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HWY24MH013

HUMAN PERFORMANCE

Group Chair's Factual Report

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A. CRASH INFORMATION

Location: Swanton, Lucas County, Ohio
Date: August 15, 2024
Time: 5:29 a.m. EDT

B. HUMAN PERFORMANCE GROUP

Group Chair	Justin Snider Senior Highway Accident Investigator NTSB
Group Member	Sergeant Jason Eiden Ohio State Highway Patrol (OSHP)

C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Information and Summary Report,* which can be found in the NTSB docket for this investigation.

D. DETAILS OF THE INVESTIGATION

The focus of this report is the drivers of the 2019 Mack truck-tractor and van semitrailer combination vehicle (Mack driver) and 2015 Toyota Highlander sport utility vehicle (Toyota driver) and the behavioral, medical, operational, and environmental factors that may have influenced the drivers' performance. Both drivers involved in this crash lived within the Central Daylight Time (CDT) zone. For consistency, all times presented in this report have been adjusted to Eastern Daylight Time (EDT) by adding one hour to any stated or recorded CDT times.

1.0 Mack Driver

1.1 Background and License History

The Mack was being driven by a 43-year-old male with a valid Illinois Class A commercial driver's license issued in August 2024 and due to expire in August 2028.[1] The license was restricted for corrective lenses, with endorsements for passengers, double and triple trailers, hazardous materials, and tank vehicles.[2] According to the

[1] An Illinois Commercial Class A Driver's License permits the holder to operate, in commerce, a commercial vehicle with a gross vehicle weight rating (GVWR) of 26,001 pounds or more in combination with a trailer with a GVWR of 10,000 pounds or more.

[2] (a) A corrective lenses restriction requires the driver to wear corrective lenses while driving; (b) a

Commercial Driver's License Information System (CDLIS), the Mack driver had eight traffic violations (Table 1) and one traffic crash that did not occur in a commercial motor vehicle (CMV).[3]

Table 1. Reported traffic convictions for the Mack driver

Offense Date	State	Violation	Commercial Vehicle
05/31/2014	Illinois	Handheld phone use while driving	No
03/11/2014	Indiana	Speeding	Yes
06/11/2016	Illinois	Seatbelt not properly worn	No
06/11/2016	Illinois	Failure to pay fine	No
04/02/2018	Illinois	Speeding (15 mph or more above limit)	No
01/20/2018	Indiana	Seatbelt not properly worn	Yes
06/21/2021	Ohio	Obey traffic sign/traffic control device	Yes
02/08/2023	Ohio	Operate without required equipment	Yes

In driver's certification of violations/annual review of driving records from 2020 to 2024, the Mack driver reported several violations that were documented in inspection reports or written warnings (Table 2).[4]

passenger endorsement permits the license holder to operate a vehicle with more than 15 passenger seats; (c) Double/triple endorsements permits the license holder to operate a combination vehicle with two or three trailers where allowed; (d) A hazardous materials endorsement permits the holder to operate a vehicle transporting hazardous materials in a quantity which requires placarding. (e) A tank endorsement permits the holder to operate a vehicle with a bulk tank container which exceeds 1000 gallons (combined).

[3] Human Performance Attachment – Mack Driver CDLIS Report.

[4] (a) Human Performance Attachment – Mack Driver Certification of Violations. (b) Human Performance Attachment – Mack Driver/Vehicle Examination Reports.

Table 2. Documented driver/vehicle examination reports and written warnings for the Mack driver

Date	State	Level[a]	Violations	Hazmat
03/26/18	IL	3	None	No
04/19/18	IL	3	None	No
01/20/19	MI	2	Inoperative light on a trailer	Yes
1/20/20	IN	3	Speeding, seatbelt not worn, log not started, log entries missing	No
6/21/21	OH	3	Lane restriction, speeding	Yes
11/30/21	IN	N/A[b]	Inoperative lights	Unknown
3/27/23	IN	3	Speeding, no blank back-up logs, improper lane, log entries missing	No
7/17/23	IN	3	Portable ELD not mounted, low tire pressure	Yes
10/16/23	IN	3	Speeding, Log not started, log entries missing	Yes
07/22/24	IL	3	None	Yes

Notes: [a]Inspection levels; 1: North American standard inspection, 2: walk-around driver/vehicle inspection, 3: driver/credential/administrative inspection, 4: special inspections, 5: vehicle only (CVSA, 2025). [b]Written warning only.

1.2 Employment History

The Mack driver had been employed as a commercial vehicle driver since, at-least, September 2012. Employment prior to Best National Industries, Inc. (doing business as CJJ Industries, Inc.) can be found in the *Motor Carrier Factors Group Chair's Factual Report* for this investigation.

