable Effects on Driving
0.02	Some loss of judgment, slight increase in body warmth, altered mood	Decline in visual functions (rapid tracking of a moving target), decline in ability to perform two tasks at the same time (divided attention)
0.05	Exaggerated behavior, may have loss of small-muscle control (e.g., focusing your eyes), impaired judgment, usually good feeling, lowered alertness, release of inhibition	Reduced coordination, reduced ability to track moving objects, difficulty steering, reduced response to emergency driving situations
0.08	Muscle coordination becomes poor (e.g., balance, speech, vision, reaction time, and hearing), harder to detect danger; judgment, self-control, reasoning, and memory are impaired	Concentration, short-term memory loss, speed control, reduced information processing capability (e.g., signal detection, visual search), impaired perception
0.10	Clear deterioration of reaction time and control, slurred speech, poor coordination, and slowed thinking	Reduced ability to maintain lane position and brake appropriately
0.15	Far less muscle control than normal, vomiting may occur (unless this level is reached slowly or a person has developed a tolerance for alcohol), major loss of balance	Substantial impairment in vehicle control, attention to driving task, and in necessary visual and auditory information processing
Source: NHTSA Drunk Driving | Statistics and Resources | NHTSA Note: This table should be considered generally illustrative only. Signs of alcohol intoxication depend on individual factors such as developed tolerance, whereas even individuals with tolerance are subject to impairing cognitive, perceptual, and motor effects of alcohol. Additionally, listed driving effects may occur at lower BACs than listed.		

Additionally, as a driver's BAC increases, so does crash risk. Blomberg and others (2009) found that an elevated crash risk began at a BAC of 0.04 g/dL and grew steeply at higher BACs. For a driver with a BAC of 0.16 g/dl (the first BAC measurement for the school bus driver in the Millstone crash), the risk of being involved in a crash was almost 30 times greater than the risk that a driver faces with a BAC of 0.00 g/dL.

As detailed in NHTSA's table above, drivers with a BAC of 0.05 g/dL have lowered alertness and exhibit difficulty steering and a reduced response to emergency situations. At a BAC of 0.10 g/dL, drivers exhibit poor muscle control and have a reduced ability to maintain their lane position and brake appropriately. At the time of the crash, the school bus driver had a BAC above 0.10 g/dL. Video footage

from the bus's outward-facing camera from the activity run and witness reports about the afternoon run indicate the bus was moving laterally in its lane, as well as crossing the centerline and edge line of the roadway several times. At the time of the crash, the driver did not maintain lane control in the curve and allowed the bus to drift off the right edge of pavement, which then initiated the impact with the culvert and the rollover. A witness reported she had observed the crash-involved bus swerving and almost colliding with a guardrail around 5:00 p.m. The bus's inward-facing video footage shows that before the crash, the driver exhibited signs of poor muscle control by supporting his head with his left hand. The NTSB concludes that at the time of the crash, the school bus driver was impaired by alcohol, which resulted in his inability to maintain control of the bus, leading to the bus's roadway departure, return to the roadway, and overturn.

2.2.2 Prevalence of Impaired School Bus Drivers

Crashes involving alcohol-impaired driving are a significant problem on US roadways. In 2023, 12,429 fatalities from alcohol-impaired crashes—30% of all traffic fatalities—occurred in the United States (NHTSA 2025). To the NTSB's knowledge, none of the fatalities occurred in large school buses driven by impaired drivers.

However, other evidence exists to suggest that impaired drivers have operated school buses. In 2020, Stateline reported that from 2015 through 2019, 118 school bus drivers were cited or arrested for driving a school bus while impaired by alcohol, drugs, or a combination of both.[35] Additionally, news reports from 2025 alone show that alcohol-impairment charges for school bus drivers are frequent.[36] Although not conclusive until proven in each case, collectively such charges reflect frequent detection of impairing levels of blood alcohol content in school bus drivers:

- November 20, 2025, Minnesota: a school bus driver was arrested on charges of driving while intoxicated (DWI) after a preliminary breath test registered a 0.082 BAC. School officials and the bus company stopped the bus mid-route after receiving a report from a student that they smelled alcohol.

- August 20, 2025, North Dakota: a school bus driver was arrested for driving under the influence (DUI). His BAC was reported to be 0.214.

- May 8, 2025, Nebraska: a school bus driver was arrested on suspicion of DUI; her BAC was reported to be 0.22.

[35] See "Drunken School Bus Drivers Put Kids' Lives at Risk," | Stateline, January 22, 2020.

[36] See the public docket for copies of the news reports.

- May 5, 2025, Indiana: a school bus became stuck in mud. The driver was reported to have a BAC of 0.221.

- February 26, 2025, Minnesota: a school bus driver with a BAC reported to be 0.289 was charged with two counts of second-degree DWI and obstructing the legal process.

- February 5, 2025, Indiana: after failing a field sobriety test and testing revealed a BAC above 0.04, a school bus driver was charged with neglect of a dependent and operating a vehicle while intoxicated with passengers under the age of 18.

Federal and West Virginia regulations prohibit drivers, including school bus drivers, from operating a commercial motor vehicle requiring a CDL with an alcohol concentration of 0.04 or greater (49 *CFR* 382.201), using alcohol while performing safety-sensitive functions (49 *CFR* 382.205), or performing a safety-sensitive function within 4 hours after using alcohol (49 *CFR* 382.207).[37] The federal regulations also specify testing requirements for alcohol misuse and use of controlled substances such as random or postaccident testing (49 *CFR* 382 subpart C). Drivers of school buses requiring a CDL and employers of those drivers, such as the driver in the Millstone crash and the Calhoun County BOE, are required to comply with these regulations. Despite the 49 *CFR* Part 382 federal regulations, drivers operating school buses continue to be charged with alcohol impairment. The next section discusses technology that could be used to prevent alcohol-impaired operation of a vehicle.

