

Multivehicle Crash

Near the Township of Arlington, Wisconsin
 June 12, 2020

On June 12, 2020, near the Township of Arlington, Wisconsin, a queue of slowed and stopped traffic formed on Interstate 39 because of two previous traffic collisions.¹ About 6:45 a.m., a 2013 Freightliner truck-tractor in combination with a 2017 Utility semitrailer struck the end vehicle in the queue, causing a crash involving eight vehicles. Four vehicle occupants died and three were seriously injured.

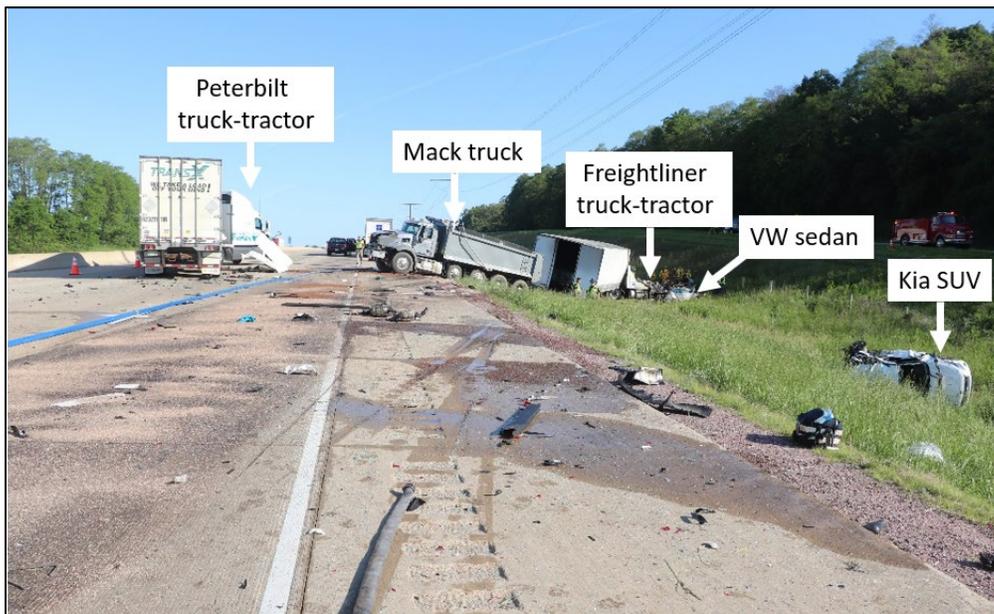


Figure 1. View to the north from the shoulder of northbound Interstate 39, showing the final rest positions of some of the involved vehicles. (Source: Wisconsin State Patrol, annotations added by NTSB).

¹ (a) In this report, all times are central time. (b) Visit [ntsb.gov](https://www.ntsb.gov) to find additional information in the [public docket](#) for this NTSB investigation (case no. HWY20FH006). Use the [CAROL Query](#) to search safety recommendations and investigations.

Location	Interstate 39, near mile marker (MM) 120.5, Township of Arlington, Wisconsin
Date	June 12, 2020
Time	06:45 a.m. central time
Involved vehicles	8
Involved people	9
Injuries	4 fatal (Freightliner driver, Kia driver, Volkswagen driver, Chevrolet driver), 3 serious (Ford driver and passenger, Mack driver), 2 uninjured (Peterbilt driver, Volvo driver)
Weather	Dry, clear, and daylight
Roadway information	Interstate highway, limited access, 3 northbound and 3 southbound 12-foot-wide travel lanes, rumble strips on right and left shoulders, straight, concrete pavement



Figure 2. Map showing the location of the 6:45 a.m. crash and two previous crashes on I-39 that resulted in a 1.5-mile traffic queue. (Source: Google Maps)

1. Factual Information

1.1 Background

On June 12, 2020, a traffic queue formed on Interstate 39 (I-39) near the Township of Arlington, Wisconsin, because of two earlier crashes at 3:31 a.m. (MM 119) and 4:51 a.m. (MM 119.5). As a result of these earlier crashes, Wisconsin State Patrol implemented a traffic incident management plan that conformed to Wisconsin Department of Transportation (WisDOT) Emergency Traffic Control and Scene Management Guidelines and to available national guidance from the Federal Highway Administration (WisDOT 2014, FHWA 2009). As part of the incident management plan, advance warning signs were posted to alert drivers to the crash scene ahead and the need to be prepared to stop.

