



# National Transportation Safety Board

Washington, DC 20594

## Highway Accident Brief

### Motorcoach Roadway Departure and Crash Into Ravine Near Loxley, Alabama, March 13, 2018

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<b>Accident Number:</b>	HWY18MH008
<b>Accident Type:</b>	Motorcoach roadway departure and crash into ravine
<b>Location:</b>	Westbound on Interstate 10 in Baldwin County near Loxley, Alabama
<b>Date and Time:</b>	March 13, 2018, 5:28 a.m., central daylight time
<b>Vehicle:</b>	2018 Prevost 56-passenger motorcoach
<b>Motor Carrier:</b>	First Class Tours & Charters of Houston, Texas
<b>Fatalities:</b>	1
<b>Injuries:</b>	46

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#### Crash Description

About 5:28 a.m. (local time) on Tuesday, March 13, 2018, a 2018 Prevost 56-passenger motorcoach, occupied by a 65-year-old male driver and 46 passengers, was traveling westbound on Interstate 10 (I-10) in Baldwin County near Loxley, Alabama. (See figure 1 map.) The motorcoach was part of a two-motorcoach chartered tour operated by First Class Tours & Charters of Houston, Texas, which was transporting students from Channelview High School, who were returning to Houston from a trip to Disney World in Orlando, Florida.

At the crash location, I-10 is a four-lane divided highway with a posted speed limit of 70 mph; its eastbound and westbound travel lanes are divided by an earthen center median. The weather conditions were reported as dry and clear.

The crash event began when the 2018 Prevost motorcoach departed the westbound lanes at a shallow angle of about 5 degrees, crossed the center median, traveled into and across the opposing eastbound travel lanes and onto the far eastbound shoulder, striking the guardrail adjacent to the south shoulder of the roadway.<sup>1</sup> The guardrail redirected the motorcoach, which went back across the eastbound travel lanes and returned to the center median.

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<sup>1</sup> While traversing the eastbound lanes, the motorcoach narrowly missed striking an eastbound tractor-trailer and a passenger vehicle.

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**Figure 1.** Map of crash location on I-10 in southern Alabama.

At some point in this sequence of events following the departure from the intended westbound travelway, an adult passenger realized that the motorcoach driver was unresponsive. This passenger called the driver by name and, receiving no response, got out of his own seat and shook the driver. Again failing to get a response, the passenger grabbed and pulled on the steering wheel.

After traveling for more than a quarter-mile (1,561 feet) off its intended course, the motorcoach—now traveling roughly westbound in the median—drove off the roadway and fell into the Cowpen Creek ravine, which was spanned by two separate bridges for the eastbound and westbound I-10 roadways. At the bottom of the ravine, the motorcoach came to rest on its passenger side with its roof wedged against a vertical bridge support. (See figure 2, which identifies various points along the motorcoach’s crash path.)

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**Figure 2.** Aerial view of crash area. (Source: Baldwin County Sheriff's Office, annotated)

As a result of the crash, the motorcoach driver received fatal injuries, and all 46 motorcoach passengers were injured; 15 passengers sustained serious injuries and 31 passengers sustained minor injuries.

Parties to the investigation included the Alabama Law Enforcement Agency Highway Patrol, Baldwin County Sheriff's Office, Alabama Department of Transportation, and Federal Motor Carrier Safety Administration (FMCSA).

### Crash Trip

Channelview High School is part of the Channelview Independent School District (ISD), located in a suburb of Houston. The school sponsored the trip for about 100 students, faculty members, and chaperones to attend a band competition in Orlando. The Channelview ISD used Greenlight Tours to manage the trip; Greenlight Tours arranged for the carrier First Class Tours & Charters to conduct the trip. The two motorcoaches comprising the charter left Channelview on Thursday, March 8, 2018. On the day of the crash, Tuesday, March 13, the group was returning from Florida to Texas. In addition to the driver, the crash motorcoach was occupied by 4 adults and 42 students, ranging in age from 14 to 65.

