



# National Transportation Safety Board

Washington, DC 20594

## Highway Accident Brief

### Intersection Collision and Rollover Involving School Bus and Pickup Truck, Helena, Montana, November 27, 2017

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<b>Accident Number:</b>	HWY18FH002
<b>Accident Type:</b>	Intersection collision and rollover
<b>Location:</b>	Green Meadow Drive and John G. Mine Road, near Helena, Montana
<b>Date and Time:</b>	November 27, 2017, 7:13 a.m.
<b>Vehicle 1:</b>	2011 Chevrolet Express school bus operated by First Student, Inc.
<b>Vehicle 2:</b>	1998 Dodge Ram 1500 pickup truck
<b>Fatalities:</b>	0
<b>Injuries:</b>	6 (minor)

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### Crash Description

About 7:13 a.m. on Monday, November 27, 2017, a 2011 Chevrolet Express 12-passenger school bus, operated by First Student, Inc., was traveling east on John G. Mine Road, near Helena, Montana, when the driver stopped at Green Meadow Drive before proceeding into the intersection, where the bus was struck by a 1998 Dodge Ram 1500 pickup truck.<sup>1</sup> The bus was occupied by the driver, an adult aide, and two student passengers. The pickup truck—occupied by the driver and one passenger—was towing a flatbed equipment trailer and traveling south on Green Meadow Drive, on which traffic was not controlled by a stop sign.

Following the collision, the school bus departed the intersection to the southeast, struck an electrical equipment box, and overturned 90 degrees onto its right side. The pickup truck and trailer also came to rest by the side of the road at the southeast corner of the intersection. The bus driver and passengers evacuated from the rear emergency exit door. The Lewis & Clark County Sheriff's office responded to the crash and determined that there was no need for emergency medical or fire/rescue services. All vehicle occupants self-transported to medical facilities, where four persons were treated for minor injuries. The pickup truck driver and one additional bus occupant complained of minor pain, but no records of treatment were found.

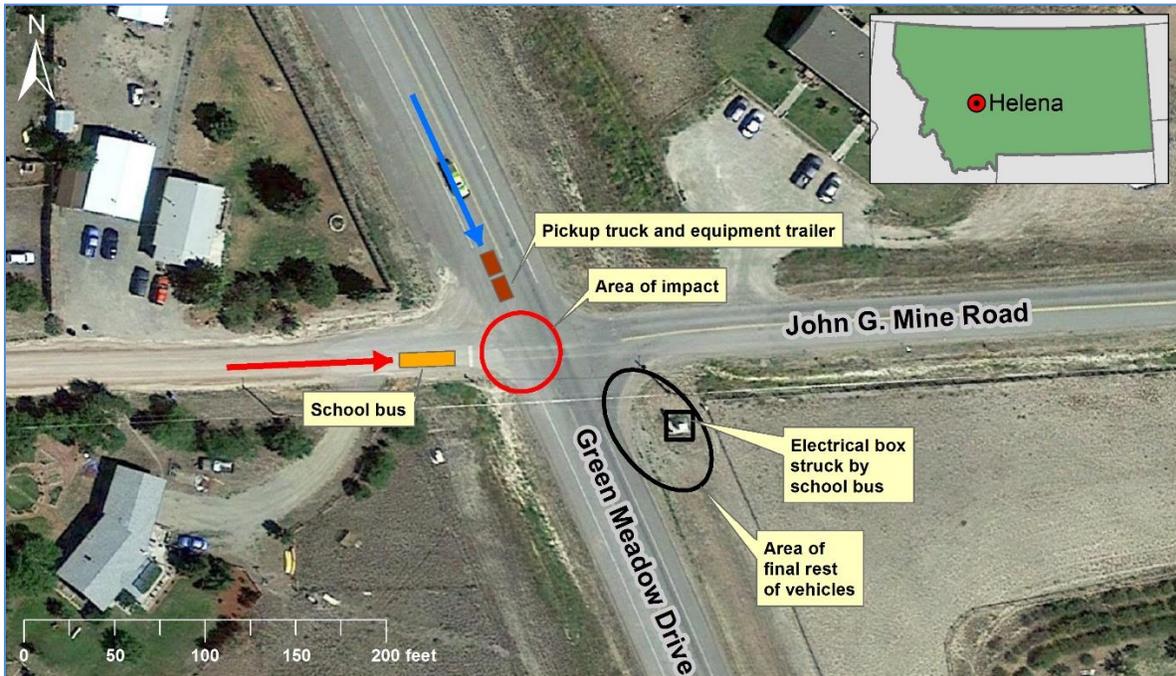
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<sup>1</sup> The school bus was equipped with 10 passenger seats and two wheelchair bays.

