



**HUMAN PERFORMANCE FACTORS GROUP CHAIRMAN'S  
FACTUAL REPORT**

**Valhalla, NY**

**DCA15MR006**

(11 pages)

**NATIONAL TRANSPORTATION SAFETY BOARD  
OFFICE OF HIGHWAY SAFETY  
WASHINGTON, D.C.**

**HUMAN PERFORMANCE-HIGHWAY FACTORS GROUP CHAIRMAN'S  
FACTUAL REPORT**

---

**A. CRASH INFORMATION**

Location: Commerce Street at DOT Crossing #529-902V (rail line milepost 26.60)  
Westchester County, Valhalla, NY

Vehicle #1: 2011 Mercedes Benz ML350

Vehicle #2: Metro-North Train 659 (8 car train)

Operator #2: Metropolitan Transportation Authority

Date: February 3, 2015

Time: Approximately 6:26 p.m. EST

NTSB #: **DCA15MR006**

**B. HUMAN PERFORMANCE-HIGHWAY FACTORS GROUP**

Kenneth J. Bragg, Human Performance Factors Investigator, Group Chairman  
NTSB Office of Highway Safety  
490 L'Enfant Plaza East, S.W.  
Washington, DC 20594

Dr. Mary Pat McKay  
NTSB Office of Research and Engineering  
490 L'Enfant Plaza East, S.W.  
Washington, DC, 20594

Detective Sergeant John Rizatelli  
Metropolitan Transportation Authority Police Department  
345 Madison Avenue  
New York, NY 10017

Detective Sean Connolly  
Metropolitan Transportation Authority Police Department  
345 Madison Avenue  
New York, NY 10017

Richard Green, Railroad Safety Specialist  
Federal Railroad Administration  
55 Broadway Rm. 1074A  
Cambridge, MA 02142

## **C. CRASH SUMMARY**

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

## **D. DETAILS OF THE INVESTIGATION**

The focus of this report is a crash which involved a 2011 Mercedes Benz ML350 sport utility vehicle (SUV) and Metro-North commuter train 659. The crash occurred at a highway grade crossing equipped with active warning devices on a public roadway. The Human Performance factual investigation focused on the behavioral, medical, operational, and environmental factors associated with the driver of the 2011 Mercedes Benz, henceforth referred to as the SUV driver.

### **1. Factors Associated with the 2011 Mercedes Benz Driver**

Information in this section was obtained from an interview with the driver's husband<sup>1</sup>, employee time and attendance records<sup>2</sup>, medical records, and her cell phone records<sup>3</sup>.

#### **1.1. Behavioral Factors**

##### **1.1.1. Activities Prior to the Crash**

Because the SUV driver was fatally injured, documentation of her recent activity history was based on information from cell phone records and from interviews with her husband and co-workers. A summary of the driver's activities for the 72 hour period leading up to the accident are depicted in **Table 1**. Times in the table are in Eastern Standard Time (EST).

---

<sup>1</sup> Interview conducted on April 2, 2015; see Human Performance Factual Report Attachment 1: Narrative/Transcripts of Investigative Interviews.

<sup>2</sup> See Human Performance Factual Report Attachment 2: 2011 Mercedes Benz Driver's Employee Time and Attendance Records.

<sup>3</sup> See Human Performance Factual Report Attachment 3: 2011 Mercedes Benz Driver's Cellular Telephone Phone Records.

**Table 1** 2011 Mercedes Benz driver activities prior to the crash

Sunday, February 1, 2015		
<u>Time</u>	<u>Event</u>	<u>Source</u>
1:28 a.m.	Last text sent before available rest period	Spouse Interview
8:45 a.m.	Driver gets up, goes to gym	Spouse Interview
10:38 a.m.	First outbound text message of the day	Cellphone Records
9:00 a.m.	Driver leaves home	Spouse Interview
6:34 p.m.	Last phone call of the day	Cellphone Records
Monday, February 2, 2015		
<u>Time</u>	<u>Event</u>	<u>Source</u>
12:00 a.m.	Driver goes to bed	Spouse Interview
9:00 a.m.	Gets up, works from home	Spouse Interview
9:47 a.m.	First outbound text message of the day	Cellphone Records
9:29 p.m.	Last phone call of the day	Cellphone Records
Tuesday, February 3, 2015		
<u>Time</u>	<u>Event</u>	<u>Source</u>
9:00 a.m.	Driver wakes up	Spouse Interview
9:21 a.m.	First phone call of the day	Cellphone Records
9:44 a.m.	Driver begins shift	Employer Records
6:00 p.m.	Driver ends shift	Coworker Interview
6:11 p.m.	Last phone call before crash occurs <sup>4</sup>	Cellphone Records
6:26 p.m.	<b>Crash occurs</b>	

### 1.1.2. Sleep History

Information on the accident driver's recent sleep history and general sleep health were obtained from an interview with her husband. Observations of the SUV driver's sleep history were made casually thus, the reported times are approximate. The driver's opportunity for sleep is displayed in **Table 2**.

