

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**Public Meeting of August 11, 2015**  
**(Information subject to editing)**

**Multivehicle Work Zone Crash**  
**on Interstate 95**  
**Cranbury, New Jersey**  
**June 7, 2014**

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 recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing.

### **Executive Summary**

About 12:55 a.m. on Saturday, June 7, 2014, a 2011 Peterbilt truck-tractor in combination with a 2003 Great Dane semitrailer operated by the motor carrier Walmart Transportation LLC (Walmart Transportation truck) was traveling northbound on the New Jersey Turnpike (part of Interstate 95) near Cranbury, New Jersey, in the center lane of the three-lane roadway. Near milepost 71.4, the Walmart Transportation truck encountered traffic that had slowed to less than 10 mph along a construction corridor, due to closure of the center and right-hand lanes. The truck was traveling 65 mph in a nighttime work zone that had a posted speed limit of 45 mph.

The Walmart Transportation truck struck the left rear of a slowly moving 2012 Mercedes-Benz limo van (limo van) that was in the center lane. The impact from the Walmart Transportation truck accelerated the limo van forward and caused it to turn to the right. The limo van collided with a 2006 Freightliner tractor-trailer traveling in the right lane. Contact from the Freightliner and Walmart Transportation trucks forced the limo van to roll over one quarter turn onto its left (driver) side. During its roll, the limo van struck the rear of a 2011 Buick Enclave, which then struck the rear of a 2011 Ford F-150 pickup truck. The limo van came to rest overturned onto its left (driver) side across the center lane. After striking the limo van, the Walmart Transportation truck continued into the left lane and struck a 2005 Nissan Altima in the rear before colliding with a guardrail and stopping on the shoulder against a concrete barrier.

Twenty-one people in six vehicles were involved in the crash. As a result of the crash, one limo van passenger, who had been riding in the vehicle's passenger compartment, died on scene, and the other four passengers in this compartment were seriously injured. Five additional people had minor injuries.

The crash investigation focused on the following safety issues:

- **Enacting programs to address driver fatigue.** When the Walmart Transportation truck driver reported to work at the Walmart Transportation distribution center in Smyrna, Delaware, at 11:00 a.m. on June 6, 2014, he had been up all night driving in his personal vehicle from his Georgia residence to his Delaware workplace, a trip of about 12 hours. When the crash occurred at 12:55 a.m. on June 7, the driver was in the sixth leg of his workday and had been on duty 13 hours 32 minutes of a 14-hour duty day. As he approached the work zone in Cranbury, he had had only 4 hours of sleep opportunity in the preceding 33 hours. His fatigued condition diminished his awareness, and he failed to reduce his speed or respond appropriately to the slowed vehicles ahead of him, resulting in the crash. Implementation of fatigue management programs specifically geared to the motor carrier operating environment could help carriers better address the complexities of mitigating driver fatigue.
- **Improving work zone safety, including reducing vehicle speeds.** The crash occurred near the end of a traffic queue that had developed in an active work zone established by the New Jersey Turnpike Authority (NJTA). Although the NJTA established the work zone in accordance with federal and state requirements, the overall plan did not incorporate supplemental traffic control devices or other proactive means to monitor and warn motorists of traffic backing up within the work zone. A slow traffic queue more than a mile long developed in the advance warning zone preceding the lane closures. Just before the crash, the Walmart Transportation truck had been traveling 65 mph in the beginning of the warning zone, which had a posted speed limit of 45 mph. A technical reconstruction determined that had the Walmart Transportation truck been traveling 45 mph, it could have been stopped before it struck the limo van. Traffic control practices are available, but not currently required by regulation, that might have alerted even this fatigued driver to the need to reduce his vehicle's speed in the work zone.
- **Assessing the limitations of, and means of enhancing, in-vehicle forward collision warning systems.** The Walmart Transportation truck was equipped with a Wingman Active Cruise with Braking system made by Bendix Commercial Vehicle Systems, which could have issued a precrash audible alert to the truck driver. However, because of its limited data recording capability, the system did not record any forward radar sensor data, which made both the crash and the system's performance difficult to analyze and assess. To address these system shortcomings, manufacturers of such systems could design them to be capable of storing and retrieving data in a manner useful to system performance analysis and accident investigation.
- **Using the safety data available through critical event recording systems.** Walmart Transportation deployed a telematics system on the accident truck and its other fleet vehicles that generated reports of critical safety-related driving events and forwarded them to company management. The carrier, however, did not analyze the aggregated data or use the cumulative information to improve its corporate safety program.