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## Highway Information

The crash occurred at the intersection of John G. Mine Road and Green Meadow Drive, as shown in figure 1. At the crash location, Green Meadow Drive is a two-lane paved asphalt road with paved shoulders and a posted speed limit of 55 mph. John G. Mine Road is a two-lane road with a posted speed limit of 25 mph; stop signs are located at the intersection with Green Meadow Drive. Although portions of John G. Mine Road consist of unpaved gravel segments, the road transitions to pavement on the west-to-east approach to the intersection.



**Figure 1.** Intersection of John G. Mine Road and Green Meadow Drive, Helena, Montana.

Figures 2 and 3 provide views of the intersection, with figure 2 looking east from John G. Mine Road on approach to the intersection and figure 3 looking north onto Green Mountain Drive from the stop bar at John G. Mine Road.

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**Figure 2.** View from John G. Mine Road looking east on approach to intersection.



**Figure 3.** View from John G. Mine Road looking north onto Green Mountain Drive.

The Montana Highway Patrol (MHP) trooper who investigated the crash told National Transportation Safety Board (NTSB) investigators that tire marks were visible on Green Mountain Drive, indicating that the pickup truck driver had made some effort to avoid the collision by swerving to the left, but there was no substantial evidence of braking. The trooper stated that the roadway on the morning of the crash was damp from the morning dew, but it was not icy.

### Drivers

#### *School Bus*

The school bus driver, a 72-year-old male, was restrained by a lap/shoulder belt and received minor injuries. He self-transported to an urgent care facility for treatment later that day. A review of the driver's medical records revealed that he sustained contusions to the left side of his head, an abrasion on his left thigh, and a sprained right thumb.

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The bus driver held a Montana class B commercial driver's license (CDL) with passenger and school vehicle endorsements.<sup>2</sup> He first obtained a CDL in May 2006. His license was set to expire on his birthday in 2020. He had experience driving heavy vehicles during a 26-year career in the US Marine Corps and Army National Guard. Following his military service, he began employment with First Student in 2006. A review of his driving records found no issues that would affect his ability to work as a school bus driver. Records showed that he had no previous crashes and had been cited for three traffic violations, in 2002, 1997, and 1995.

In accordance with CDL requirements, the driver had a medical examination in September 2016 and was given a 2-year medical certificate with no conditions or restrictions. He self-reported that he was not taking any medications and did not have any illnesses or other conditions that could adversely affect his ability to operate a vehicle. In compliance with Federal Motor Carrier Safety Administration requirements, the school bus carrier, First Student, had the driver submit to a postcrash toxicology test. The urine sample was collected at 9:39 a.m. on November 27, within 2.5 hours of the crash. Test results were negative for alcohol or other drugs.<sup>3</sup> The driver reported to NTSB investigators that he sleeps uninterrupted during the night and has not been diagnosed with any sleep disorders.

First Student is the driver's sole source of employment. He is responsible for transporting special needs children from their homes to a local elementary school. At the time of the crash, he had 3 years of experience driving the 12-mile route on which the crash occurred. His route included six stops.