1.2.1 CJJ Industries

The Mack driver had been employed as a commercial vehicle driver with CJJ Industries since September 2017. For more information see the *Motor Carrier Factors Group Chair's Factual Report* for this investigation.

1.2.1.1 Training

The Mack driver completed his initial CMV driver training at Progressive Driving School in 2012 and completed a driver's road test at CJJ Industries in November 2017. Refer to the *Motor Carrier Factors Group Chair's Factual Report* for this investigation for information about company policies and training received while employed by CJJ Industries.

1.2.1.1 Driver Monitoring Technology

The Mack was equipped with a Samsara dual facing camera which monitored the environment forward of the vehicle, through the windshield, as well as the driver's in-cab actions. Although the gateway module used to transmit video and data to Samsara was not damaged during the crash, the windshield-mounted camera, which stored data, was not recovered after the windshield was ejected from the vehicle during the crash. No crash-related video or data had been transmitted by the gateway module, which did not store video or telematics data.

1.2.1.1 Duties

The Mack driver's primary duty was the transportation of mixed loads of hazardous materials between Brenntag facilities in Chicago, Illinois, and Toledo, Ohio. He made the same trip daily, beginning and ending in Chicago, Illinois, from Monday morning to Friday afternoon. The Mack driver had traveled through the crash location five days per week for four or five years, primarily in the same vehicle, about the same time of day. His workdays normally started just before midnight and ended about noon the next day.

1.3 Pre-crash Activities

The Mack Driver's pre-crash activities were evaluated using electronic logging device (ELD) data, toll plaza data, cell phone data, and an interview of the Mack driver, conducted by NTSB investigators, at CJJ Industries on September 3, 2024.[5]

[5] (a) Human Performance Attachment – Mack Driver ELD Report. (b) Human Performance Attachment – Mack Driver NTSB Interview.

Table 3. Shift start and end times for the Mack driver

Date	Start [EDT]	End [EDT]	Shift Duration[a] [hh:mm]	Time From Last Shift [hh:mm]
8/10/2024	N/A	N/A	OFF	N/A
8/11/2024	N/A	N/A	OFF	N/A
8/12/2024	12:22 a.m.	1:54 p.m.	13:32	59:32
8/13/2024	12:20 a.m.	1:41 p.m.	13:21	10:26
8/14/2024	12:26 a.m.	1:52 p.m.	13:26	10:45
8/15/2024	12:32 a.m.	5:29 a.m. (crash)	4:57	10:40

Note: [a] Shift duration reflects time elapsed during the workday, inclusive of short breaks, and is not a calculation of hours of service, which can be found in the *Motor Carrier Factors Group Chair's Factual Report* for this investigation.

1.3.1 August 10 and 11, 2024

The Mack driver was off duty on August 10 and 11. He told NTSB investigators he kept his nocturnal wake/sleep schedule on his days off; in which he slept during the day and was awake at night. With the exception of a series of rich content messages sent from his cell phone between 7:30 p.m. and 8:00 p.m. on August 10, the Freightliner's cell phone use occurred between midnight and early afternoon on the 10th and no cell phone use was reported or recorded on August 11 (Figure 1).

1.3.2 August 12, 2024

The Mack driver woke about 11:15 p.m. on August 11 and began his day when he drove about six miles from his residence in Indian Head Park, Illinois, to the CJJ Industries yard in Summit Park, Illinois. He went on duty at 12:22 a.m. and conducted a 17-minute pre-trip inspection of the Mack truck-tractor. He then drove approximately five miles to the Chicago, Illinois, Brenntag facility to pick up a semitrailer. The Mack driver was at Brenntag for about one hour as the trailer was loaded by workers at the facility. While there, he checked shipping papers, installed appropriate hazardous materials placards, and connected and walked around the combination to make sure everything was connected and working properly.

The Mack driver left the Chicago, Illinois, Brenntag facility at 2:10 a.m. and made the 245-mile drive to the Toledo, Ohio, Brenntag facility, arriving at 6:18 a.m. The semitrailer was unloaded by workers at the facility for one hour and the Mack driver began his return trip at 7:28 a.m. He took a one-hour break at 8:25 a.m. near Bryan, Ohio, and returned to the CJJ Industries yard at 1:48 p.m. The Mack driver conducted a post-trip inspection and went off duty at 1:54 p.m.

The Mack driver drove about seven miles to Progressive Driving School in Cicero, Illinois, where he used one of the school computers to study for a test he was scheduled to complete the following day to renew his CMV license. He left the school before 5:00 p.m. and drove about 11 miles to his residence. He relaxed at home for an undetermined time before sleeping. The Mack driver's daily start and end times as well as hours on and off duty on August 12 are summarized in Table 3.