At the time of the crash, the driver was operating the motorcoach from Orlando to Mobile, Alabama, where he was scheduled to be relieved by another driver. The Houston-based driver had begun his multiday work trip by picking up an assignment from Houston to Mobile on March 7, arriving in Mobile at 1:15 a.m. on March 8. He remained in Mobile to obtain his required rest to comply with commercial vehicle hours-of-service (HOS) rules (49 *Code of Federal Regulations* [CFR] 395.3). He assumed responsibility for the outbound part of the Channelview tour beginning at 1:15 a.m. on March 9 and drove one of the charter motorcoaches from Mobile to Orlando. With a few short exceptions, the driver was off duty in Orlando from his arrival on the morning of March 9 until beginning the charter's return trip at 9:00 p.m. on Monday, March 12. During the nighttime trip, the driver made two 15-minute rest stops, at 1:30 a.m. and 4:15 a.m. According to company records, the driver had driven the same route many times, and he was in compliance with the HOS regulations at the time of the crash.

## Highway

The crash occurred on I-10, about 0.25 mile east of milepost 57 and about 12 miles east of the city of Loxley, in Baldwin County, Alabama. In the area of the crash, I-10 is a divided four-lane highway, consisting of two eastbound and two westbound travel lanes. Each of the travel lanes is about 12 feet wide, bordered on the right side by a 10-foot-wide paved shoulder and on the left side by a 6-foot-wide paved shoulder. A depressed earthen median separates the eastbound and westbound roadways. The median width in the area of the motorcoach's initial departure from the westbound lanes is about 42 feet, measured from the pavement edges.<sup>2</sup>

In the vicinity of the crash, I-10 is essentially straight. Pavement markings consist of a 5-inch-wide solid yellow line separating the left travel lane from the left shoulder, a 5-inch-wide solid white line separating the right travel lane from the right shoulder, and 5-inch-wide broken white lines separating the travel lanes. All of the lines are retroreflective. The left and right travel lanes are further delineated by raised bidirectional reflective pavement markers and longitudinal rumble strips scored into the paved shoulders.

The motorcoach's initial departure from the westbound travel lanes and into the median occurred about 1,561 feet southeast of the eastern end of the bridge over the Cowpen Creek ravine. The median cross slope in the area where the motorcoach entered the center median was about 6:1 (lateral distance compared to verticle drop); the cross slope in the area where the motorcoach left the median to enter the eastbound travel lanes was about 7.5:1. Both of these slopes would be considered recoverable.<sup>3</sup>

For the westbound travel lanes, a test level 3 W-beam guardrail was installed along the inside and outside shoulders, transitioning to the concrete bridge railing at the east end of the bridge over the ravine.<sup>4</sup> The guardrail on the median side of the westbound travel lanes was 190 feet long; the guardrail on the outside shoulder was 636 feet long. Along the outside shoulder of the eastbound travel lanes, there was a 587-foot-long guardrail, installed beginning at the east end of the bridge's concrete railing.

All aspects of the geometric design and signing of the highway in this area, including the guardrails, conformed to American Association of State Highway and Transportation Officials and Federal Highway Administration design standards.

## Vehicle

### Configuration

The occupant compartment of the 2018 Prevost (model H3-45) 56-passenger motorcoach contained 14 rows of seats, with 2 seats on each side of the aisle. The driver's seat and all the

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<sup>2</sup> The NTSB used on-scene survey data, photographs, engineering design records, and aerial imagery to document the highway. Investigators used an unmanned aerial vehicle under a night waiver to document the scene at a time of day similar to the crash.

<sup>3</sup> A recoverable slope is one on which a driver should be able to retain or regain control of a vehicle by slowing or stopping. Slopes flatter than 4:1 are generally considered recoverable.

<sup>4</sup> Although the guardrail redirected the motorcoach in this case, a test level 3 guardrail is not designed to provide protection for a motorcoach-sized vehicle.

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passenger seats were equipped with lap/shoulder belts. The passenger (right) side had eight windows, as well as a secondary access door for wheelchairs; the driver (left) side had nine windows. A lavatory was located in the rearmost portion of the vehicle.

### Damage

The motorcoach came to rest 105 feet below the top of the sloped concrete retaining wall in a 38-foot-deep ravine, against a structural bridge support. The motorcoach sustained extensive damage from the impact with the ground and the collision with the bridge support. (See figure 3.)



**Figure 3.** Rear of the motorcoach at the bottom of Cowpen Creek ravine, with its roof crushed against a bridge support structure.

Postcrash examination of the motorcoach found it in two segments—front and aft—as a result of crash damage and mechanical cutting carried out by emergency responders to extricate injured passengers. The front segment included the front-end structure and components including the steer axle, driver seating area and forward controls, and passenger loading stairwell.