2.2.3 Alcohol Detection Systems

2.2.3.1 Introduction

Alcohol detection systems measure a driver's alcohol concentration, typically through breath.[38] The benefits of these technologies stem from the relative ease of sample collection, accuracy of breath and touch devices at assessing blood alcohol concentrations, and the strongly established relationship between alcohol concentrations, driver impairment, and crash risk. These devices have been used in a medical and legal context for decades, and emerging iterations of these systems offer opportunities for impaired driving prevention through in-vehicle alcohol detection of drivers' blood alcohol levels.

[37] A commercial motor vehicle weighs 26,001 pounds or more, transports 16 or more passengers (including the driver), or transports hazardous materials. See 49 *CFR* 382.107 for specifics.

[38] This section discusses systems that detect the presence of alcohol as opposed to technologies such as driver monitoring systems that detect impaired driving.

Alcohol detection systems can be active (requiring the driver to take an action to engage them) or passive (in effect without the driver taking a specific action).[39] An active, breath-based alcohol detection system requires the driver to blow into a mouthpiece or across a sensor to determine the driver's breath alcohol concentration, or BrAC.[40] Some of these devices are referred to as preliminary breath tests and are typically handheld devices used as a screening device; others are evidential breath tests (EBT), which may be portable or stationary machines, and provide generally more reliable results that may be used to definitively establish blood alcohol levels. Calibration of these systems is essential to ensure accuracy. The US Department of Transportation (USDOT) maintains a list of approved EBTs that can be used to conduct alcohol screening or confirmation tests under 49 *CFR* Part 40.[41]

2.2.3.2 Active In-Vehicle Alcohol Detection Systems

Active breath test systems are connected to vehicle ignitions to form alcohol ignition interlock systems. With such technology, before starting a vehicle, the driver is required to blow into the interlock system. If alcohol over a certain threshold is detected by the interlock system, the vehicle will not start. These systems must be added and integrated into vehicles as aftermarket devices and must be regularly calibrated.

Ignition interlock systems were introduced as a way to prevent people who repeatedly drive while intoxicated, often referred to as repeat offenders, from driving after consuming alcohol.[42] All states have some type of ignition interlock program with various requirements for first-time offenders, repeat offenders, and drivers with high BAC levels.[43] Ignition interlock systems have been associated with reductions in re-arrest rates for alcohol-impaired driving (Elder and others 2011; Voas and others 2016). States with ignition interlock laws have lower rates of alcohol-impaired fatal crashes (McGinty and others 2017; Kaufman and Wiebe 2016). A study funded by the Insurance Institute for Highway Safety showed that states with laws requiring the use

[39] Seat belts would be an example of active technology and airbags would be an example of passive technology. A vehicle occupant must buckle the seat belt whereas the airbag is always available for activation if the vehicle senses a crash. See Alcohol Measurement Devices for general information on alcohol detection devices.

[40] BrACs measure alcohol in grams per 210 liters of breath. These units are converted to g/dL for consistency with blood alcohol results.

[41] See Approved Evidential Breath Measurement Devices | USDOT.

[42] The NTSB issued Safety Recommendation H-12-45 asking states to require the use of alcohol ignition interlock devices for all individuals convicted of driving while intoxicated. The overall classification of this recommendation is Open—Acceptable Response. For West Virginia, this recommendation is classified Open—Acceptable Alternate Response.

[43] For details, see Alcohol-Impaired Driving | Governors Highway Safety Association.

of ignition interlock devices reduced the number of drivers in fatal crashes with BAC at or above 0.08 g/dL by 26% compared with states with no such law (Teoh and others 2021).

Although ignition interlock systems are typically used with drivers who have already been convicted of driving while impaired, they can also be used as a preventive measure, particularly for certain populations such as those responsible for transporting children. For example, France requires an alcohol ignition interlock system in school transport vehicles and Finland mandates alcohol ignition interlock systems on all vehicles providing services for school and daycare transportation (Martino and others 2014). Lithuania also introduced a program to install alcohol ignition interlocks on commercial vehicles being used for school transport (European Transport Safety Council 2020). However, no US state requires an interlock device for school bus drivers (National Conference of State Legislatures 2021).[44]

2.2.3.3 Passive In-Vehicle Alcohol Detection Systems

A passive alcohol detection system does not require active participation from the driver, such as blowing into a breath alcohol tester. Instead, these systems measure alcohol presence in the driver's exhaled breath or through touch sensors (for example, a sensor integrated into the ignition button of a vehicle). A recent update to a 2007 study, *Review of Technology to Prevent Alcohol-Impaired Crashes*, found no production-ready vehicles have been equipped with technologies to detect alcohol (Pollard, Nadler, and Melnik 2024).