1.3.3 August 13, 2024

The Mack driver woke about 11:15 p.m. on August 12 and drove from his residence to the CJJ Industries yard. The driver began his August 13 shift at 12:20 a.m., conducted a 19-minute pre-trip inspection of the Mack, then drove to the Chicago, Illinois, Brenntag facility where he picked up a loaded semitrailer. The Mack driver performed a similar pre-trip tasks with the combination before he began his trip at 1:11 a.m. The Mack driver arrived at the Toledo, Ohio, facility at 5:41 a.m. and was there until 6:42 a.m., when he began his return trip. He took a one-hour break at 7:39 a.m. near Bryan, Ohio, and returned to the CJJ Industries yard at 1:32 p.m. The Mack driver conducted a post-trip inspection and went off duty at 1:41 p.m. He drove to Progressive Driving School in Cicero, Illinois, where he completed a test to renew his CMV license. Upon completion of the test, at about 4:00 p.m., he returned home. He relaxed at home for an undetermined time before sleeping. The Mack driver's daily start and end times as well as hours on and off duty on August 13 are summarized in Table 3.

1.3.4 August 14, 2024

The Mack driver woke about 11:15 p.m. on August 13. After driving from his residence to the CJJ Industries yard, the Mack driver began his August 14 shift at 12:26 a.m. by conducting a 20-minute pre-trip inspection of the Mack. He drove to the Chicago, Illinois, Brenntag facility where he picked up a loaded semitrailer, performing similar pre-trip tasks with the combination before he began his trip at 1:22 a.m. The Mack driver arrived at the Toledo, Ohio, facility at 5:49 a.m. and was there until 7:15 a.m., when he began his return trip. He took a 51-minute break at 8:26 a.m. near Bryan, Ohio, and returned to the CJJ Industries yard at 1:23 p.m. The Mack driver conducted a post-trip inspection and went off duty at 1:52 p.m. He returned home, where relaxed for an undetermined time before sleeping. The Mack driver's daily start and end times as well as hours on and off duty on August 14 are summarized in Table 3.

1.3.5 August 15, 2024

At the end of a 10-hour and 40-minute off-duty period on August 14, the Mack driver woke about 11:15 p.m. and drove from his residence to the CJJ Industries yard, where he began his shift at 12:32 a.m. He conducted a 17-minute pre-trip inspection of the Mack, then drove about 15 minutes to the Chicago, Illinois, Brenntag facility, where a loaded semitrailer was waiting for him. He checked shipping papers, connected the combination, installed hazardous materials placards, and inspected the combination before beginning his trip at 1:39 a.m. After about 52 minutes of driving, the Mack driver made a 5-minute stop near Lake Station, Indiana. The Mack passed through several toll plazas listed in Table 4.[6]

Table 4. Mack toll plaza entries on August 15, 2024

Time [EDT]	Location	Roadway	Toll Plaza
2:45 a.m.	Portage, Indiana	Interstate 80 eastbound	Westpoint
4:42 a.m.	Angola, Indiana	Interstate 80 eastbound	Eastpoint
4:49 a.m.	Edon, Ohio	Interstate 80 eastbound	Westgate

Video recorded by cameras at the Westgate toll plaza depicted the Mack with its headlights illuminated when it passed the area in the right high-speed lane. The Mack driver told NTSB investigators he had been listening to a podcast playing on his cell phone through the vehicle's radio via a wireless connection during the trip. At the time of the crash, he had been awake about 7 hours and on duty for 4 hours 57 minutes.

1.3.6 Cell Phone Data and Records

The Mack driver's personal cell phone was recovered from the truck by OSHP following the crash. Imaging of the phone was conducted by OSHP. Data indicative of phone use from the imaged phone were reviewed for the period of August 10 to August 15, 2024. Additionally, records were obtained for the Mack driver's cell phone number from the phone carrier. The records covered the timeframe from August 9 to August 15, 2024.[7] Phone records and data reported in Coordinated Universal Time (UTC) were converted to EDT for review by subtracting four hours. Only native voice, short message service (SMS), and rich communication services (RCS) information was available in the phone records. Phone carrier records and imaged phone data were generally consistent. The times and durations of voice calls, and times of SMS activity were compared to the driver's daily log duty statuses to identify sleep opportunity and cell phone use while driving (Table 5). An outgoing SMS text message was sent by the Mack driver while driving at 5:17 a.m. on August 15, but the native calling and messaging applications were not in use at the time of the crash.

[6] Human Performance Attachment – Mack Tolls.
[7] Human Performance Attachment – Mack Driver Phone Records.