The aft segment comprised the remainder of the motorcoach. The passenger compartment seating area and the floor were generally intact, although the floor deck exhibited deformation, particularly above the forward cargo bay. The roof near the rear of the motorcoach was displaced downward, with intrusion of about 20 inches into the occupant compartment. Intrusion of the roof was greatest on the passenger side of the vehicle. (See figure 4.)



**Figure 4.** Cross-section image of the 3D point cloud scan of the aft section of the motorcoach as viewed from the passenger side.

### Systems

Investigators inspected the motorcoach's mechanical and other systems, including the driver's controls, steering and suspension, tires and wheels, brakes, transmission, and electrical components. The entire vehicle sustained severe damage affecting all major mechanical systems, but inspection indicated no precrash defects or deficiencies.

The motorcoach had been put into service new on February 18, 2018, and it had only 4,500 miles on the odometer. Because of the motorcoach's newness, the carrier had performed no significant maintenance on it. Two motorcoach driver vehicle inspection reports (49 CFR 396.11) were found, and no mechanical issues were noted on the forms.

The vehicle was equipped with modules capable of recording event data. There was some damage to the Volvo engine control unit, which was mounted near the front of the vehicle, under the driver's seat. The motorcoach also had a Pure Mack vehicle engine control unit and a Bendix antilock brake system module, both of which were removed and inspected. The data available from these systems did not provide any information relevant to the crash.<sup>5</sup>

On its vehicle fleet, the motor carrier First Class Tours & Charters used an automatic onboard recording system supplied by Saucon. This system recorded a vehicle's hours, global positioning system (GPS) location, speed, engine idling, and braking ratio.<sup>6</sup> The system created reports that the carrier could use to monitor its drivers' daily performance. The data available from the system did not provide information relevant to the crash.

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<sup>5</sup> The motorcoach was also equipped with a factory-installed camera system that was not active at the time of the crash. Instead of using the manufacturer's camera system, the motor carrier chose to use a Lytx DriveCam system on its fleet, which combines telematic and video technology to allow carriers to monitor the driver's operation of the vehicle. However, because of the crash motorcoach's newness, the carrier had not yet installed a Lytx DriveCam system on the vehicle.

<sup>6</sup> Braking ratio refers to the braking power of vehicles in relation to their weight and the gradient of the slope over which they are operating.

## **Survival Factors**

As has been noted, all 46 motorcoach passengers were injured as a result of the crash, and the motorcoach driver was a fatality. Postcrash, the driver's body was found restrained by the lap/shoulder belt in the driver's seat but, due to the impact and damage to the front of the vehicle, the seat had been ejected out the front windshield. Following the collision, about 20 passengers were able to self-extricate, and first responders found them outside the motorcoach. Emergency responders extricated numerous additional ambulatory passengers.

Five passengers required extra extrication effort. Three were trapped in the rear of the bus due to the roof damage from the impact with the bridge pier. Emergency responders cut a 48- by 41-inch hole in the roof to extricate these individuals. Two other passengers were trapped in the front of the motorcoach. These passengers were partially covered by soil as a result of the motorcoach's plowing into the earth at impact; responders had to make additional efforts to extract them.

## **Emergency Response**

The Baldwin County Emergency Command Center (ECC) received the first 911 call at 5:30 a.m., and it dispatched two ambulances, one from a local fire department and one from Medstar, a contracted ambulance service. At 5:32 a.m., a second call resulted in the dispatch of responders from the Baldwin County Sheriff's Department and a Medevac helicopter. At 5:37 a.m., the Baldwin County ECC dispatched two additional helicopters and two additional ambulances. At 5:45 a.m., the Baldwin County Emergency Management Agency was notified, and mutual aid was requested from Mobile, Orange Beach, and Gulf Shores, Alabama; and from Escambia County, Florida. At 8:53 a.m., the last occupant was extricated from the motorcoach and, at 9:22 a.m., the last patient was transported by helicopter from the scene. In total, 4 helicopters, 15 ambulances, and a 15-passenger van were used to transport patients to 5 medical centers in Alabama and 3 in Florida.