The bus driver provided NTSB investigators with an account of his activities on the days preceding the crash, which occurred on a Monday morning. He had not worked the previous weekend. On a typical day, he works about 1.5 hours in the morning and nearly 2 hours in the afternoon. Between shifts, he returns home and spends the day with his wife. On each of the 5 days leading up to the crash, the driver had the opportunity for 8–10 hours of rest at night. On November 27, he awoke around 5:00 a.m. His first stop was at the carrier depot. The crash occurred a short distance from his second stop along the route.

Following the crash, the bus driver completed a Helena Public School District driver accident report, which includes fields for driver and accident information. He indicated that the school bus was traveling 5 mph. He entered a dash for the speed of the pickup truck and left blank the field for describing the crash. In response to questions about preventing the crash and how to prevent future accidents, he wrote that he should have looked again to the left for oncoming traffic. He indicated that he attempted to prevent the crash by pulling to the left. The investigating MHP trooper completed a Montana vehicle crash report, which indicated that the driver had the appropriate CDL to operate the school bus and that—other than corrective lenses—his license had no restrictions. The crash report also noted the bus driver's action as “failed to yield right of way.”

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<sup>2</sup> A Montana class B CDL permits the holder to operate, in commerce, a vehicle transporting either passengers or school students, with a gross vehicle weight rating of 26,001 pounds or more.

<sup>3</sup> Title 49 *Code of Federal Regulations* (CFR) 382.303 requires a commercial driver to be administered a controlled substance test following a motor vehicle accident that results in loss of life, medical treatment away from the scene of the crash, issuance of a citation, or towing of a vehicle from the crash site. The regulation requires administering the test as soon as practicable.

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### ***Pickup Truck***

The pickup truck was driven by an 18-year-old male, who was restrained by a lap/shoulder belt. The driver air bag did not deploy during the crash. The driver told the investigating MHP trooper that he received minor injuries and complained of neck pain. The day after the crash, he reportedly visited an urgent care facility for a checkup, but NTSB investigators found no records of the visit. The state vehicle crash report indicated that the driver held a Montana driver's license with no restrictions and that the license was appropriate for the type of vehicle he was operating. The crash report noted the truck driver's action as "no contributing action."

### **Helena Public School District and First Student, Inc.**

The Helena Public School District includes 11 elementary schools, two middle schools, and two high schools, as well as multiple educational programs. A transportation department oversees bus transportation for those students residing in the school attendance area. Student transportation is restricted to home-to-school and school-to-home. School bus transportation to facilities such as daycare or after-school care is prohibited. To qualify for ridership, a student must reside outside of the areas defined by the district as school walk zones.

The school bus was operated by First Student, Inc., under contract to the Helena Public School District. First Student operates in 39 states and seven Canadian provinces. The company operates 44,000 school vehicles and has 50,000 employees. The school district determines bus routes and manages student discipline.

### **Vehicle Passengers**

#### ***School Bus***

At the time of the crash, the school bus was occupied by three passengers: a 10-year-old male, seated in the second row at the window seat on the right (passenger) side; a 61-year-old female aide, seated in the third row at the aisle seat on the right side; and an 11-year-old female, seated in the third row at the window seat, next to the aide. All three passengers were wearing their lap/shoulder belts. Each passenger received minor injuries, as noted below:

- The parents of the 10-year-old boy took him to a pediatric clinic on the day of the crash, but no appointments were available. He was then reportedly taken to an urgent care facility, but investigators found no records of the visit. On the day after the crash, the adult aide asked the boy how he was doing, and he responded that he had pain in his right shoulder.
- The parents of the 11-year-old girl took her to a pediatric clinic on the day of the crash. Medical records indicated that she complained of pain to her right elbow and the back of her right knee. Her examination noted a small abrasion on the right elbow.
- The 61-year-old aide self-transported to a medical center on the day of the crash. Her medical records indicated that she had right shoulder pain, neck stiffness, and discomfort to the left shin.

