

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**Public Meeting of August 7, 2018**  
**(Information subject to editing)**

**Motorcoach Collision With Train on Railroad Crossing**  
**Biloxi, Mississippi**  
**March 7, 2017**  
**NTSB/HAR-18-10**

This is a synopsis from the NTSB’s report and does not include the Board’s rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendations will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

## **Executive Summary**

On Tuesday, March 7, 2017, about 2:11 p.m. central standard time, a 2016 Van Hool motorcoach, operated by ECHO Transportation and occupied by a 60-year-old driver and 49 passengers, ranging in age from 50 to 88, was traveling northbound on Main Street in Biloxi, Mississippi, having departed that afternoon from a casino in Bay St. Louis, Mississippi, to travel to a casino in Biloxi. The motorcoach stopped in advance of a highway–railroad grade crossing on Main Street that had a high vertical profile.

The grade crossing was marked with (1) a crossbuck, (2) warning lights that would activate at a train’s approach, (3) a gate arm that would lower at a train’s approach, and (4) a low ground clearance grade crossing warning sign with a “LOW GROUND CLEARANCE” plaque below it on the signpost. The crossing warning system was not in active mode when the motorcoach approached, stopped, and then moved onto the railroad tracks. As the driver attempted to drive over the crossing, the frame of the motorcoach came into contact with the pavement, and the vehicle became stuck on the crossing. The driver moved the motorcoach back and forth in an attempt to dislodge it from the crossing but was unsuccessful.

As the motorcoach became stuck on the crossing, an eastbound freight train operated by CSX Transportation was approaching the crossing at a recorded speed of 27 mph while continuously sounding its warning horn. The grade crossing warning system activated when the train was about 29 seconds away; first, the warning lights began to flash, and then the gate arm began to descend 3 seconds later. As soon as he became aware of the approaching train, the motorcoach driver opened the vehicle’s loading door and told the passengers to evacuate. Due to their age and limited mobility, the passengers’ evacuation was slow and the aisleway became congested; only six passengers had safely evacuated before the train struck the grounded motorcoach.

The train engineer told investigators that he had noticed the motorcoach on the tracks ahead, but he expected it to clear the crossing before the train reached it. Once the engineer realized that the motorcoach might not clear the tracks, he put the train into emergency about 502 feet west of the crossing. About 14 seconds later, by which time the train had decelerated to about 19 mph, it struck the left side of the motorcoach, pushing it 259 feet down the tracks before coming to a stop, with the motorcoach still in contact with the lead locomotive. Four motorcoach passengers died, the driver and 37 passengers sustained injuries, and 8 passengers were uninjured. The train crewmembers were uninjured.

The crash investigation focused on the following safety issues:

- ***High-profile grade crossings.*** No current guidelines for high-profile grade crossings (1) describe the conditions under which signage that selectively excludes certain vehicle types from using the crossing should be installed or (2) define when a crossing should be reconstructed (or otherwise have its safety risk mitigated) due to its unsafe vertical profile. Also, railroad companies are not required to coordinate their maintenance plans with local and state highway transportation agencies, and crossing safety risk is not effectively monitored. The report explores approaches to improve grade crossing safety by addressing these deficiencies.
- ***Emergency egress and extrication.*** The motorcoach was equipped with a secondary door in the rear, which was not used for emergency egress or passenger extrication. Had the rear door been used, it most likely would have expedited the postcrash extrication of the passengers. The report discusses pretrip safety briefings that might be used to enhance passengers' awareness of the secondary door as an emergency egress point and extrication route.

## **Findings**

1. None of the following were causal or contributory factors in the crash: (1) motorcoach driver licensing or experience; (2) train engineer or conductor licensing or experience; (3) motorcoach driver cell phone distraction, substance impairment, or medical condition; (4) train engineer or conductor cell phone distraction; (5) mechanical condition of the motorcoach; (6) railroad track condition or signal system operation; or (7) weather.
2. The emergency response to the crash was timely and effective.
3. The motorcoach driver's decisions to take a scenic route and to rely on a portable global positioning system device programmed for commercial vehicle navigation were reasonable.
4. Given that (1) the motorcoach driver most likely could not have perceived the steepness of the northern slope before beginning to traverse the crossing, (2) he took the precaution of raising the rear of the motorcoach to prevent scraping the crossing, and (3) no signage prohibited transiting the crossing in a commercial vehicle, the driver's decision to travel over the Main Street grade crossing was reasonable.