In preparation for the trip, students had been required to obtain parental permission to participate in the outing, and the school received signed guardianship forms for each student. The school developed a trip manifest, which included student and adult participants, for accountability purposes. However, because of late changes to the group of participants, the manifest was inaccurate before the trip began. In addition, none of the chaperones on the crash motorcoach possessed a manifest or could identify all the students who were on the bus. Upon arrival at the crash scene, emergency responders located a partial passenger manifest in the motorcoach. Lack of a complete manifest caused some confusion during the response, but, by about 8:00 a.m., emergency responders had determined that all the motorcoach occupants had been identified.<sup>7</sup>

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<sup>7</sup> The manifest for the motorcoach passengers was both inaccurate and inaccessible at the time of the crash. Following the crash, the Channelview ISD recognized the need for up-to-date and accessible manifests and revised its school trip procedures to require that a complete and verified manifest for each motorcoach be provided to every trip chaperone.

### **Seat Belt Use**

As required by federal regulations (49 CFR 571.208), the 2018 Prevost motorcoach was equipped with lap/shoulder belts at all seating positions. Investigators examined these seat belts and found that 44 of the passenger belts showed no evidence of use.<sup>8</sup> At multiple points in the motorcoach, it appeared that unbelted passengers had been propelled into the seats in front of or to the side of them during the crash, as evidenced by the bending, twisting, or breaking of seat structures. Two unbelted passengers, who had been seated behind the driver in the first row, were ejected out the front windshield. A third unbelted passenger was partially ejected out a side window. Another unbelted passenger, who had been lying down across the seats in one of the rear rows, was seriously injured when his head struck the bridge structure.<sup>9</sup> The NTSB has a long history of recommending the installation and proper use of passenger lap/shoulder belts in large buses.<sup>10</sup>

### **Pretrip Safety Briefing**

Interviews with the passengers revealed that, due to a mechanical malfunction of the video system, they were not shown the recorded pretrip safety briefing before departing Texas or before beginning the return trip from Florida. The safety briefing included information on emergency exits and the use of seat belts. The passengers were also not given a verbal pretrip safety briefing before either leg of the trip. The motor carrier's policy required the driver to provide a pretrip safety briefing, either by showing the video or by giving a verbal briefing.<sup>11</sup> After the crash, the carrier reemphasized this policy to its drivers. The NTSB has previously issued recommendations addressing the benefits of pretrip safety briefings.<sup>12</sup>

### **Motor Carrier**

The crash motorcoach was operated by First Class Tours & Charters (First Class Tours) of Houston, Texas. First Class Tours began business in 1998 and was issued US Department of Transportation (USDOT) number 774995 and motor carrier number 346963. The First Class Tours ownership had experience operating motorcoach service businesses since 1984. At the time of the crash, the carrier operated 78 vehicles and employed 94 drivers.

The carrier is overseen by the Texas Department of Public Safety, the Texas Department of Motor Vehicles (DMV), and the Louisiana Public Service Commission, as an intrastate carrier in Louisiana; the FMCSA is responsible for federal oversight. At the time of the crash, the carrier did not have any alerts in the FMCSA Safety Management System. The carrier's last previous

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<sup>8</sup> In postcrash interviews, three passengers stated that they had been using the lap/shoulder belts at the time of the crash.

<sup>9</sup> Postcrash interviews indicated that many passengers were sleeping when the motorcoach left the roadway.

<sup>10</sup> This history includes the issuance of Safety Recommendations H-99-46 ("Closed—Unacceptable Action") and -47 ("Closed—Acceptable Action"), H-10-3 ("Open—Unacceptable Response"), and H-15-42 ("Open—Await Response").

<sup>11</sup> The carrier provided its drivers with a written script for the pretrip safety briefing, to be used in case of the video's unavailability.

<sup>12</sup> The most recent NTSB recommendation concerning pretrip safety briefings is Safety Recommendation H-15-14 ("Open—Unacceptable Response") to the FMCSA, which was issued as a result of our investigation of a 2014 motorcoach crash in Orland, California.

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compliance review, a comprehensive review that resulted in a satisfactory rating, took place in March 2015.

### Driver

#### *Background*

The driver of the crash motorcoach began employment with First Class Tours in January 2005; he worked full time for the carrier. The employment application that the driver submitted to First Class Tours indicated that he had been operating motorcoaches since 1990 and had commercial vehicle experience dating to 1985. The driver was also employed as a part-time bus driver for Houston Baptist University and had last driven for the university about 1 month before the crash.