Table 5. Mack driver phone use while driving (August 12 to August 15)

Date	Time [hh:mm:ss]	Duration [min]	Use Type
8/12/2024	5:17:21 a.m.	N/A	Outgoing SMS
8/12/2024	12:53:20 p.m.	0.10	Outgoing voice
8/12/2024	1:19:18 p.m.	1.18	Outgoing voice
8/13/2024	5:03:27 a.m.	N/A	Outgoing SMS
8/13/2024	12:14:14 p.m.	2.77	Incoming voice
8/14/2024	4:45:24 a.m.	N/A	Outgoing SMS
8/14/2024	12:59:21 p.m.	0.55	Outgoing voice
8/14/2024	1:03:10 p.m.	0.00	Outgoing voice
8/14/2024	1:12:37 p.m.	N/A	Outgoing RCS
8/14/2024	1:12:42 p.m.	N/A	Outgoing RCS
8/14/2024	1:16:36 p.m.	2.50	Incoming voice
8/14/2024	2:01:01 p.m.	0.15	Outgoing voice
8/14/2024	2:32:08 p.m.	0.23	Incoming voice
8/15/2024	5:17:44 a.m.	N/A	Outgoing SMS

1.3.7 Sleep Opportunity

During the evaluated period, the Mack driver did most of his driving between about midnight and early afternoon. The Mack driver reported sleeping at home, either in his bed or on a couch, between shifts and kept his nocturnal wake/sleep schedule on his days off. By evaluating ELD data as well as his phone records for August 10 to August 15, it was possible to determine periods that he had available to sleep.

Off-duty periods, during which his mobile phone was not in use, were identified as periods available for the Mack driver to rest (Figure 1 and Table 6). Home internet and media usage was unable to be accounted for. The quality of any sleep during the available periods was not determined.

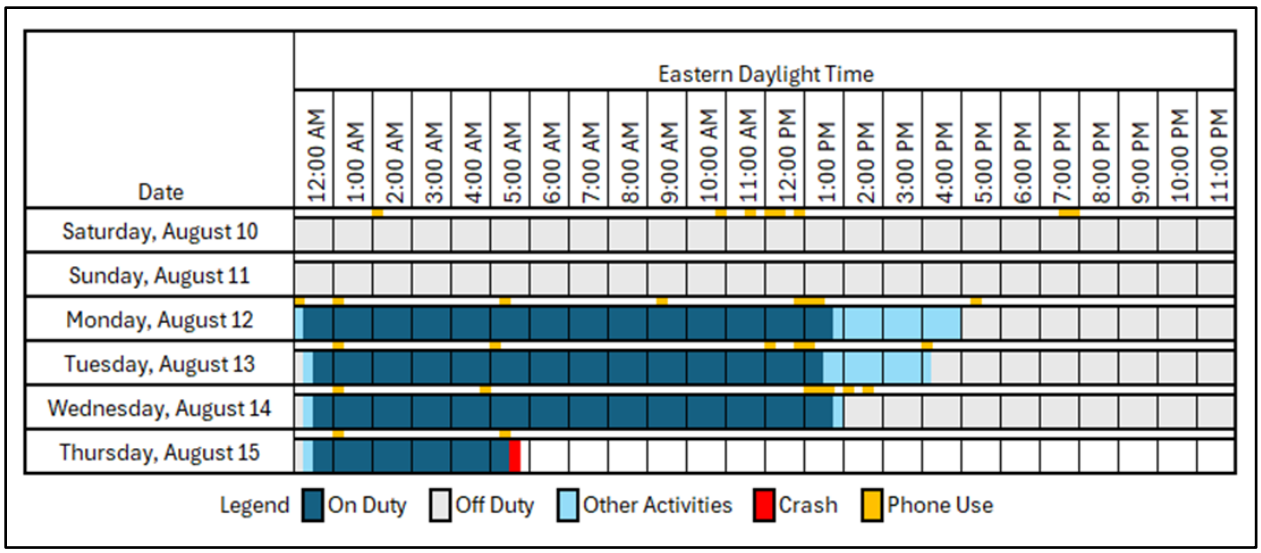

Figure 1. Approximate on- and off-duty times and cell phone use, reported in 15-minute blocks, from August 10 to August 15.

Table 6. Sleep opportunity for the Mack driver (August 12 to August 15)

Shift[a]	Longest Contiguous Period [hh:mm][b]	Accrued Sleep Opportunity [hh:mm][b]
8/12/2024	28:00	>47:00
8/13/2024	6:45	6:45
8/14/2024	8:00	8:00
8/15/2024	10:15	10:15

Notes: [a]Sleep opportunity periods reflect the time from the previous to the current shift. [b]Time accrued in 15-minute increments for periods 30 minutes or more.