As noted above and in our 2012 special investigation of wrong-way-driving crashes (NTSB 2012), ignition interlock systems are an effective countermeasure for reducing fatal crashes and impaired driving by those already convicted of impaired driving. However, many crashes involving alcohol are caused by drivers who have not been convicted of impaired driving. The NTSB's 2012 report noted that a passive device would be a beneficial way to deal with such drivers and recommended that NHTSA and the Automotive Coalition for Traffic Safety (ACTS) work together to accelerate widespread implementation of the Driver Alcohol Detection System for Safety (DADSS) technology by defining usability testing that will guide driver interface design and implementing a communication program that will direct driver education and promote public assistance (Safety Recommendations H-12-43 and -48).[45]

The DADSS program, begun in 2008, is a partnership between NHTSA and ACTS to develop a system that can reliably, quickly, and passively measure a driver's

[44] New York Senate Bill S3047A, introduced in 2016 but not enacted, would have mandated ignition interlock devices for school buses.

[45] ACTS is a nonprofit organization funded by motor vehicle manufacturers to promote vehicle safety.

BAC and prevent the vehicle from moving if the BAC measurement is above a certain level (such as 0.08 for drivers of passenger vehicles or 0.04 for drivers of commercial vehicles).[46] The program is focused on the development of two alcohol detection technologies: breath-based and touch-based. For the breath test, sensors in the vehicle measure the BAC of the driver's exhaled breath using infrared light and are designed to distinguish between the driver's breath and the breath of any passengers. The touch system uses tissue spectroscopy to measure BAC under the skin's surface using infrared light and would likely be built into vehicle controls such as the starter button or gearshift.

We reiterated Safety Recommendations H-12-43 and -48 in 2013 in our report *Reaching Zero: Actions to Eliminate Alcohol-Impaired Driving* (NTSB 2013a). These safety recommendations were classified Closed—Unacceptable Action in 2022 (NTSB 2022a) due to the slow pace of development of the systems. In the 10 years between issuance of the recommendations and closure, neither passive breath nor touch-based technologies had reached sufficient development for deployment in vehicles. As of late 2025, the DADSS program had a kit with passive breath sensors available for automakers to test and validate in their vehicles, which could take up to 2 years.[47]

In 2021, recognizing the serious danger posed by drunk drivers to public safety, Congress directed NHTSA to, within 3 years, issue a final rule establishing a Federal Motor Vehicle Safety Standard (FMVSS) that requires all new passenger vehicles to be equipped with advanced drunk and impaired driving prevention technology.[48] Public Law 117-58 defines the technology as one that can passively measure a driver's alcohol concentration (such as through breath or touch sensors) or passively monitor the driver's performance to identify impairment (such systems are often referred to as *driver monitoring systems* and measure impairment through indirect measures like lane keeping, vehicle speed, eye glance behavior, and blinking), or a combination of both systems. Additionally, both systems must prevent or limit motor vehicle operation. By specifying only passenger vehicles, the law excludes heavy vehicles, including school buses.

Also in 2021, we investigated a collision between an SUV and a pickup truck in Avenal, California. In our 2022 final report, we found that vehicle-integrated passive alcohol detection devices that prevent or limit impaired drivers from operating their

[46] See the DADSS website for the DADSS Program overview.

[47] This information was obtained through personal communication with the president and chief executive officer of the Automotive Coalition for Traffic Safety, January 2026. This communication may be found in the docket for this investigation.

[48] See the Infrastructure Investment and Jobs Act (Public Law 117-58), section 24220.

vehicles have significant lifesaving potential but their development has been slow. In that report, we recommended that NHTSA:

> Require that all new vehicles be equipped with passive vehicle-integrated alcohol impairment detection systems, advanced driver monitoring systems, or a combination thereof; the systems must be capable of preventing or limiting vehicle operation if driver impairment by alcohol is detected. (H-22-22)

In February 2023, NHTSA responded to Safety Recommendation H-22-22 stating that it was planning to publish an advance notice of proposed rulemaking (ANPRM) to seek comment on developing minimum performance standards for passenger vehicles equipped with "advanced drunk and impaired driving prevention technologies." However, because NHTSA did not provide a realistic plan or projected timeline for the publication of a final rule and the eventual widespread deployment of this advanced impairment-detection technology in all vehicles, we classified Safety Recommendation H-22-22 Open—Unacceptable Response in November 2023.

In January 2024, NHTSA published an ANPRM titled "Advanced Impaired Driving Prevention Technology" for new passenger vehicles in response to the Infrastructure Investment and Jobs Act.[49] The ANPRM initiates rulemaking that would gather the information necessary to develop performance requirements and an FMVSS requiring that all new passenger vehicles be equipped with "advanced drunk and impaired driving prevention technologies." The ANPRM provided an update on NHTSA's various activities on impaired driving, discussed the current state of technologies, and sought public comment to gather necessary information to develop a notice of proposed rulemaking. In our response, we urged NHTSA to take immediate action because it had been studying these technologies for more than 15 years and had already published a request for information on this topic in 2020.[50] We also called on NHTSA to immediately identify implementable standards based on current technologies and to use an iterative strategy with performance standards that continue to strengthen over time as these technologies evolve. No additional rulemaking on alcohol detection systems has been published.

[49] See the NHTSA ANPRM titled "Advanced Impaired Driving Prevention Technology," published on January 5, 2024 (89 *Federal Register* 830, Docket No. NHTSA-2022-0079). NHTSA previously published a request for information in 2020; see Request for Information: Impaired Driving Technologies, November 12, 2020. (85 *Federal Register* 71987, Docket No. NHTSA-2020-0102).

[50] For the full text, see NTSB comment on "Advanced Impaired Driving Prevention Technology" ANPRM (comment ID NHTSA-2022-0079-8656).