5. Given the speed of the train, the brief period that the motorcoach spent grounded on the tracks before the crash, the numerous grade crossings in this area, and how frequently the train crew encountered vehicles on crossings that ultimately cleared them safely, the estimated time that the train engineer took to detect the motorcoach on the tracks was reasonable, and his response time before engaging emergency braking was acceptable.
6. Based on the high frequency of grounding incidents at the Main Street grade crossing, which was posted with low ground clearance grade crossing (LGCGC) warning signage, and the lack of evidence of the safety benefits provided by LGCGC warning signs, the effectiveness of such signs in promoting safety at grade crossings may be negligible.
7. Traffic engineers would benefit from clear guidance that describes when vehicle exclusion signs should be installed at grade crossings.
8. Due to the February 2014 track maintenance work, which increased the crossing's vertical profile and resulted in increased frequency of vehicle groundings, the Main Street grade crossing had been unsafe for certain types of vehicles for several years before the fatal March 2017 crash.
9. Traffic engineers would benefit from clear guidance that describes the maximum vertical profile a grade crossing may have before comprehensive risk mitigation options, including crossing reconstruction, should be considered to improve safety.
10. Had CSX Transportation communicated and coordinated with the City of Biloxi and the Mississippi Department of Transportation about planned railroad projects that might affect the vertical profiles of grade crossings in their jurisdictions, it would have provided them the opportunity to assess and monitor the risks of vehicle groundings and, if necessary, to take proactive action to reduce those risks.
11. Although CSX Transportation and the City of Biloxi knew that numerous vehicle groundings had occurred on the Main Street grade crossing after track maintenance was performed in early 2014, neither took action to reduce the safety risk posed by the crossing to both railroad and highway traffic.
12. Because the Mississippi Department of Transportation has authority to close grade crossings in the state, increasing the department's awareness of the safety conditions of grade crossings through enhanced communication with local municipalities might enable it to prioritize improvements to Mississippi grade crossings and assist in improving grade crossing safety.
13. If railroads shared their information on incidents of vehicle groundings on grade crossings with state departments of transportation, it would enable state authorities to continuously monitor and assess the safety of the grade crossings in their jurisdictions.
14. With respect to preimpact evacuation, because of the brief period during which the motorcoach was grounded on the crossing before the train struck it and the limited mobility of many of the passengers, it is unlikely that many more passengers could have safely evacuated before the collision occurred, regardless of which means of egress was used.

15. With respect to postimpact evacuation, although use of the rear door might not have improved the passengers' injury outcomes, a pretrip safety briefing that included a demonstration of how to operate the rear door might have enabled the passengers to open that door after the impact, expediting the postcrash evacuation and extrication process.

## **PROBABLE CAUSE**

The National Transportation Safety Board determines that the probable cause of the Biloxi, Mississippi, crash was the failure of CSX Transportation and the City of Biloxi to coordinate and take action to improve the safety of the Main Street grade crossing, a high vertical profile crossing on which motor vehicles were known to ground frequently; their inaction led to the grounding of the motorcoach that was subsequently struck by the CSX Transportation freight train. Contributing to the circumstances of the crash was the inadequate guidance from the Federal Highway Administration on how to mitigate the risks posed by grade crossings with high vertical profiles.

## **RECOMMENDATIONS**

### **New Recommendations**

As a result of this investigation, the National Transportation Safety Board (NTSB) makes new safety recommendations to the Federal Highway Administration, Federal Railroad Administration, Mississippi Department of Transportation, City of Biloxi, American Association of State Highway and Transportation Officials, American Railway Engineering and Maintenance-of-Way Association, Association of American Railroads, American Short Line and Regional Railroad Association, and Class I railroads. The NTSB reiterates and reclassifies one recommendation to the Federal Motor Carrier Safety Administration.