The posted speed limit on this portion of I-39 was 70 mph. The Freightliner truck, which was driven by a 55-year-old male and operated by K Express, Inc., was traveling northbound on I-39, in the right lane of the three-lane highway. The truck driver held an Illinois class A commercial driver's license, issued in October 2019 and scheduled to expire in November 2023.² The truck driver also held a commercial motor vehicle (CMV) driver medical certificate, issued in March 2020 and scheduled to expire in March 2021, with a restriction requiring he wear corrective lenses.

At the time of the crash, the weather was clear and the roadway was straight. There were no unusual roadway conditions, and the truck driver had an unobstructed view for more than one quarter mile on his approach to the crash location. Additionally, a mechanical inspection of the truck found no deficiencies that contributed to the crash.

1.2 Crash Description

The Freightliner truck encountered the traffic queue near MM 120.5 about 6:45 a.m. Based on outward-facing dashcam video from a commercial vehicle traveling immediately behind the Freightliner, the truck was traveling about 70 mph and maintaining its position in the lane. Although advance warning signs were in place, the dashcam video showed that when the Freightliner truck reached the slowed and stopped traffic, the driver took no evasive action; he did not brake or steer away from the vehicles in the lane ahead, despite numerous visual cues,

² The truck driver self-reported on his employment application that he had driven more than one million miles in truck-tractors.

including two large commercial trucks already stopped in the two right lanes and the brake lights of other slowing vehicles.

The Freightliner truck collided with the rear of a 2021 Kia Seltos sport utility vehicle (SUV) that had slowed at the back of the traffic queue. Following the collision with the Kia, the Freightliner truck continued forward, colliding with additional vehicles and forcing them into subsequent crashes. Six other vehicles were involved in this crash: a 2006 Volkswagen (VW) Passat sedan, a 1999 Chevrolet Malibu sedan, a 2018 Ford F-150 pickup truck, a 2018 Mack dump truck, a 2020 Peterbilt truck-tractor in combination with a 2014 Utility semitrailer, and a 2020 Volvo truck-tractor in combination with a 2007 Utility semitrailer.