2.2.4 Summary

The crash that occurred in Millstone, West Virginia, and the evidence of frequent detection of unacceptable blood alcohol levels in bus drivers cited in this report, illustrate that alcohol-impaired school bus drivers pose an unacceptable risk to the safe transportation of school children.

Alcohol detection systems that prevent the operation of a vehicle, such as alcohol ignition interlock systems, have been used successfully as a countermeasure for convicted impaired offenders in reducing fatal alcohol-related crashes and recidivism. In some instances in Europe, the use of these systems has been accepted as a preventive measure with school bus operators. Progress on the development of a passive in-vehicle alcohol detection system has been slow, although implementation of a system may be forthcoming. Other passive systems, such as driver monitoring systems, are also being explored as ways to prevent operation of a vehicle by an alcohol-impaired driver. However, these systems unacceptably permit a certain amount of impaired driving to take place before the system can assess the driver's degree of impairment. An alcohol detection system has the benefit of preventing any movement of the vehicle with an alcohol-impaired driver. The NTSB concludes that implementation of alcohol detection systems on school buses can prevent alcohol-impaired drivers from operating school buses.

Public Law 117-58 directing NHTSA to require all new passenger vehicles to be equipped with technology to detect alcohol-impaired driving and other impaired states, as well as the ANPRM published by NHTSA addressing these technologies, focus on the installation of the systems on passenger vehicles. School buses that transport students to and from school should not be operated by alcohol-impaired drivers, which places school bus passengers at an unacceptable level of risk. Therefore, the NTSB recommends that NHTSA require that all new school buses be equipped with a vehicle-integrated alcohol detection system capable of preventing or limiting vehicle operation if driver impairment by alcohol is detected.

2.3 Incomplete Occupant Protection on Large School Buses

2.3.1 Crash Analysis

The 2022 IC bus was not equipped with passenger lap or lap/shoulder belts, nor was it required to be equipped with these belt systems by federal regulation or West Virginia state law. Instead, school buses with a GVWR greater than 10,000 pounds are required to be designed with a passive form of occupant protection called "compartmentalization," which requires no action by the passenger

and functions by forming a compartment in front of and behind the bus occupant.[51] It is designed to contain passengers within their seating compartments during frontal and rear-impact collisions. However, as found in multiple NTSB investigations over the past 25 years (NTSB 1999, NTSB 2013b, NTSB 2016, NTSB 2018, NTSB 2019, NTSB 2022b, and NTSB 2023), a properly worn passenger lap/shoulder belt provides a higher level of protection than compartmentalization alone, particularly in a rollover or side-impact crash with severe lateral motion. With such crashes, compartmentalization is incomplete because even properly seated children are thrown from the seating compartment during the crash sequence and are at risk of injury from impacts with other children or hard surfaces inside the bus and are at greater risk of ejection. In addition, precrash school bus maneuvers can throw children from the seating compartment before the crash even occurs, negating any potential benefit of compartmentalization. Although large school buses are not required by federal regulation to be equipped with passenger lap/shoulder belts, any belts that are installed must meet the standards in FMVSS 222, "School Bus Passenger Seating and Crash Protection" (49 *CFR* 571.222).

In the Millstone crash, students on the left side of the bus were thrown out of their seating positions toward the right, then upward toward the interior of the roof as the bus continued to overturn onto its right side. The students impacted the side of the seats, other passengers, and the windows and sidewall structure of the bus's right side. The students seated on the right side remained on the right side and were impacted by students from the left side as well as other personal items. When the bus came to final rest on its right side, all the student passengers were on top of each other. Three passengers seated toward the rear of the bus sustained serious injuries, including one passenger in the last row of the bus (row 13) who sustained serious leg injuries as a result of his motion across the bus during the rollover sequence and impacts with other occupants and the bus sidewall and roof structure. In comparison, the school bus driver, who was restrained with a lap/shoulder belt, was jerked from side to side during the crash sequence and rollover but was protected from impacts with the interior of the bus and remained in his seat at final rest.

The Dale, Texas, crash provides another example in which a school bus was involved in a collision and rollover crash (see section 1.10 of this report). In the video footage, the unbelted school bus occupants, including adult chaperones, could be seen being thrown around the bus when it rolled over one complete roll (360 degrees) and came to rest on its wheels after being struck by a cement truck. One student was partially ejected and others landed on top of each other.

The occupants of the Dale crash included preschool children, ages 4 and 5, as well as adult chaperones. The best practices for transporting preschoolers include

[51] See 49 *CFR* Part 571.222, Standard No. 222: School bus passenger seating and crash protection.

using a height- and weight-appropriate child safety restraint system (CSRS; NHTSA 1999, NHTSA 2023, Bull and others 2019).[52] Passenger lap/shoulder belts on school buses often have an adjustable shoulder strap that can be appropriately fitted for children who are at least 40 inches tall and weigh 40 pounds.[53] Additionally, a lap/shoulder belt can be used to install a CSRS on a school bus seat.[54] The adult chaperones would have also been able to use lap/shoulder belts.

Neither the school bus involved in the Millstone crash nor the bus in the Dale crash were equipped with passenger lap/shoulder belts, which resulted in the unbelted passengers impacting hard surfaces of the interior of the bus or other occupants during the rollover sequences; one student was partially ejected and several sustained fatal or serious injuries. Furthermore, CSRSs, the appropriate seat for some of the preschool children in the Dale, Texas, crash, could not be installed on the bus because there were no lap/shoulder belts to secure CSRSs.[55] The NTSB concludes that the school bus passengers in the Millstone, West Virginia, and the Dale, Texas, crashes were thrown about the interior of the large school bus during the crash and rollover sequence because they were unbelted, resulting in injuries from impacting the school bus interior and other occupants and an increased risk of ejection due to the lack of passenger lap/shoulder belts.