The driver's file maintained by First Class Tours contained all the required documents (per 49 CFR 391.51). Records included a copy of the driver's Texas class B commercial driver's license (CDL), which was issued in March 2017, with an expiration date of May 2020; the CDL included a passenger endorsement. That license had a 3-month medical certificate that had been issued in March 2018 and was valid until June 2018.<sup>13</sup> The driver's file also contained his application for employment, background checks by previous employers, motor vehicle reports, preemployment drug test results, records of DriveCam events, annual reviews, and record of participation in the safety training provided by First Class Tours.

A CDL information system report for the driver listed one USDOT-reportable accident in a commercial motor vehicle on November 17, 2013, in Texas.<sup>14</sup> The accident was described as a left lane change in which the motorcoach sideswiped a private vehicle. As a result of the accident, the driver received a citation. First Class Tours disciplined the driver because of the event.

#### *Performance-Related Factors*

**Toxicology.** Forensic toxicological testing conducted by the Federal Aviation Administration Bioaeronautical Sciences Research Laboratory did not detect ethanol in the vitreous or carbon monoxide in cardiac blood. Testing detected 33.75 micrograms per milliliter ( $\mu\text{g}/\text{mL}$ ) of the non-sedating pain reliever acetaminophen in urine, the sedating antihistamine chlorpheniramine in urine and at 0.008  $\mu\text{g}/\text{mL}$  in cardiac blood, and the generally non-sedating cough suppressant dextromethorphan and its metabolite dextrorphan in urine and cardiac blood.<sup>15</sup>

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<sup>13</sup> A USDOT physical exam may be valid for up to 2 years. The medical examiner may issue a medical certificate for a period less than 2 years, when the examiner considers it desirable to monitor a medical condition, such as high blood pressure. (CDL medical certification is further discussed later in this brief report.)

<sup>14</sup> Per 49 CFR 390.5, a USDOT-reportable accident is one that involves a commercial motor vehicle operating on a highway in interstate or intrastate commerce in which a vehicle was towed from the scene, or an injury or fatality occurred.

<sup>15</sup> Additional information on the medications and their effects can be found in the "Details of the Investigation" section of the Medical Factual Report for this investigation (search the [NTSB public docket](#) for accident number HWY18MH008).

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**Lifestyle.** When interviewed, the driver's wife stated that the driver had not experienced any significant life changes in the 2–3 months before the crash. She stated that he normally got about 7 hours of sleep per night. She described his sleep as good and said that he typically awoke feeling rested. She said that he was not restless and did not get up during the night. She said that he did take daytime naps. She indicated that the driver did not drink much, mentioning that he only occasionally would drink a single beer. She said that he did not take any illicit drugs.

**Fatigue.** Using the driver's logbook entries, GPS information, interviews with the driver's family and coworkers, and cell phone records, investigators reconstructed the driver's activities in the days before the crash. Available information indicates that the driver's schedule generally provided sufficient opportunity for nighttime sleep. In the 3 nights preceding the crash trip, the driver had approximately 6, 11, and 9 hours available for rest.<sup>16</sup> Although 6 hours of sleep is below the typical human need, in the 2 nights immediately preceding the crash, his sleep opportunity was adequate and allowed for recovery from any sleep debt due to the single 6-hour night. In addition, the driver reportedly napped before departing on the trip back to Texas, further reducing the possibility of an acute sleep debt.

**Distraction.** According to his family, the driver had two cell phones with him; investigators examined records from both service providers. One phone showed little activity overall and none on the day of the crash; the other showed more total activity, including on the day of the crash. The last cell phone activity before the crash was a 1-second-long outgoing signal at 5:21 a.m., about 7 minutes before the crash. The cell service provider's compliance/law enforcement team indicated that the phone activity—which could have been caused by an attempted call, a dropped phone, accidental button presses, or damage to the phone—began a calling process, but no call was placed. The motorcoach was equipped with a citizen's band radio but, according to the driver of the second bus in the charter, no radio communication took place at or near the time of the crash.

**Medical.** Investigators obtained health information about the deceased driver from family members, his current and previous CDL medical exams, his personal physician, and pharmacies. The 65-year-old bus driver was 5 feet 6 inches tall, weighed about 265 pounds, and was severely obese, with a body mass index (BMI) of 42.8 kilograms per square meter ( $\text{kg}/\text{m}^2$ ).<sup>17</sup> His medical conditions included diabetes treated with diet, high blood pressure treated with enalapril, elevated cholesterol treated with pravastatin, and gastric reflux treated with esomeprazole. These medications are not generally considered impairing. The review of the driver's records identified no other potentially impairing medical conditions or medications.