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### Pickup Truck

The passenger in the pickup truck was an 18-year-old male, who was wearing his lap/shoulder belt. He received minor injuries as a result of the crash. On November 28, he visited an urgent care facility for a checkup. His medical records indicated that he suffered neck pain. The pickup truck was not equipped with a passenger air bag.

### School Bus

The 2011 Chevrolet Express school bus was manufactured in two stages.<sup>4</sup> The first stage build, completed in 2011, consisted of the Chevrolet cab and chassis—known in the industry as an incomplete vehicle or commercial cutaway. The final stage build, completed the same year, consisted of configuring the vehicle with a midsize school bus body and associated equipment. The school bus body, identified as type CGX6WR, was manufactured by Collins Bus Corporation. The completed vehicle had a gross vehicle weight rating of 12,300 pounds.

The passenger compartment of the school bus was configured with two rows of double seats on the left (driver) side and three rows of double seats on the right side. Additionally, two wheelchair bays were located on the left side at the rear of the bus, providing a total passenger capacity of 12, including two wheelchair-seated passengers. The Safeguard passenger seats were manufactured by IMMI (Indiana Mills and Manufacturing, Inc.) and incorporated integrated lap/shoulder belt systems. Two seat positions at the second row on the left side were also fitted with a student transportation add-on restraint (STAR) system—consisting of additional cushioning, straps, and buckles—which is used to accommodate smaller students or special needs students and is similar to a child restraint system. Figures 4 and 5 show a view of the passenger seats on each side of the school bus.



**Figure 4.** Right-side passenger seats equipped with lap/shoulder belts.

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<sup>4</sup> The bus was originally designed to carry a maximum of 18 passengers and the driver. However, it was reconfigured to transport special needs children, which reduced the total number of passenger seating accommodations to 12.

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**Figure 5.** Left-side passenger seats equipped with lap/shoulder belts and STAR system.

The occupied passenger seats were inspected postcrash, and the lap/shoulder belts were functional. Postcrash interviews with the bus driver and the adult aide indicated that the driver assisted the aide in releasing her seat belt buckle. Her lap/shoulder belt, as well as another lap/shoulder belt that was not in use during the crash, were removed from the bus for inspection and testing at the manufacturer's facility. NTSB investigators worked with IMMI in determining any anomalies or deficiencies with the aide's lap/shoulder belt and in comparing the buckle release characteristics with the noncrash buckle.

These inspections of the seat belt, including its latching mechanism, revealed no anomalies or performance issues. Test data were compared with the original manufacturing lot inspection data. The physical tests included release force testing with the buckles both static and under load, according to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 209 contained in 49 CFR 571.209.<sup>5</sup> The results indicated that both buckles were within production specifications, exhibited similar release characteristics, and performed as designed.

Damage to the school bus included the following:

- ***Along the left side of the bus:*** contact damage from colliding with the pickup truck. This damage was most severe along the lower portion of the bus body, between the driver door and the front portion of the passenger compartment.
- ***At the left front of the bus:*** damage due to striking the electrical box. The left front bumper was displaced upward and to the rear. The left side of the hood was crushed rearward and buckled at the middle.

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<sup>5</sup> FMVSS 209 includes procedures for measuring the buckle release force with no load, and in a condition in which the complete restraint assembly is loaded to a 5,000 pound-force (lbf), then reduced to 150 lbf, and released while under a 150-lbf load. The requirements are that the button release force for the no-load condition be less than 10 lbf and for the loaded condition less than 30 lbf. In these tests, the crash buckle released at forces of 4.3 and 4.0 lbf, respectively; and the exemplar buckle released at forces of 4.8 and 3.6 lbf, respectively.

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- *Along the right side of the bus:* damage from contact with the ground due to the rollover.
- *Other damage:* scratches to the bus body, and broken forward pane of the loading door glass and upper pane of the first passenger window.

Figures 6 and 7 provide views of the exterior damage to the school bus.