As noted earlier, compartmentalization is incomplete in some crashes because precrash, lateral, and rollover vehicle dynamics still expose unbelted passengers to injury-producing movement within the vehicle including into intrusion areas, to movement out of the protective seating compartment, and to ejection. The NTSB has investigated several crashes over the years involving school buses equipped and not equipped with lap/shoulder belts and found that passenger injuries would be reduced by the proper use of passenger lap/shoulder belts. The NTSB investigated a crash in 2016 in Chattanooga, Tennessee, involving a school bus that struck a utility pole and subsequently rolled over and collided with a tree, resulting in six fatalities and numerous injuries (NTSB 2018). The school bus was not equipped with passenger lap or lap/shoulder belts. The NTSB found that properly worn lap/shoulder

[52] For reference, according to growth charts from the US Centers for Disease Control and Prevention, the 50th-percentile height and weight for a 4-year, 0-month-old girl is about 40 inches and 35 pounds; the 50th-percentile height and weight for a 5-year, 6-month-old boy is about 44 inches and 43 pounds.

[53] For example, see the SafeGuard seat and the C.E. White Portable Child Restraint.

[54] Booster seats should not be used on a school bus seat. If the shoulder belt cannot be adjusted for the height of the child, a CSRS should be used. Booster seats should not be used with a lap-only belt.

[55] The seats in the Dale, Texas, crash-involved bus were not equipped with a lower anchors and tethers for children (LATCH) system, which is another method to attach a CSRS to a school bus seat.

belts provide the highest level of protection for school bus passengers in all crash scenarios, including frontal-, side-, and rear-impact collisions and rollovers.

More recently, the NTSB initiated an investigation of a school bus rollover crash in Leander, Texas (NTSB 2025). The school bus involved in this crash was equipped with passenger lap/shoulder belts and five-point harnesses. Video footage showed that, of the 42 student passengers visible in the video (out of the 46 passengers onboard), only 6 were belted and 4 of those passengers were improperly wearing only the lap portion of the lap/shoulder belt.[56] In an interim report, the NTSB concluded that the non-use of the available lap/shoulder belts and five-point harnesses by most of the school bus passengers resulted in occupant-to-interior and occupant-to-occupant impacts, leading to injuries for many of the unbelted passengers. The NTSB also concluded that the safety of school bus passengers is improved by properly using passenger lap/shoulder belts or five-point harnesses on every trip.

Properly used lap/shoulder belts would have prevented the students involved in the Millstone and Dale crashes from being displaced from the seating compartments. The NTSB concludes that properly worn passenger lap/shoulder belts provide the best protection for school bus passengers in the event of a crash by reducing occupant injuries sustained by impacts with the bus interior, impacts with other occupants, and occupant ejections, such as occurred in the Millstone, West Virginia, and Dale, Texas, crashes.

2.3.2 Requirements for Installation and Proper Use of Lap/Shoulder Belts

2.3.2.1 Installation of Lap/Shoulder Belts

In 1999, we released a special investigation report on bus crashworthiness (NTSB 1999). In this report, we issued two recommendations to NHTSA:

> In 2 years, develop performance standards for school bus occupant protection systems that account for frontal impact collisions, side impact collisions, rear impact collisions, and rollovers. (H-99-45)
>
> Once pertinent standards have been developed for school bus occupant protection systems, require newly manufactured school buses to have an occupant crash protection system that meets the newly developed performance standards and retains passengers, including

[56] Due to the angle and orientation of the video cameras, visibility of passengers on the left side of the bus was limited.

those in child safety restraint systems, within the seating compartment throughout the accident sequence for all accident scenarios. (H-99-46)

Safety Recommendation H-99-45 is classified Closed—Acceptable Alternate Action and H-99-46 is classified Closed—Unacceptable Action. NHTSA issued a final rule in 2008 establishing performance standards for passenger lap/shoulder belts that are voluntarily installed in large school buses; however, NHTSA did not require newly manufactured large school buses to be equipped with lap/shoulder belts, which would provide additional protection to occupants of large school buses in side-impact and rollover crashes. Additionally, the federal regulations continue to allow for the installation of lap-only belts on large school buses, which the NTSB has found in its investigations can provide some protection to school bus occupants (NTSB 2013b), although injuries can still occur from upper body flailing.

As a result of our investigation into the school bus crash in Chattanooga, Tennessee (NTSB 2018), we issued Safety Recommendation H-18-10 to states without requirements for seat belts on school buses, including West Virginia, to enact legislation to require that all new large school buses be equipped with passenger lap/shoulder belts for all passenger seating positions in accordance with FMVSS 222.[57] Recognizing that Florida, Louisiana, New Jersey, and New York already required lap belts on school buses, we issued Safety Recommendation H-18-9 asking these states to amend their statutes to upgrade the seat belt requirement from lap belts to lap/shoulder belts for all passenger seating positions in new large school buses in accordance with FMVSS 222.[58] Texas as well as Arkansas, California, and Nevada already required passenger lap/shoulder belts in large school buses, so these states did not receive either of these safety recommendations.