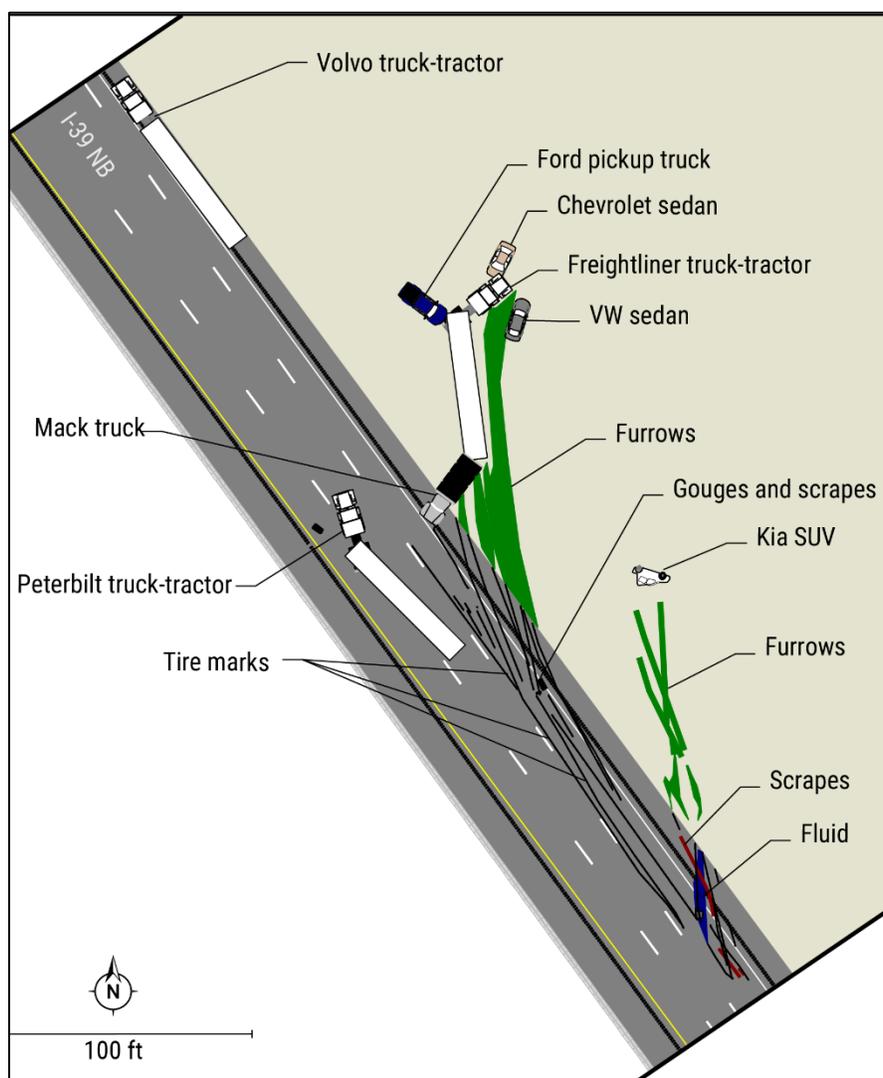


Figure 3. Scene diagram showing physical evidence and final rest positions of the involved vehicles. (Source: Wisconsin State Patrol, annotations added by NTSB).

1.3 Additional Information

1.3.1 Driver Background and Work Schedule

The Freightliner truck driver had worked Monday through Friday the week of the crash.³ The collision occurred on his fifth day on duty. During the week of the crash, the driver's workday began between 1:30 a.m. and 4:00 a.m. and ended in the late afternoon, about 4:00 p.m. to 4:30 p.m. The driver's sleep location alternated during the work week, with two nights (Monday, June 8, and Wednesday, June 10) of rest occurring out of state in the truck's sleeper berth. Because the driver did not survive the crash, limited information was available regarding his activities, sleep opportunity, and quality of sleep on the two nights spent in the sleeper berth.

On the Thursday evening before the crash, the driver went to bed at his residence about 8:00 p.m. and woke up about 2:15 a.m. He drove his personal vehicle to the K Express terminal location about an hour away, and went on duty at 3:48 a.m. The truck driver's scheduled trip was a general freight delivery from the carrier's base in Bensenville, Illinois, to a packaging manufacturer in Arden Hills, Minnesota. The distance of the intended trip was about 394 miles. The crash occurred about 149 miles from the beginning of the trip and about 245 miles from the destination. When the crash occurred, the truck driver had been on duty for about 3 hours.

1.3.2 Cell Phone Data

Cell phone records were examined to determine if the truck driver was using a cell phone when the crash occurred. The records showed that the truck driver initiated a phone call at 5:27 a.m.; the call ended at 5:51 a.m. (54 minutes before the crash). No evidence indicated that the truck driver was interacting with his cell phone at the time of the collision. Investigators found no sources of distraction, external to the vehicle, in the vicinity of the crash.

1.3.3 Medical Issues

When interviewed by NTSB investigators, the truck driver's wife said her husband had been scheduled to see his primary care physician the day after the

³ Because the Freightliner truck driver died in the crash, background information was obtained from an interview with the Freightliner truck driver's wife, cell phone records, and data from the electronic logging device.

crash; she wanted him to be seen because, according to her, he had been feeling “really rundown” and was “not looking right” to her. She said that he had been tired, had no energy, and that his appetite had been different than usual. She stated he had been saying “I just don’t feel good.” When questioned about the truck driver’s sleep habits, his wife said her husband had always been a loud snorer.

According to medical records from his primary care provider, the 55-year-old truck driver had medical conditions including diabetes, high blood pressure, and obesity. His most recent primary care office visit had been on March 7, 2020, for routine follow-up of his diabetes.⁴ As of that visit date, he had prescriptions for the oral diabetes medications metformin, glipizide, and pioglitazone. His prescriptions also included gabapentin, a medication used to treat chronic nerve pain.⁵ The truck driver had not had any documented changes to his diabetes medications or gabapentin dose since late 2019.

The truck driver’s most recent CMV driver medical examination was also conducted on March 7, 2020 (not by his primary care provider). At the time of that examination, the driver was 69 inches (5 feet, 9 inches) tall and weighed 325 pounds, corresponding to a body mass index (BMI) of 48 kg/m².⁶ He reported smoking one pack of cigarettes per day. He reported no medication use and no active medical conditions.⁷ The medical examiner (ME) certified the truck driver for 1 year, with a restriction requiring the use of corrective lenses, and with periodic monitoring required due to diabetes, high blood pressure, and trace blood in the urine.⁸ The examiner requested and received a waiver from the truck driver’s primary care provider stating that the driver was able to drive a public transportation vehicle.