**Figure 6.** Left-front and partial side view of school bus postcrash.



**Figure 7.** Right-front and side view of school bus postcrash.

The passenger loading door is located at the front right side of the bus. Other doors include a driver access door, a rear emergency exit door, and a wheelchair ramp and door located at the right-side rear. The second window on the right side and the third window on the left side are configured as emergency exits. Additionally, a roof exit hatch is located near the center of the bus. A postcrash inspection indicated that the emergency exits and loading doors were functional; however, the driver door was damaged and inoperable.

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### Pickup Truck and Trailer

The 1998 Dodge Ram 1500 is an extended cab pickup truck. At the time of the crash, it was towing a 2005 MNDE model flatbed utility trailer. The pickup truck sustained impact damage to the right-front corner, as shown in figure 8.



**Figure 8.** Right-front view of pickup truck postcrash.

### Law Enforcement Response

The crash occurred outside the Helena city limits. The Lewis & Clark County Sheriff's Office was the primary responding agency. The MHP conducted the local crash investigation.

#### ***Lewis & Clark County Sheriff's Office***

The sheriff's office received an emergency 911 call reporting the crash at 7:13 a.m., and officers were dispatched to the scene. The MHP was advised of the crash by 7:15 a.m. Sheriff's deputies logged their arrival on scene at 7:28 a.m. A 7:30 a.m. entry in the dispatch logs noted that the school bus collided with an electrical box and live wires were present. The initial call indicated that all vehicle occupants had evacuated the bus, and there was no report of injuries.

During an interview with NTSB investigators, the ranking sheriff's deputy indicated that he responded to a report of a school bus rollover involving no injuries. When he arrived at the crash location, the vehicle occupants were outside and moving around. The deputies secured the scene, checked on the victims, obtained driver information, and contacted the energy company to report damage to the electrical box.

#### ***Montana Highway Patrol***

Following notification by the sheriff's office, the MHP dispatched a trooper to the scene. The event was classified as a crash with unknown injuries at 7:15 a.m.—later, at 7:18 a.m., it was reclassified as a crash with no injuries. At 7:16 a.m., the dispatcher informed responders of a rolled school bus with children exiting the bus. First Student was notified of the crash at 7:17 a.m. and within 1 minute acknowledged that it was sending a safety manager to the scene. The MHP trooper

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conducting the accident investigation arrived at 7:32 a.m. and departed at 9:07 a.m. The event was closed at 3:13 p.m.

### **Crash Event and School Bus Evacuation**

The school bus was equipped with an Apollo three-camera video surveillance system operated by RoadRunner secure management software. One camera was mounted on the left sidewall above the driver seat, with a view of the passenger loading door area. The second camera was mounted on a surface forward of and above the driver seat, with a view rearward into the passenger compartment. The third camera was mounted on the left side above the last of five passenger windows. This camera provided an interior view of the wheelchair ramp and access door. NTSB investigators determined that the video system captured the crash and postcrash events.

The crash event occurred in darkness, near dawn. Evidence from the school bus video system indicated that the headlights of the pickup truck were on. The school bus–pickup truck collision caused the bus to roll over and come to rest on its right side.

### ***Occupant Restraint***

Due to the darkness, camera angles, and obstructions such as seatbacks, the video recording provided an incomplete view of the school bus occupants during the crash. However, it showed that during the collision and subsequent rollover, the driver and passengers were restrained and remained in their seats, with limited flailing due to the proper use of the lap/shoulder belts. After the pickup truck struck the left side of the school bus, the video showed occupants moving toward the left. As the bus rolled onto its right side, the occupants then moved toward the right, within the constraints of their lap/shoulder belts.