1.4 Health

Commercial drivers in the United States are required by Federal Motor Carrier Safety Regulations (FMCSRs) to be medically certified as being physically qualified to drive a commercial vehicle.[8] To determine if a driver is physically qualified, a certified medical examiner must perform a United States Department of Transportation (DOT) physical qualification examination. These examinations are documented on a Medical Examination Report (MER) Form, MCSA-5875, and if medically certified the driver is issued a Medical Examiner's Certificate (MEC), Form MCSA-5876.These examinations may result in one of four outcomes with respect to medical qualification:

- The driver is found to meet the physical qualification standards in 49 CFR, Part 391.41 and is issued an MEC, Form MCSA-5876 for up to 2 years;[9]

[8] 49 *CFR* 391.41.
[9] For more information on who must be examined and the examination process, refer to 49 *CFR* 391.43 and 49 *CFR* 391.45.

- The driver is found to meet the physical qualification standards but requires periodic monitoring for one or more conditions and is issued an MEC, Form MCSA-5876, for less than 2 years;

- The driver is placed in determination pending due to the medical examiner requiring more information about the driver's health to make a qualification decision. The medical examiner can delay the qualification decision up to 45 days after the initial examination to allow the driver to return the required information back to the medical examiner to make a qualification decision;

- The driver is found not to meet the physical qualification standards and is medically disqualified;

- The driver is found not to meet the physical qualification standards and is medically disqualified.

1.4.1.1 Most Recent CDL Medical Exam

The Mack driver's most recent DOT physical qualification examination took place on October 10, 2022. The exam resulted in issuance of a two-year MEC, Form MCSA-5876, which expired in October 2024. The medical examiner who conducted the DOT physical qualification examination was a chiropractor listed in the Federal Motor Carrier Safety Administration's (FMCSA) National Registry of Certified Medical Examiners.

The carrier provided NTSB investigators the Mack driver's last four MER, Form, MCSA-5875.[10] On the Mack driver's most recent MER, Form MCSA-5875, the driver self-certified he was not suffering from any medical conditions and was not taking any medications. The driver's resting heart, blood pressure, corrected visual acuity, and peripheral vision were within regulatory limits.[11] The driver's hearing was normal, and the medical examiner did not note any issues during his physical examination.

1.4.1.2 Pre-Crash Medical Care

The Mack driver claimed during interview with NTSB investigators he had no pre-crash health issues and had sought occasional care at various medical clinics, when needed. He was not prescribed any medications. A subpoena was issued for the claim history for the Mack driver's health insurance provider. No records pertaining to the Mack driver's health were obtained. The Mack driver stated he had been wearing his prescription contact lenses at the time of the crash, which corrected his vision "close to 20/20."

[10] 2017, 2019, 2021, and 2022.
[11] 49 *CFR* 391.41.

1.5 Toxicology

Blood and urine samples obtained from the Mack driver by personnel during pre-admission screening on August 15, 2024, were tested by the Federal Aviation Administration (FAA) Forensic Sciences laboratory.[12] The hospital samples were negative for Carboxyhemoglobin, ethanol, and drugs.[13] Glucose was detected in the urine sample at a concentration of 13 milligrams per deciliter (mg/dL).[14]

2.0 Toyota Driver

2.1 Background and License History

The Toyota was being driven by a 58-year-old female driver with a valid Minnesota non-commercial driver's license. The Toyota driver sustained serious injuries during this crash. The Toyota driver told NTSB investigators she first obtained a driver license in 2015 or 2016 while living in Ithaca, New York and had not been involved in any traffic crashes as a driver. To obtain the license, the Toyota driver attended a video-based safe driving class before taking an in-car driving test. The Toyota driver worked as a nurse assistant at a hospital in St. Louis Park, Minnesota, and would drive to and from work, which was about 15 miles north of her home, in Prior Lake, Minnesota. Her drives to and from work covered a mixture of roadway types, including a freeway. She had driven the Toyota since its purchase and was not aware of any mechanical issues with the vehicle. The vehicle had brakes replaced about two or three months before this crash.

2.2 Pre-crash Activities

An evaluation of the Toyota driver's pre-crash activities was conducted by evaluating toll records and interviews of the Toyota driver conducted by NTSB investigators at St. Vincent Medical Center on August 16, 2024, and by phone on December 4, 2024.[15]

The Toyota driver went to bed about 9:00 p.m. on August 13 and woke about 6:00 a.m. on August 14. She prepared for the day and drove to work, where she began her shift at 8:00 a.m. The Toyota driver had a slow day at work, with a lot of time spent sitting. She returned home about 5:00 p.m. and packed for a trip to Ithaca, New York. About 7:30 p.m., the Toyota driver began the trip, driving for the first two hours before

[12] Urine was first collected from the Mack driver at 7:18 a.m. and venous blood was first collected from the Mack driver at 7:25 a.m. on August 15.