- **Increasing seat belt use in passenger vehicles and ensuring that vehicle modifications do not reduce safety.** None of the passengers in the passenger compartment of the limo van struck in this accident were wearing their seat belts when the crash occurred. The carrier operating the limo van, Atlantic Transportation Services, was based in Delaware and was operating in New Jersey at the time of the crash. In both these states, all the limo van occupants were required by law to use seat belts. No one from Atlantic Transportation Services told the occupants of the passenger compartment that they were required to wear seat belts nor were there any placards in the vehicle prompting them to wear the belts. The carrier did not have, nor was it required to have, established policies for making pretrip safety briefings. Pretrip safety briefings are beneficial to all passenger operations, but they are particularly needed in limousine service because the seating configuration in such vehicles is intended to create a relaxed social setting; in such an environment, passengers may easily overlook the use of seat belts if not prompted by the vehicle operator. In addition, although the modified vehicle met all Federal Motor Vehicle Safety Standards, some modifications, including the permanent barriers at the front and back of the passenger compartment and the single side door, delayed emergency evacuation of the injured passengers from the compartment. The modifications also reduced the vehicle's gross vehicle weight rating capacity.
- **Creating an acceptable minimum standard of care to be provided by emergency medical responders.** The investigation found that the emergency response included missteps on scene due to poor communication, lack of oversight, and nonstandard patient care practices. Responders did not obtain appropriate medical resources in a timely fashion, and the standard of care provided by some responders was inadequate. Some of the injured occupants of the limo van were moved before they were properly restrained and stabilized. Such problems could be addressed by ensuring that responding agencies adhere to minimum training and practice standards.

## **Findings**

1. No mechanical conditions of the vehicles caused or contributed to the severity of the crash; alcohol, illicit drugs, or distractions did not appear to affect the Walmart Transportation LLC truck driver; and weather and road conditions were not factors in the crash.
2. The driver of the Walmart Transportation LLC truck was fatigued due to his failure to obtain sleep before reporting for duty, resulting in acute sleep loss and excessive time awake.
3. Due to his fatigued condition, the Walmart Transportation LLC truck driver had a delayed response to slowed traffic in an active work zone.
4. Although Walmart Transportation LLC addressed fatigue as part of its driver training program, it did not have a structured fatigue management program in place that could have improved its ability to better monitor and educate its drivers about the risks of fatigue.

5. Had the Federal Motor Carrier Safety Administration required motor carriers to adopt a fatigue management program as recommended by the National Transportation Safety Board in 2010, it seems likely, based on other instances of the carrier's compliance with federal motor carrier safety requirements, that Walmart Transportation LLC would have implemented a program to better monitor and educate its drivers about the risks of fatigue.
6. The research the Federal Motor Carrier Safety Administration has been conducting to evaluate integrated onboard systems, including fatigue-monitoring technologies, should be finalized.
7. With respect to the work zone where the crash took place, the New Jersey Turnpike Authority (NJTA) followed the guidance in 23 *Code of Federal Regulations* Part 630 Subpart J, and the NJTA's temporary traffic control zone and the lane closure process it used were in accordance with *Manual on Uniform Traffic Control Devices* "Guidance" and NJTA policy.
8. Engineering decisions concerning traffic control devices would benefit from additional *Manual on Uniform Traffic Control Devices (MUTCD)* "Guidance" on (1) traffic conditions that call for supplemental devices in addition to the MUTCD "Standard," (2) the length of advance warning areas and the use of rumble strips in these areas, (3) traffic control devices particular to speed control, and (4) other proactive measures to monitor and warn motorists of traffic backing up within the work zone.
9. Had the Walmart Transportation LLC truck been traveling at the posted work zone speed of 45 mph, the vehicle could have been stopped before impact if the brakes had been applied at the same point.
10. The Wingman Active Cruise with Braking system on the Walmart Transportation LLC truck was capable of issuing an alert to the driver just prior to the crash.
11. Based on the data recorded by the Wingman Active Cruise with Braking system, the system did not provide a precrash alert, although the possibility that it issued an alert that occurred between the 0.5-second data-sampling intervals cannot be ruled out.
12. Collision warning and avoidance systems capable of storing and retrieving vehicle and system performance information would aid in the evaluation and improvement of such systems, as well as facilitate a better understanding of crashes.
13. Analysis of critical event report data would enable Walmart Transportation LLC to better understand driving behavior factors in aggregate terms as well as to study individual driver-level performance.
14. The serious injuries sustained by the passengers seated in the passenger compartment of the limo van were caused by flailing and secondary impacts with the interior, other occupants, or intrusion/contact with the vehicle sidewall and roadway, which resulted, in part, from the passengers' failure to use available seat belts and properly adjusted head restraints.