As of January 2026, seven states had laws requiring the installation of lap/shoulder belts on school buses: Arkansas, California, Illinois, Iowa, Nevada, New Jersey, and Texas.[59] Florida, Louisiana, and New York still require lap belts on school

[57] Safety Recommendation H-18-10 is classified Closed—Acceptable Action for Iowa; Closed—Acceptable Alternate Action for the District of Columbia and Wyoming; Open—Acceptable Response for Arizona, Connecticut, Hawaii, Illinois, Indiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, New Hampshire, New Mexico, North Carolina, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin; Open—Acceptable Alternate Response for Alabama and Nebraska; and Open—Unacceptable Response for Alaska, Colorado, Delaware, Georgia, Idaho, Kansas, Kentucky, Maine, Maryland, North Dakota, Oregon, Pennsylvania, Puerto Rico, South Dakota, and Vermont.

[58] Safety Recommendation H-18-9 is classified Closed—Acceptable Action for New Jersey, Open—Acceptable Response for New York, and Open—Unacceptable Response for Florida and Louisiana.

[59] See the National Conference of State Legislatures' School Bus Safety site.

buses. Arkansas's, Louisiana's, and Texas's laws are subject to appropriations or approval or denial by local jurisdictions.

School buses in West Virginia are not required to be equipped with seat belts. In 2021, House Bill 2541 requiring seat belts on new large school buses was introduced to the West Virginia House of Delegates but it did not pass.[60] Correspondence from the WVDE concerning Safety Recommendation H-18-10 stated that the state legislature typically asks for a cost analysis of placing seat belts on school buses, and the department was preparing one for the next session (2023). However, no further legislative action on this issue has been taken since 2021. The decision and authority to install passenger lap/shoulder belts on large school buses remains with the local school district.

In 2007, Texas enacted legislation requiring lap/shoulder belts on school buses purchased by school districts on or after September 1, 2010, but funding was not appropriated.[61] Legislation addressing funding of the lap/shoulder belt requirement was passed in 2009 and 2011, stating that school districts had to comply with the requirement if funds were appropriated for reimbursement of the costs of the lap/shoulder belts.[62] In 2017, Texas's law was changed again to require school districts to equip new large school buses (model year 2018) with lap/shoulder belts; however, school districts could opt out of the requirement due to budgetary constraints and if it was voted on at a public school board meeting.[63] In September 2025 and effective immediately, school districts are required to equip all of their school buses, regardless of model year, with passenger lap/shoulder belts.[64] If the school district determines that its budget is not sufficient to meet this requirement, then by the end of the 2025–2026 school year, it is required to submit to the Texas Education Agency a report on how many of its buses are equipped with each type of belt (lap belts versus lap/shoulder belts) and an estimation of the costs to equip each school bus with lap/shoulder belts and present this information in a public meeting. The Texas Education Agency will then summarize and provide this information to the governor and legislature. Finally, the law allows a school district to accept gifts, grants, or donations to implement the requirement to install lap/shoulder belts.

[60] See West Virginia House Bill 2541.

[61] See Acts 2007, 80th Legislature (HB 323).

[62] See Acts 2009, 81st Legislature (HB 3646), and Acts 2011, 82nd Legislature (SB 1610).

[63] See Texas Senate Bill 693.

[64] See Texas Senate Bill 546 and Texas Transportation Code 547.701(e).

2.3.2.2 Proper Use of Lap/Shoulder Belts

Properly worn passenger lap/shoulder belts provide the best protection for school bus passengers. Although a growing number of states are passing legislation to require school buses to be equipped with lap/shoulder belts, students are not always wearing the available belts and are sometimes not required to wear them. Although not passed, West Virginia's proposed Bill 2541 to require new school buses to be equipped with seat belts contained a section requiring the State Board of Education to provide guidance for bus drivers and passengers concerning the required use of seat belts while on a school bus.

In the Leander, Texas, crash, even though the school bus was equipped with lap/shoulder belts and five-point harnesses and despite Texas code requiring students who are riding a school bus operated by a district to wear a seat belt if the bus is so equipped, most of the students did not use the available seat belts.[65] The few students who did use the seat belts used them improperly (NTSB 2025). Although the Leander Independent School District (ISD) provided limited information on its website and listed requirements in its *Student and Parent Handbook* for students to be belted, it had not established specific procedures to ensure that passengers were properly belted. Additionally, Leander ISD did not provide adequate training to school staff, parents, or students about proper seat belt use, nor did it provide adequate guidance for the periodic review of onboard video camera footage to monitor proper seat belt use compliance. On October 20, 2025, the NTSB issued an urgent recommendation to Leander ISD to:

> Establish, implement, and routinely audit adherence to enforceable policies and procedures for seat belt use on school buses, in compliance with Texas Education Code 34.013, so that every student and driver on school buses equipped with passenger seat belts is properly restrained by lap/shoulder belts or five-point harnesses on every trip. The policies and procedures should at a minimum include:
>
> - mandatory pre-departure driver instruction to students to properly belt and periodic pre-departure inspection by drivers or other staff to ensure that each student is properly belted;
> - periodic review of onboard video camera footage, when equipped, to verify seat belt use; and
> - increased training and education of school administrators and staff, bus drivers, parents, and students about seat belt use and proper adjustment, seat belt policies and procedures, the

[65] For more information, see Texas Education Code Section 34.013 – Bus Seat Belt Policy.

safety benefits of seat belt use, and the importance of being properly belted (H-25-26).