[13] Tested for drugs of abuse (Barbiturates, Benzodiazepines, Cannabinoids, Cocaine, Fentanyl, Methamphetamine, Opiates, and Phencyclidine (PCP)) as well as basic and acidic/neutral drugs.

[14] Although glucose is not normally detected in urine, a level of 0 to 15 ng/dL is considered within the normal range (University of California San Francisco, 2025).

[15] (a) Human Performance Attachment – Toyota Driver 8-16-2024 NTSB Interview, (b) Human Performance Attachment – Toyota Driver 12-4-2024 NTSB Interview.

switching driving duties with the adult male passenger. While the adult male was driving, the Toyota driver slept in the right-front seat, against the door and window.

During the trip, the Toyota occupants ate food that was brought from home. Two or three stops for fuel were made before the Toyota stopped on the side of the road at an unknown location between 2:30 and 3:30 a.m. on August 15. The Toyota driver recalled feeling rested when she resumed driving.

When she started this leg of the trip, the adult male was in the second row left seat, the female juvenile was seated in the middle second row seat, and the male juvenile was seated in the right second row seat. The Toyota driver thought the passengers were wearing seatbelts. Her cell phone was in a mount on the dash to the right of the steering wheel, open to Google Maps navigation application. She was not listening to the radio or other media.

The Toyota was not equipped with a toll road transponder. The Toyota driver recalled stopping at two toll plazas while driving on the morning of August 15. The Toyota passed through tolls listed in Table 7.[16]

Table 7. Toyota toll plaza entries on August 15, 2024

Time [EDT]	Location	Roadway	Toll Plaza	Toll Type
12:56 a.m.	Roscoe, Illinois	Interstate 90 eastbound	1-71	High-speed (E-ZPass and online payment) and low-speed (E-ZPass and online payment) lanes[a]
1:22 a.m.	Riley, Illinois	Interstate 90 eastbound	7-71	High-speed (E-ZPass and online payment)[b]
1:34 a.m.	Almora, Illinois	Interstate 90 eastbound	9-63	High-speed (E-ZPass and online payment) and low-speed (E-ZPass and online payment)[c]
1:53 a.m.	Rosemont, Illinois	Interstate 90 eastbound	19-53	High-speed (E-ZPass and online payment) and low-speed (E-ZPass and online payment)[a]
2:25 a.m.	Portage, Indiana	Interstate 80 eastbound	Westpoint	Low-speed (E-ZPass and cash)
4:43 a.m.	Angola, Indiana	Interstate 80 eastbound	Eastpoint	Low-speed (E-ZPass and cash)
4:51 a.m.	Edon, Ohio	Interstate 80 eastbound	Westgate	High-speed (E-ZPass) and low speed (cash) lanes

Notes: [a]Three low-speed toll lanes closed to through traffic by striping. [b]low speed lanes closed to through traffic by striping across the exit lane. [c]Four low-speed toll lanes closed to through traffic by striping with one low-speed lane for vehicles exiting to Illinois 31 south.

[16] Human Performance Attachment – Toyota Tolls.

No images were available of the Toyota when it traveled through the toll plazas in Illinois. Payment type was documented as "violation" for all Illinois toll plazas because the vehicle was not equipped with an Illinois tollway transponder.

During the 2:25 a.m. toll-plaza entry in Portage, Indiana, an image depicting the front of the Toyota was captured by a camera at the facility. The driver of the vehicle appeared to be an adult male. The right-front seatback appeared to be upright, but no other occupants were visible in the image. A toll was paid at the kiosk using a bank card, without the assistance of a remote operator.

No photo accompanied the transaction details for the 4:43 a.m. toll-plaza entry. While the Toyota was at the Eastpoint toll plaza in Angola, Indiana, at 4:43 a.m., a session with a remote operator was initiated because the driver of the Toyota did not present a ticket at the kiosk. A bank card was used to pay the toll about one minute after the initial transaction had timed out.

Video of the Toyota using the cash/credit lanes at the Ohio Turnpike Westgate toll plaza in Edon, Ohio, at 4:51 a.m. did not show the driver; however, from an overhead view of the vehicle, an unoccupied front passenger seat was visible. The driver paid the toll to an operator at the cash/credit toll booth #4, which serviced the left low-speed lane (cash/credit). After the toll was paid at the Westgate toll plaza, the Toyota continued east about 45 miles to the crash location. The headlights and tail lamps of the Toyota were illuminated while the vehicle was at the toll plaza.