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<sup>16</sup> For these 3 nights, the driver retired to bed at 12:49 a.m. on March 10, 8:10 p.m. on March 10, and 10:06 p.m. on March 11.

<sup>17</sup> The relationship between obstructive sleep apnea and obesity is particularly strong; 40–90 percent of individuals with a BMI above  $40 \text{ kg}/\text{m}^2$  are reported to have moderate-to-severe sleep apnea (Alan R. Schwartz, Susheel P. Patil, Alison M. Laffan, Vsevolod Polotsky, Hartmut Schneider, and Philip L. Smith, "Obesity and Obstructive Sleep Apnea: Pathogenic Mechanisms and Therapeutic Approaches," *Proc Am Thorac Soc*. 2008. 5(2): 185–192). A 2002 study conducted by the University of Pennsylvania, which was sponsored by the FMCSA and the American Transportation Research Institute of the American Trucking Associations, found that 28 percent of commercial truck drivers had some degree of sleep apnea (A.I. Pack, D.F. Dinges, and G. Maislin, *A Study of Prevalence of Sleep Apnea Among Commercial Truck Drivers*, Report No. DOT-RT-02-030. Washington, DC: US Department of Transportation, FMCSA, 2002).

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When interviewed, the driver's wife and adult son indicated that his health was good, except for high cholesterol and some issues with high blood pressure. They described the driver's vision and hearing as good and stated that he did not wear glasses or contact lenses.

The autopsy conducted by the Alabama Department of Forensic Sciences documented the cause of death as multiple blunt force injuries. The driver had an enlarged heart and moderate coronary artery disease with atherosclerotic plaques, resulting in the narrowing of up to 50 percent of his right coronary and left anterior descending coronary arteries. No evidence of a recent or remote heart attack, infection, cancer, or natural disease was described in the autopsy report.

Commercial interstate drivers in the United States, including motorcoach drivers, are required by the *Federal Motor Carrier Safety Regulations* to be medically certified as being physically qualified to drive a commercial vehicle. The Medical Examination Report for Commercial Motor Vehicle Driver Fitness Determination (CDL medical exam) is used to provide the certification. These examinations result in one of the following four qualification outcomes:

- (1) The driver is found to meet the standards and is given a 2-year certificate;
- (2) The driver is found to meet the standards but requires periodic evaluation for one or more conditions and is qualified for 3 months, 6 months, or 1 year;
- (3) The driver is temporarily disqualified due to a condition or medication; or
- (4) The driver is found not to meet the standards.

With respect to drivers with high blood pressure, the FMCSA provides specific guidance for medical certification. Per the FMCSA, drivers with a blood pressure reading greater than 180/110 are disqualified, until their blood pressure is less than 140/90; drivers with a reading of 160–179/100–109 may be certified for 3 months; drivers with a reading of 140–159/90–99 may be certified for 1 year; and drivers with a reading of 140/90 or lower may be certified for 2 years.<sup>18</sup>

Investigators located CDL medical exams performed on the driver in December 2016, March 2017, and March 2018.

In the December 2016 exam, the driver indicated that he had a history of high blood pressure and high cholesterol. He indicated that he was taking medication for high blood pressure. His blood pressure was taken twice during the exam and was recorded as 161/90 and 158/92. Due to high blood pressure, he was certified for 3 months.

In his March 2017 exam, the driver indicated that he had a history of high blood pressure and was taking medication. His blood pressure was taken twice and recorded as 168/96 and 138/72. He was certified for 1 year due to high blood pressure under treatment with medication.

The driver's most recent CDL medical exam was performed a week before the crash, on March 7, 2018. In that exam, the driver reported no health history or health conditions. He indicated "no" to the question concerning any surgery and "no" to the question of whether he was

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<sup>18</sup> See [FMCSA high blood pressure certifications](#), accessed February 27, 2019.