A similar recommendation was issued to the state of Texas (H-25-25) to establish, distribute, and require implementation of enforceable policies and procedures for seat belt use on school buses that include information on mandatory predeparture briefings, periodic review of onboard cameras, and increased training and education on the proper use of seat belts and seat belt policies.[66]

On November 21, 2025, Leander ISD responded to Safety Recommendation H-25-26 stating that new policies regarding seat belt use had already been implemented, including periodic inspections of student belt use on the afternoon routes by school staff and increased review of videos for seat belt compliance. Leander ISD also plans to publish new documentation about seat belt use expectations in the student handbooks, transportation handbooks, and the transportation webpage in spring 2026. It is also developing videos on seat belt use geared toward students and plans to add these to the website also in spring 2026. Additionally, a new policy will be introduced, requiring parents to acknowledge the school district's expectations on seat belt use before registering for school bus transportation. The NTSB is encouraged by these steps and, pending completion of these plans, classifies Safety Recommendation H-25-26 to Leander ISD Open—Acceptable Response.

2.3.3 Summary

The school buses involved in the crashes in Millstone, West Virginia, and Dale, Texas, were not equipped with passenger lap/shoulder belts, leading to an increased risk of injuries for the unbelted passengers. For more than two decades, the NTSB has investigated crashes involving school buses. We found that properly worn lap/shoulder belts provide the best protection for school bus passengers in the event of a crash, and we have issued recommendations for the installation of lap/shoulder belts on large school buses, including a recommendation to West Virginia. Texas already requires school districts to equip large school buses with lap/shoulder belts, and its education code requires students to wear them. Because of the continued risks to unbelted school bus occupants in crashes such as the rollover crash in Millstone, West Virginia, the NTSB reiterates Safety Recommendation H-18-10 to West Virginia. Even if school buses are equipped with lap/shoulder belts, passengers

[66] The NTSB also issued H-25-27 to the National Association for Pupil Transportation (NAPT), the National School Transportation Association (NSTA) and the National Association of State Directors of Pupil Transportation Services (NASDPTS) to inform their members of the Leander, Texas, rollover crash and of the need for school districts to have policies for seat belt use. Safety Recommendation H-25-25 is classified Open—Await Response and Safety Recommendation H-25-27 is classified Closed—Acceptable Response for NAPT and NASDPTS and Open—Await Response for NSTA.

must properly wear them to be protected against injuries and fatalities. Therefore, the NTSB recommends that West Virginia enact legislation to require all passengers on school buses equipped with seat belts to properly use the seat belts on every trip. Additionally, because the NTSB has found that enforceable policies and procedures, along with routine audits to verify compliance, are necessary to ensure students use the available lap/shoulder belts properly, the NTSB recommends that West Virginia:

Establish, distribute, and require implementation of enforceable policies and procedures for seat belt use on school buses, with routine audits, for all school districts so that every student and driver on school buses equipped with passenger seat belts is properly restrained by lap/shoulder belts or five-point harnesses on every trip. The policies and procedures should at a minimum include:

- mandatory pre-departure driver instruction to students to properly belt and periodic pre-departure inspection by drivers or other staff to ensure that each student is properly belted;

- periodic review of onboard video camera footage, when equipped, to verify seat belt use; and

- increased training and education of school administrators and staff, bus drivers, parents, and students about proper seat belt use and adjustment, seat belt policies and procedures, the safety benefits of seat belt use, and the importance of being properly belted.

3 Conclusions

3.1 Findings

1. None of the following were factors in this crash: (1) weather; (2) roadway condition and signage; (3) mechanical condition of the school bus; (4) school bus speed; (5) school bus driver licensing, experience, training, use of drugs tested for other than alcohol, or distraction from cell phone or personal electronic device use, the bus's loading doors, or students; or (6) Calhoun County Board of Education policies.

2. No evidence suggests that either a medical condition or driver fatigue were factors in this crash.

3. The emergency response was timely and adequate.

4. At the time of the crash, the school bus driver was impaired by alcohol, which resulted in his inability to maintain control of the bus, leading to the bus's roadway departure, return to the roadway, and overturn.

5. Implementation of alcohol detection systems on school buses can prevent alcohol-impaired drivers from operating school buses.

6. The school bus passengers in the Millstone, West Virginia, and the Dale, Texas, crashes were thrown about the interior of the large school bus during the crash and rollover sequence because they were unbelted, resulting in injuries from impacting the school bus interior and other occupants and an increased risk of ejection due to the lack of passenger lap/shoulder belts.

7. Properly worn passenger lap/shoulder belts provide the best protection for school bus passengers in the event of a crash by reducing occupant injuries sustained by impacts with the bus interior, impacts with other occupants, and occupant ejections, such as occurred in the Millstone, West Virginia, and Dale, Texas, crashes.

3.2 Probable Cause

The National Transportation Safety Board determines that the probable cause of the Millstone, West Virginia, crash was the school bus driver's alcohol impairment resulting in his loss of vehicle control and the school bus's roadway departure and rollover. Contributing to the severity of the passenger injuries was the lack of passenger lap/shoulder belts on the large school bus.

4 Recommendations

4.1 New Recommendations

As a result of this investigation, the National Transportation Safety Board makes the following new safety recommendations.