The Toyota driver told NTSB investigators that as she approached the crash location, she was driving the vehicle about 70 miles per hour in an unknown lane and weather conditions were "foggy but just teeny, tiny foggy" when she became aware she had to exit as she passed a bridge (about 500 feet west of the exit from the right lane). She recalled slowing to about 50 miles per hour and moving to the right to exit the high-speed lanes in order to pay the toll. Refer to the *Highway Factors Group Chair's Factual Report* for this investigation for a description of signage preceding the toll plaza at the crash location. Refer to the *Technical Reconstruction Group Chair's Factual Report* for a description vehicle speeds and driver control inputs recorded by the Toyota ECU during the 4.75 seconds preceding impact with the Mack.

2.2.1 Phone Records

The Toyota driver's Apple iPhone 15 ProMax remained in the vehicle after the crash, but was released, along with the rest of the occupant compartment contents, to family members by OSHP without imaging. Records were obtained for the number for the Toyota driver's cell phone. The records covered the period from August 12 to August 15, 2024.[17] Phone data reported in UTC were converted to EDT for review by subtracting four hours. Although mobile data use was included in the phone records, insufficient information about pre-crash driving times and patterns of use were available to identify cell phone use while driving or phone use that would interfere with sleep opportunity. The native calling and messaging applications were not in use at the time of the crash.

Between 5:31:15 a.m. and 5:31:24 a.m., four outgoing calls were made as part of the crash detection feature of the iPhone. The first call of the series connected to a phone number with a 419-area code, which covered northwestern Ohio (AllAreaCodes, 2024), and was followed by two unanswered calls to 911 and one connected call to 911. The final, connected call to 911 matched a call received by the Lusa County 911 Regional Council of Governments (RCOG) communication center at 5:31:25 a.m. Apple crash detection is a feature included in iPhone models 14 and newer and Apple Watch Series 8 or newer, which automatically calls emergency personnel after a 20-second delay to report a detected crash (Apple, Inc., 2024).

2.2.2 Sleep Opportunity

The Toyota driver slept at home each night, with about nine hours of sleep opportunity, before leaving on her road trip toward Ithaca, New York, on the evening of August 14. After driving about 2 1/2 hours at the beginning of the trip, she had about 5 to 6 hours of sleep opportunity while a passenger in the right-front seat while the adult male drove the Toyota. The amount of time she spent sleeping and the quality of the sleep obtained while sitting in the right-front seat of the Toyota was not determined (Figure 2 and Table 8).

[17] Human Performance Attachment – Toyota Driver Phone Records.

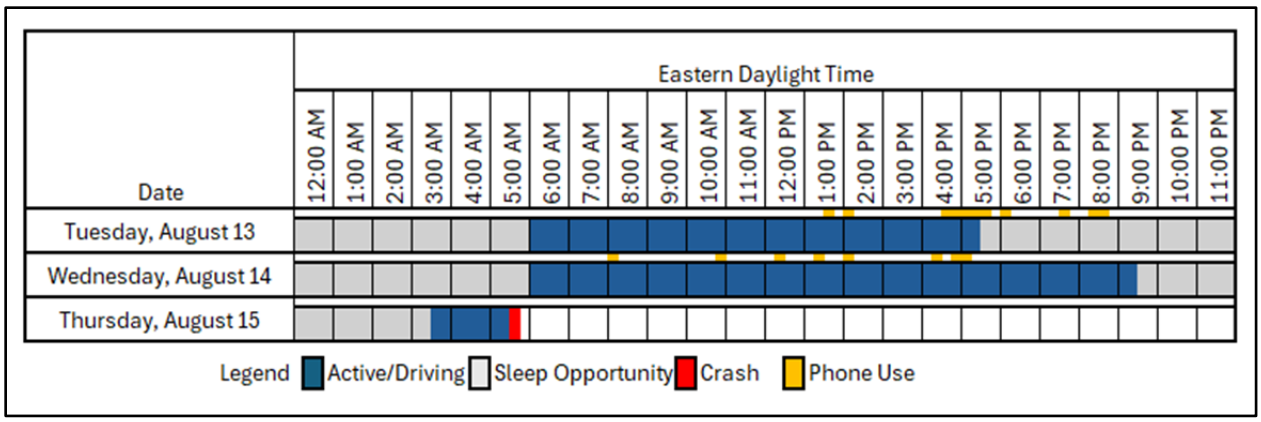

Figure 2. Approximate active/driving periods and cell phone use, reported in 15-minute blocks, from August 13 to August 15.