15. The guidance provided to limousine operators concerning passenger seat belt use and properly adjusted head restraints is inadequate.
16. The modified limo van, with permanent barriers at the front and back of the passenger compartment and only one side door, failed to provide adequate means of emergency evacuation or rescue of injured victims.
17. Although the loaded limo van did not exceed its capacity at the time of the crash, and vehicle weight was not a factor in the crash, had all of its available seats been occupied, the limo van could have exceeded its capacity by several hundred pounds.
18. Miscommunication and a lack of oversight on scene resulted in failure to obtain appropriate medical resources in a timely fashion, indicating that better integrated oversight and mutual agency training could help prepare emergency responders to avoid common problems.

### **Probable Cause**

The National Transportation Safety Board determines that the probable cause of the Cranbury, New Jersey, crash was the Walmart Transportation LLC truck driver's fatigue, due to his failure to obtain sleep before reporting for duty, which resulted in his delayed reaction to slowing and stopped traffic ahead in an active work zone and his operation of the truck at a speed in excess of the posted limit. Contributing to the severity of the injuries was the fact that the passengers seated in the passenger compartment of the limo van were not using available seat belts and properly adjusted head restraints.

### **RECOMMENDATIONS**

#### **New Recommendations**

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

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

1. Amend the *Manual on Uniform Traffic Control Devices* "Guidance" for work zone projects on freeways and expressways to advise traffic engineers on the use of supplemental traffic control strategies and devices to mitigate crash events involving heavy commercial vehicles. (H-15-XX)

#### **To the National Highway Traffic Safety Administration:**

2. Require that modifications to limo van vehicles (1) retain a full-sized exit on at least one side of the vehicle's passenger compartment, and (2) have at least one

other exit located on the front, back, or roof of the passenger compartment. (H-15-XX)

**To the New Jersey Department of Health–Office of Emergency Medical Services:**

3. Work with the New Jersey State First Aid Council to establish, with the involvement of county emergency medical services (EMS) coordinators, local municipalities, and EMS agencies, minimum training and practice standards for all organizations that provide EMS on the New Jersey Turnpike. (H-15-XX)

**To the New Jersey State First Aid Council:**

4. Work with the New Jersey Department of Health–Office of Emergency Medical Services to establish, with the involvement of county emergency medical services (EMS) coordinators, local municipalities, and EMS agencies, minimum training and practice standards for all organizations that provide EMS on the New Jersey Turnpike. (H-15-XX)

**To the National Limousine Association:**

5. Develop and distribute guidelines to your member operators urging them, during pretrip safety briefings, to (1) direct passengers to use seat belts where required by law and strongly encourage passengers to use seat belts where not required by law, and (2) encourage passengers to use properly adjusted head restraints. (H-15-XX)
6. Request that your vehicle-altering and final-stage manufacturing members post the total passenger and luggage weight limit on any vehicle they alter. (H-15-XX)

**To Walmart Transportation LLC:**

7. Develop and implement a fatigue management program based on the North American Fatigue Management Program guidelines. (H-15-XX)
8. Incorporate into your corporate safety program a method for conducting ongoing analysis of aggregated critical event report data on hard-braking and stability control events. (H-15-XX)

**To Bendix Commercial Vehicle Systems LLC, Detroit Diesel Corporation, and Meritor WABCO Vehicle Control Systems:**

9. Include, in all collision warning and avoidance systems for use on truck-tractors, single-unit trucks, and motorcoaches, the capability to store and retrieve data

pertaining to object detection, driver audible/visual alerts, and interventions by the system for a period and at a data rate adequate to support accident investigation and reconstruction. (H-15-XX)

### **Previously Issued Recommendations Reiterated in this Report**

As a result of its investigation, the NTSB reiterates the following safety recommendations:

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

##### H-10-9

Require all motor carriers to adopt a fatigue management program based on the North American Fatigue Management Program guidelines for the management of fatigue in a motor carrier operating environment.

##### H-12-13

Develop and disseminate guidance for motor carriers on how to most effectively use currently available onboard monitoring systems and develop a plan to periodically update the guidance.

##### H-15-14

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.

#### **To the National Highway Traffic Safety Administration:**

##### H-12-20

Develop performance standards for advanced speed-limiting technology, such as variable speed limiters and intelligent speed adaptation devices, for heavy vehicles, including trucks, buses, and motorcoaches.

##### H-12-21

After establishing performance standards for advanced speed-limiting technology for heavy commercial vehicles, require that all newly manufactured heavy vehicles be equipped with such devices.

H-15-5

Complete, as soon as possible, the development and application of performance standards and protocols for the assessment of forward collision avoidance systems in commercial vehicles.