To the National Highway Traffic Safety Administration:

Require that all new school buses be equipped with a vehicle-integrated alcohol detection system capable of preventing or limiting vehicle operation if driver impairment by alcohol is detected. (H-26-7)

To the state of West Virginia:

Enact legislation to require all passengers on school buses equipped with seat belts to properly use the seat belts on every trip. (H-26-8)

Establish, distribute, and require implementation of enforceable policies and procedures for seat belt use on school buses, with routine audits, for all school districts so that every student and driver on school buses equipped with passenger seat belts is properly restrained by lap/shoulder belts or five-point harnesses on every trip. The policies and procedures should at a minimum include:

- mandatory pre-departure driver instruction to students to properly belt and periodic pre-departure inspection by drivers or other staff to ensure that each student is properly belted;
- periodic review of onboard video camera footage, when equipped, to verify seat belt use; and
- increased training and education of school administrators and staff, bus drivers, parents, and students about proper seat belt use and adjustment, seat belt policies and procedures, the safety benefits of seat belt use, and the importance of being properly belted. (H-26-9)

4.2 Previously Issued Recommendation Reiterated in This Report

The National Transportation Safety Board reiterates the following safety recommendation.

To the state of West Virginia:

Enact legislation to require that all new large school buses be equipped with passenger lap/shoulder belts for all passenger seating positions in accordance with Federal Motor Vehicle Safety Standard 222. (H-18-10)

4.3 Previously Issued Recommendation Classified in This Report

As a result of its investigation, the National Transportation Safety Board classifies the following safety recommendation:

To Leander Independent School District:

Establish, implement, and routinely audit adherence to enforceable policies and procedures for seat belt use on school buses, in compliance with *Texas Education Code* 34.013, so that every student and driver on school buses equipped with passenger seat belts is properly restrained by lap/shoulder belts or five-point harnesses on every trip. The policies and procedures should at a minimum include:

- mandatory pre-departure driver instruction to students to properly belt and periodic pre-departure inspection by drivers or other staff to ensure that each student is properly belted;

- periodic review of onboard video camera footage, when equipped, to verify seat belt use; and

- increased training and education of school administrators and staff, bus drivers, parents, and students about seat belt use and proper adjustment, seat belt policies and procedures, the safety benefits of seat belt use, and the importance of being properly belted. (H-25-26; Urgent)

Safety Recommendation H-25-26 is classified Open—Acceptable Response for the Leander Independent School District.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

JENNIFER L. HOMENDY
Chairwoman

THOMAS CHAPMAN
Member

MICHAEL E. GRAHAM
Vice Chairman

JOHN DELEEUW
Member

Report Date: April 6, 2026

Appendixes

Appendix A: Investigation

The National Transportation Safety Board was notified of this crash on March 7, 2024, and dispatched a partial investigative team consisting of the investigator in charge and motor carrier investigator. Groups were established to investigate human performance, motor carrier operations, and occupant safety. The on-scene investigation was supported by staff from the Office of Research and Engineering and the Transportation Disaster Assistance Division.

Parties to the investigation were the West Virginia State Police and the Calhoun County Board of Education.

Appendix B: Consolidated Recommendation Information

Title 49 *United States Code* 1117(b) requires the following information on the recommendations in this report.

For each recommendation—

(1) a brief summary of the Board's collection and analysis of the specific accident investigation information most relevant to the recommendation;

(2) a description of the Board's use of external information, including studies, reports, and experts, other than the findings of a specific accident investigation, if any were used to inform or support the recommendation, including a brief summary of the specific safety benefits and other effects identified by each study, report, or expert; and

(3) a brief summary of any examples of actions taken by regulated entities before the publication of the safety recommendation, to the extent such actions are known to the Board, that were consistent with the recommendation.

To the National Highway Traffic Safety Administration:

H-26-7

Require that all new school buses be equipped with a vehicle-integrated alcohol detection system capable of preventing or limiting vehicle operation if driver impairment by alcohol is detected.

Information that addresses the requirements of 49 *USC* 1117(b), as applicable, can be found in section 2.2, Alcohol Impairment of School Bus Drivers, and section 2.2.4, Summary. Information supporting (b)(1) and (b)(2) can be found on pages 18–26; (b)(3) is not applicable.

To the state of West Virginia:

H-26-8

Enact legislation to require all passengers on school buses equipped with seat belts to properly use the seat belts on every trip.

Information that addresses the requirements of 49 *USC* 1117(b), as applicable, can be found in section 2.3, Incomplete Occupant Protection on Large School Buses. Information supporting (b)(1) and (b)(2) can be found on pages 26–34; (b)(3) is not applicable.

H-26-9

Establish, distribute, and require implementation of enforceable policies and procedures for seat belt use on school buses, with routine audits, for all school districts so that every student and driver on school buses equipped with passenger seat belts is properly restrained by lap/shoulder belts or five-point harnesses on every trip. The policies and procedures should at a minimum include:

- mandatory pre-departure driver instruction to students to properly belt and periodic pre-departure inspection by drivers or other staff to ensure that each student is properly belted;
- periodic review of onboard video camera footage, when equipped, to verify seat belt use; and
- increased training and education of school administrators and staff, bus drivers, parents, and students about proper seat belt use and adjustment, seat belt policies and procedures, the safety benefits of seat belt use, and the importance of being properly belted.

Information that addresses the requirements of 49 *USC* 1117(b), as applicable, can be found in section 2.3.2.2, Proper Use of Lap/Shoulder Belts. Information supporting (b)(1) and (b)(2) can be found on pages 32–33; (b)(3) is not applicable.

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For more detailed background information on this report, visit the NTSB Case Analysis and Reporting Online (CAROL) website and search for NTSB accident ID HWY24FH004. 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 –

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