The bus driver was seated nearest to the impact zone. He sustained minor abrasions to the left side of his head and left thigh due to contact with the left sidewall. The adult aide and the two student passengers were seated on the right side of the bus, aft of the initial impact zone. As previously noted, the 10-year-old student passenger was seated by himself, next to the window. The aide was seated in an aisle seat next to the 11-year-old student passenger, who was seated at the window. The video showed that the most pronounced motion of the passengers was during the rollover. All three passengers sustained minor injuries, reporting pain or stiffness to the right sides of their bodies. Despite being restrained by their lap/shoulder belts, the student passengers, who were sitting next to the right sidewall, likely contacted it during the rollover event.

Video evidence indicates that about 4 seconds transpired between the time of the collision and the school bus rollover. Several video frames captured the motion of the adult aide, but the other occupants are not clearly visible. As a result of the initial impact, the aide is thrown to the left, toward the aisle of the bus. Her body moves toward the inboard edge of the seat, while her torso remains on the seat, restrained by the lap/shoulder belt. Her arms and legs flail into the aisle. Following the initial impact, she moves toward the window, with her torso shifting toward the middle of the seat but still restrained. Her arms and legs flail toward the window.

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The lack of injuries to the student passenger seated next to the adult aide is an indication that the restraints were effective and limited occupant-to-occupant contact even during the rollover event. The student's lap/shoulder belt was effective in limiting her contact with the right sidewall and in preventing her from falling out of the seat and onto the right-side windows or the roof of the bus. Thus, the NTSB concludes that the passenger lap/shoulder belts helped keep the school bus occupants within their seating compartments during the side impact crash. Further, the NTSB concludes that the passenger lap/shoulder belts limited occupant-to-occupant contact and associated injuries during the rollover event.

None of the bus occupants suffered concussions or other injuries that impeded their ability to evacuate. Such injuries are not uncommon in vehicle rollovers. The absence of head or extremity injuries indicated that the lap/shoulder belts were effective in protecting the bus passengers. Therefore, the NTSB concludes that the passenger lap/shoulder belts mitigated injuries in this side impact and rollover crash.

### ***Postcrash Actions and Evacuation***

When the bus came to rest, the driver took about 40 seconds to leave his seat, move to the rear, and open the emergency exit door. He then moved back and forth in the bus, helping the student passengers and the adult aide.<sup>6</sup> In addition, the aide spoke with the students to keep them calm, and she asked the boy to release his belt and exit. The aide recalled that he followed her instructions, and the driver helped him exit from the emergency door at the rear of the bus. Based on the video, it did not appear that there was a sense of urgency among the bus occupants; they appeared to be calm and gathered some of their belongings before exiting.

The video shows the driver interacting with the adult aide and the female student passenger sitting next to her for about 30 seconds. The aide reported to NTSB investigators that she had difficulty getting out of her seat, because she was hanging in the overturned bus, yet was restrained by the lap/shoulder belt. Under these circumstances, it was difficult to locate the buckle and then press the release button. As previously noted, NTSB investigators conducted restraint evaluations to determine that the force required to release the buckle was within the manufacturer's specifications and complied with FMVSS requirements. The aide noted that while the driver helped her release the restraint, she held herself up to avoid falling onto the girl seated next to her at the window. The aide recalled then unbuckling the child. On the video, the specific actions of releasing the lap/shoulder belts are obscured by the driver standing in front of the camera. The aide and the driver are the last to exit the vehicle, several minutes after the bus comes to a final rest. The NTSB concludes that the passenger lap/shoulder belts functioned as designed and were within the specifications for release requirements both unloaded and loaded.

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<sup>6</sup> See the factual reports in the NTSB public docket for this investigation (HWY18FH002).

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### Probable Cause

The National Transportation Safety Board determines that the probable cause of the school bus–pickup truck collision near Helena, Montana, was the bus driver’s failure to see the pickup truck, which was approaching the intersection, and the acceleration of the bus into the intersection in front of the pickup truck. The use of passenger lap/shoulder belts mitigated the severity of injuries to the school bus occupants.

**Adopted:** February 13, 2019

For more details about this crash, visit the [NTSB public docket](#) and search for NTSB accident ID HWY18FH002. 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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