### **To the Federal Highway Administration:**

1. Issue an interpretation of the guidance practice for low ground clearance grade crossing warning signage in the *Manual on Uniform Traffic Control Devices for Streets and Highways* to suggest the use of other signage, such as vehicle exclusion signs, to address safety issues at high-profile grade crossings. Inform the state departments of transportation of the new interpretation.
2. Develop and establish a guidance practice addressing the circumstances in which vehicle exclusion signs should be installed to restrict access to high-profile grade crossings and the types of vehicles to which the exclusions should apply. Incorporate the guidance practice into the *Manual on Uniform Traffic Control Devices for Streets and Highways*.
3. With assistance from the Federal Railroad Administration, American Association of State Highway and Transportation Officials, and American Railway Engineering and Maintenance-of-Way Association, develop specific criteria to establish when an existing grade crossing should be reconstructed, closed, or otherwise have the risk posed by its unsafe vertical profile comprehensively mitigated. Incorporate the guidance into your *Railroad-Highway Grade Crossing Handbook*.

**To the Federal Railroad Administration:**

4. Assist the Federal Highway Administration (FHWA) in developing specific criteria to establish when an existing grade crossing should be reconstructed, closed, or otherwise have the risk posed by its unsafe vertical profile comprehensively mitigated, to be incorporated into the FHWA *Railroad-Highway Grade Crossing Handbook*.

**To the Mississippi Department of Transportation:**

5. Establish communication channels with local municipalities, particularly the City of Biloxi, to monitor the safety of grade crossings, focusing particularly on incidents of vehicle groundings, and, as necessary, assist municipalities in improving the safety of high-risk grade crossings.

**To the City of Biloxi, Mississippi:**

6. Implement a program to document incidents of vehicle groundings at grade crossings and to share this information with the Mississippi Department of Transportation.

**To the American Association of State Highway and Transportation Officials:**

7. Assist the Federal Highway Administration (FHWA) in developing specific criteria to establish when an existing grade crossing should be reconstructed, closed, or otherwise have the risk posed by its unsafe vertical profile comprehensively mitigated, to be incorporated into the FHWA *Railroad-Highway Grade Crossing Handbook*.

**To the American Railway Engineering and Maintenance-of-Way Association:**

8. Assist the Federal Highway Administration (FHWA) in developing specific criteria to establish when an existing grade crossing should be reconstructed, closed, or otherwise have the risk posed by its unsafe vertical profile comprehensively mitigated, to be incorporated into the FHWA *Railroad-Highway Grade Crossing Handbook*.

**To the Association of American Railroads and the American Short Line and Regional Railroad Association:**

9. Inform your members of the circumstances of the Biloxi grade crossing crash, and emphasize the importance of communication with local and state highway transportation agencies regarding railroad maintenance activities and vehicle grounding incidents on grade crossings.

**To all Class I railroads:**

10. Implement a process to notify and coordinate with the local and state transportation agencies responsible for highway maintenance at grade crossings as early as possible before conducting any planned maintenance work that has the potential to increase track elevation.
11. Implement a process to make information about incidents of vehicle groundings at grade crossings that did not result in a crash on your railroad available to the appropriate state departments of transportation.

**Recommendation Reiterated and Reclassified in this Report**

The National Transportation Safety Board also reiterates and reclassifies the following safety recommendation as “Open—Unacceptable Response:”

**To the Federal Motor Carrier Safety Administration:**

Require all passenger motor carrier operators to (1) provide passengers with pretrip safety information that includes, at a minimum, a demonstration of the location of all exits, explains how to operate the exits in an emergency, and emphasizes the importance of wearing seat belts, if available; and (2) also place printed instructions in readily accessible locations for each passenger to help reinforce exit operation and seat belt usage. (H-15-14)