Table 8. Sleep opportunity for the Toyota driver (August 13 to August 15)

Day[a]	Longest Contiguous Period [hh:mm][b]	Accrued Sleep Opportunity [hh:mm][b]
8/14/2024	9:15	11:00
8/15/2024	5:00 to 6:00	5:00 to 6:00

Notes: [a]Sleep opportunity periods reflect the time from the previous to the current day. [b]Time accrued in 15-minute increments for periods 30 minutes or more.

2.3 Health

The Toyota driver claimed during an interview with NTSB investigators she had no pre-crash health issues and was not prescribed any medications.

2.4 Toxicology

Blood and serum samples obtained from the Toyota driver by personnel during pre-admission screening on August 15, 2024, were tested by the Federal Aviation Administration (FAA) Forensic Sciences laboratory.[18] The hospital samples were negative for Carboxyhemoglobin, ethanol.[19] Fentanyl, which had been administered by medical personnel when the Toyota driver was transported from the scene to the hospital after the crash, was detected in both samples.

2.5 Driver Monitoring Technology

The Toyota was not equipped with driver monitoring equipment.

[18] Samples were collected from the Toyota driver at 7:35 a.m. on August 15.
[19] Tested for drugs of abuse (Barbiturates, Benzodiazepines, Cannabinoids, Cocaine, Fentanyl, Methamphetamine, Opiates, and Phencyclidine (PCP)) as well as basic and acidic/neutral drugs.

E. GENERAL FACTORS

1.0 Weather

The closest official National Weather Service weather station to the crash site was located approximately 4 miles southeast, at Eugene F. Kanz Toledo Express Airport (KTOL). Observations demonstrative of trends in weather at the time of the crash are shown in Table 9 (National Ocianic and Atmospheric Administration, 2024).

Table 9. Weather data from weather station KCRWI

Observation	4:52 a.m.	5:52 a.m.
Temperature	59° F	59° F
Dew Point	59° F	59° F
Humidity	100%	100%
Wind Direction	Calm	Calm
Wind Speed	-	-
Sky condition	Fair	Fair
Pressure	30.12 in	30.12 in
Precipitation	None	None

2.0 Astronomical Factors

According to the Earth System Research Laboratory/Global Monitoring Division of the National Oceanic and Atmospheric Administration (NOAA Solar Calculator), apparent sunrise in the immediate area of this crash occurred at 6:15 a.m., and apparent sunset occurred at 6:45 p.m. This crash occurred at 5:29 a.m., during the hours of darkness. The waxing gibbous moon had risen at 5:01 p.m. on August 14 and set at 12:47 a.m. on August 15, 2024.

F. REFERENCES

AllAreaCodes. (2024). *419 Area Code*. Retrieved October 15, 2024, from AllAreaCodes.com: https://www.allareacodes.com/419

Apple, Inc. (2024). *Use Crash Detection on iPhone or Apple Watch to call for help in an accident*. Retrieved October 15, 2024, from support.apple.com: https://support.apple.com/en-us/104959

CVSA. (2025). *All Inspection Levels*. Retrieved January 13, 2025, from CVSA.org: https://cvsa.org/inspections/all-inspection-levels/

National Oceanic and Atmospheric Administration. (2024). *NOAA Solar Calculator*. Retrieved July 27, 2024, from NOAA Global Monitoring Laboritory: https://gml.noaa.gov/grad/solcalc/

National Ocianic and Atmospheric Administration. (2024). *Weather observations for the past three days for Toledo, Toledo Express Airport*. Retrieved August 17, 2024, from NOAA National Weather Service: https://forecast.weather.gov/data/obhistory/KTOL.html

University of California San Francisco. (2025). *Glucose urine test*. Retrieved May 28, 2025, from UCSF Health: https://www.ucsfhealth.org/medical-tests/glucose-urine-test

G. DOCKET MATERIAL

The following attachments are included in the docket for this investigation:

Human Performance Attachment –	Mack Driver CDLIS Report
Human Performance Attachment –	Mack Driver Certification of Violations
Human Performance Attachment –	Mack Driver/Vehicle Examination Reports
Human Performance Attachment –	Mack Driver ELD Report
Human Performance Attachment –	Mack Driver NTSB Interview
Human Performance Attachment –	Mack Tolls
Human Performance Attachment –	Mack Driver Phone Records
Human Performance Attachment –	Toyota Driver 8-16-2024 NTSB Interview
Human Performance Attachment –	Toyota Driver 12-4-2024 NTSB Interview
Human Performance Attachment –	Toyota Tolls
Human Performance Attachment –	Toyota Driver Phone Records

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