⁴ Post-crash toxicology testing showed a HbA1c of 10.7 percent. HbA1c is an indirect measure of a person’s average blood sugar during about a 3-month period. Good control of diabetes is considered an HbA1c of less than 7 percent.

⁵ Gabapentin may cause sleepiness and dizziness and can impair driving. The drug typically carries a warning that users may not be able to accurately assess how sleepy it makes them, and that they should not drive until they have gained enough experience to determine if the drug impairs their ability to do so.

⁶ BMI is calculated by dividing body weight by the square of body surface area and is expressed in units of kg/m². BMI of 30 and above is considered obese. Obesity is sometimes further delineated into classes, where class 1 is a BMI of 30 to less than 35, class 2 is a BMI of 35 to less than 40, and class 3 (severe) is a BMI of 40 or higher.

⁷ This report was inconsistent with the medical information documented on the same date in the records from his primary care provider.

⁸ Trace blood in the urine has nonspecific significance.

Before the most current CMV driver medical examination on March 7, 2020, the truck driver had been examined by a different ME in January 2020. That examiner had determined that the truck driver was at elevated risk for obstructive sleep apnea (OSA) and had certified the driver for only 3 months, instructing him to undergo a sleep study;⁹ however, there is no evidence that the truck driver ever completed a sleep study or that he reported that recommendation to his March 2020 ME.¹⁰

The Dane County Medical Examiner's Office, which performed the truck driver's autopsy, determined the truck driver's cause of death to be thermal injuries, inhalation of byproducts of combustion, and blunt-force injuries to the head and torso. There was evidence of smoke inhalation, with soot in the airways. The autopsy report described the heart as enlarged and the right side of the heart as dilated. Moderate-to-severe coronary artery disease was present.

Two laboratories performed postmortem testing of the truck driver's blood. One laboratory identified gabapentin at 2.6 µg/mL, and measured carboxyhemoglobin to be elevated.¹¹ No other potentially impairing tested-for substances were detected.

⁹ OSA is a condition in which a person's upper airway soft tissues collapse during sleep, causing the person to have repeated episodes during which breathing temporarily stops and/or becomes ineffective. The episodes of poor breathing cause oxygen levels to drop and carbon dioxide levels to rise in the blood, eventually triggering breathing to resume, sometimes with gasping. Untreated OSA causes nonrestorative and fragmented sleep, often resulting in excessive daytime sleepiness and fatigue, and contributing to decreased alertness and cognitive and motor impairment.

¹⁰ At the January 2020 CMV driver medical examination, the truck driver's neck circumference was 18 inches. His neck circumference was not documented at his March 2020 CMV driver medical examination. Larger neck circumference is associated with increased risk for OSA. Guidelines widely used in the United States define a neck circumference of more than 17 inches as abnormal for the purposes of evaluating OSA risk in men.

¹¹ Carboxyhemoglobin is formed when carbon monoxide binds to hemoglobin in blood, impairing the blood's ability to deliver oxygen to body tissues. Smoke inhalation is a common cause of carbon monoxide exposure and elevated carboxyhemoglobin.

2. Analysis

Weather and visibility were not factors in this crash, and investigators found no evidence of mechanical deficiencies in the 2013 Freightliner truck that would have caused or contributed to the collision. The truck driver was not distracted and had sufficient experience as a commercial truck driver to recognize the slowed and stopped vehicles in the traffic queue ahead. Further, advance warning signs were present to alert him of the need to be prepared to stop.

Although the truck driver had cardiac disease that placed him at increased risk of a sudden impairing or incapacitating cardiac event, external video evidence of his driving before encountering the traffic queue was inconsistent with such an event, and it is unlikely that such an event coincidentally occurred just as he encountered the traffic queue. It is similarly unlikely that he experienced a significant diabetes-related low blood sugar event, especially given his high average blood sugar. Based on autopsy evidence, the truck driver did breathe during the postcrash fire, so the elevated carboxyhemoglobin identified by one laboratory was not evidence of precrash carbon monoxide exposure.

According to his wife, the Freightliner truck driver had been experiencing ongoing fatigue for which he was scheduled to be evaluated by his doctor the day after the crash. Fatigue can cause attention lapses—brief periods during which awareness and responsiveness are impaired. Such an attention lapse is consistent with the truck driver's failure to respond to the stopped traffic queue. In evaluating potential causes of fatigue, investigators examined circadian factors, the driver's sleep length and frequency, time awake at the time of the crash, sleep quality, and medical factors. Although he worked a schedule beginning in the early morning hours when subjective sleepiness is often most pronounced, his consistent schedule likely allowed him to adapt to working during this time, lessening the impact of the early hours.