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taking prescription, over-the-counter, herbal, or diet medications. The driver affirmed that he had never been denied a USDOT/FMCSA medical certificate or had one issued for less than 2 years. His uncorrected visual acuity, horizontal visual acuity, hearing, and urinalysis were found to be within regulatory standards. During this 2018 exam, the driver's blood pressure was taken twice; the first time, it was recorded as 170/86; when taken again, it was recorded as 165/92. His height was listed as 5 feet 6 inches, and his weight was listed as 266 pounds. The examiner noted that he discussed weight loss with the driver. The driver was medically qualified for only 3 months due to high blood pressure.

**Medications.** During postcrash examination of the motorcoach, investigators found a small bottle that contained different types of pills among the driver's personal belongings:

- Pravastatin sodium, 20 milligrams (mg): a medication used to treat high cholesterol;
- Pravastatin sodium, 40 mg;<sup>19</sup>
- Enalapril maleate, 20 mg: a medication used to treat high blood pressure.<sup>20</sup>

### Summary

Investigators confirmed through interviews that the driver was unresponsive when the motorcoach departed the westbound roadway and first entered the center median and that he remained unresponsive throughout the crash sequence. This summary section considers the factors that could have led to the road departure and the lack of driver response to execute corrective actions.

**Vision and Hearing.** In his CDL medical exams, the driver's vision and hearing were found to meet standards. His family reported no problems with his vision or hearing, and the circumstances of the crash did not suggest that vision or hearing issues were a factor.

**Licensing and Experience.** The driver was properly licensed for the vehicle that he was driving at the time of the crash. He had about 27 years of experience as a motorcoach driver. He was familiar with the vehicle and with this route.

**External Distraction.** Although the exact nature of the last activity on the driver's cell phone could not be determined, this activity took place about 7 minutes before the crash. Investigators observed no distractions in the environment at the location where the crash occurred.

**Fatigue.** In any single-vehicle, run-off-the-road crash occurring late at night or early in the morning, driver fatigue must be considered. Although the crash occurred during a time of day when humans experience a circadian low, the driver did not have a chronic or acute sleep debt at the time of the crash. The driver was obese and at increased risk for obstructive sleep apnea. Postcrash toxicology detected therapeutic levels of the sedating antihistamine chlorpheniramine in the driver's blood, increasing his risk of falling asleep. In this case, however, the circumstances of the crash indicate that the driver was not just fatigued or asleep, but incapacitated. The passenger

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<sup>19</sup> A prescription bottle containing 40 mg pravastatin sodium pills was also found in the motorcoach. Based on pharmacy records, the prescription was filled on September 25, 2017 (30 count), and on March 2, 2018 (90 count).

<sup>20</sup> A prescription bottle containing 20 mg enalapril maleate pills was also found in the motorcoach. Based on pharmacy records, the prescription was filled on September 25, 2017 (30 count), and on March 2, 2018 (180 count).

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who called the driver's name and shook him during the loss-of-control event should have been able to wake a drowsy or sleeping driver. The fact that the driver did not respond at all to this passenger's effort to rouse him strongly suggests that the driver was incapacitated. Moreover, the physical jolting of the motorcoach's off-pavement travel and the collision with the guardrail should have alerted a driver who was merely asleep.

**High Blood Pressure.** The motorcoach driver had high blood pressure that was not well controlled. Despite the driver's failure to report his medical history and medications on his most recent CDL medical exam, the examining provider identified the driver's elevated blood pressure and restricted his medical certificate to 3 months. High blood pressure can cause damage to multiple organs, which can lead to multiple possibly impairing conditions, including stroke, coronary heart disease/myocardial infarction, and heart failure. The autopsy identified chronic changes in the driver's heart consistent with high blood pressure, but it did not identify evidence of other impairing conditions or of an acute medical event. The driver's heart disease placed him at increased risk of sudden impairment or incapacitation from a cardiac arrhythmia, which would leave no autopsy evidence. Therefore, although the circumstances of the crash are consistent with sudden driver incapacitation due to a medical event, the exact cause of the driver's incapacitation could not be determined from the available evidence.

### Probable Cause

The National Transportation Safety Board determines that the probable cause of the motorcoach roadway departure and crash into a ravine near Loxley, Alabama, was the incapacitation of the driver due to an unknown medical event.

### Report Date: May 10, 2019

For more details about this crash, visit the [NTSB public docket](#) and search for NTSB accident ID HWY18MH008. The docket includes information such as police reports, photographs, driver and witness statements, data on previous crashes, and highway engineering reports.

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person." 49 *Code of Federal Regulations*, Section 831.4. Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).

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