Because the truck driver did not survive to be interviewed, information was unavailable to determine the adequacy of his sleep length and frequency, particularly for the nights he spent in the sleeper berth. At the time of the crash, the driver had been awake for about 4.5 hours. This period was preceded by a maximum sleep opportunity of 6 hours and 15 minutes, which is less than optimal and can lead to increased lapses in attention (Dinges 2014). Factors such as lifestyle habits, medications, and health conditions can also restrict an individual's ability to obtain restorative rest. Based on the circumstances of this crash, the interview statements regarding fatigue, and the driver's history, factors contributing to fatigue were further examined.

The truck driver had diabetes, with inadequate average blood sugar control. Diabetes may contribute to fatigue, but fatigue in diabetes is not predictable simply from blood sugar control. The truck driver also used the medication gabapentin, which can cause drowsiness, but there was no evidence that this had been a problem for him in the past, and the gabapentin level cannot be used to estimate drowsiness. Thus, there was insufficient information to determine if his diabetes or use of gabapentin contributed to fatigue or drowsiness.

Untreated OSA can result in excessive daytime sleepiness, fatigue, and decreased alertness.¹² Multiple studies have shown that inadequately treated OSA significantly increases the risk and severity of motor vehicle crashes (Tregear et al. 2009, Mulgrew et al. 2008, ECRI 2007). Because the truck driver did not undergo a sleep study to test for OSA, the likelihood that he had OSA may only be estimated from his OSA risk factors, of which there were many, including the following:

- High BMI (48 kg/m²) as of March 2020. The truck driver's BMI corresponds to severe obesity, which alone placed him at high risk of significant OSA.¹³
- Large neck circumference (as of January 2020). This factor is even more strongly associated with OSA risk than BMI.
- Being male. Men are two to three times more likely to have OSA than are nonpostmenopausal women.
- Age. The truck driver was 55 years old. OSA risk in adults increases with age until about the sixth or seventh decade of life.
- The truck driver had high blood pressure and diabetes. OSA is more prevalent among people with those conditions.
- The truck driver smoked, which may increase OSA risk.

Based on the truck driver's combination of risk factors, he likely had significant, undiagnosed, untreated OSA that contributed to fatigue. Thus, it is probable that his failure to respond to slow-moving traffic resulted from fatigue, likely associated, in part, with undiagnosed OSA.

¹² Refer to the Medical Factual Report in the [NTSB docket](#) for this crash (case no. HWY20FH006) for additional information and references related to OSA.

¹³ The Federal Motor Carrier Safety Administration (FMCSA) Medical Review Board has estimated that nearly 80 percent of individuals with a BMI over 35 have OSA.

The NTSB has previously recommended that the FMCSA implement a program to identify CMV drivers at high risk for OSA and require that those drivers provide evidence through the medical certification process of having been appropriately evaluated and treated before being granted unrestricted medical certification.¹⁴ Although the truck driver in this crash was instructed in January 2020 to obtain a sleep study due to his risk factors for OSA, he failed to do so in the months leading up to the crash and successfully passed his medical certification evaluation in March 2020.

3. Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the multivehicle crash near the Township of Arlington, Wisconsin, was the truck driver's failure to respond to slow-moving traffic due to fatigue. Contributing to the fatigue was his undiagnosed obstructive sleep apnea.

3.2 Lessons Learned

Commercial motor vehicle drivers must remain alert and vigilant to changing roadway conditions and traffic hazards. Obstructive sleep apnea is a medical condition that, unless identified and appropriately treated, can significantly reduce a driver's ability to obtain restorative sleep, leading to fatigue, degraded alertness, and increased crash risk. The National Transportation Safety Board has previously recommended that the Federal Motor Carrier Safety Administration implement a program to identify commercial motor vehicle drivers at high risk for obstructive sleep apnea, and require that those drivers provide evidence through the medical certification process of having been appropriately evaluated and treated before being granted unrestricted medical certification.

¹⁴ See history for [Safety Recommendation H-09-15](#).

References

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NTSB investigators worked with **the Federal Motor Carrier Safety Administration, the Wisconsin State Patrol, and the Wisconsin Department of Transportation** throughout this investigation.

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National Transportation Safety Board
Records Management Division, CIO-40
490 L'Enfant Plaza, SW
Washington, DC 20594
(800) 877-6799 or (202) 314-655