**Table 2** Accident driver opportunity for sleep

From		To		<u>Elapsed Time</u>
<u>Date</u>	<u>Time</u>	<u>Date</u>	<u>Time</u>	
2/1/15	1:27 a.m.	2/1/15	8:45 a.m.	7 hours 18 minutes
2/2/15	12:00 a.m.	2/2/15	9:00 a.m.	9 hours
2/3/15	12:00 a.m.	2/3/15	9:00 a.m.	9 hours

The accident driver's husband describes her sleep habits in the days leading up to the crash as typical; she stayed up until close to midnight and got up around 9 o'clock in the morning. He considers her sleep health, generally speaking, as normal and indicates she usually gets sufficient sleep.

<sup>4</sup> The driver's cell phone records indicate this was an incoming call from the driver's husband. The duration of the call was 8 minutes, 41 seconds; the driver was not using the phone when the crash occurred.

## **1.2. Medical Factors**

Information on medical factors affecting the SUV driver was obtained from an interview with the driver's husband, pharmacy prescription records and, medical records. Factors which may have affected the driver are described in the sections below.

### **1.2.1. General health**

In an interview with NTSB investigators, the SUV driver's husband described his wife's health as generally good. He said the only medical condition she had was Hashimoto Thyroiditis.<sup>5</sup> The driver has had the condition for approximately 15 years and through daily medication, has been able to manage its affects. The driver's husband said when his wife didn't take her medication for the disorder, her energy level was low; when she took the medication she felt normal. He stated she did not complain of having low energy in the days preceding the crash.

### **1.2.2. Vision**

When interviewed by NTSB investigators, the SUV driver's husband stated that his wife wore contact lenses but her vision was good. He does not know when the last time she has seen an eye doctor. There was no information discovered in her medical records concerning her vision.

### **1.2.3. Hearing**

The SUV driver's husband described his wife's hearing as good and does not know of any problems with her hearing. There was no information discovered in her medical records concerning her hearing.

### **1.2.4. Medications (Prescription, Over-the-Counter, Other)**

In an attempt to gain insight into the SUV driver's health, investigators attempted to locate recent medical prescriptions from pharmacies close to the driver's home. No recent prescriptions were located in the canvass for information.<sup>6</sup> When asked, the driver's husband stated that she took a daily medication for Thyroiditis but he was unable to identify the medication. He further stated that she had been taking the medication for years and did not experience associated side effects. The driver's primary care physician was not identified and relevant information was not obtained.

---

<sup>5</sup> Hashimoto Thyroiditis is an autoimmune disease in which the immune system turns against the thyroid.

<sup>6</sup> Pharmacy records indicate short term prescriptions in 2011 for medications or health conditions not likely to have contributed to this accident.

### **1.2.5. Alcohol and Drug Consumption**

When interviewed by NTSB investigators, SUV driver's husband described his wife as a social drinker who usually drinks wine. He stated she does not have an alcohol problem and she does not use illicit drugs.

### **1.2.6. Post-Crash Toxicology**

Following the crash, NTSB investigators obtained a postmortem blood sample from the SUV driver. The sample was sent to the Civil Aerospace Medical Institute toxicology laboratory for analysis. An analysis was completed on April 8, 2015.<sup>7</sup> The driver tested negative for:<sup>8</sup>

- alcohol;
- amphetamines;
- opiates;
- marihuana;
- cocaine;
- phencyclidine;
- barbiturates;
- antidepressants; and
- antihistamines.

### **1.2.7. Psychological Factors**

In an interview with NTSB investigators, the SUV driver's husband stated that she has not undergone any recent life changes or stressors which may have contributed to the accident. Additionally, the driver's coworkers were interviewed and on the day of the accident they did not observe any indications in her behavior that she was under unusual stress.

## **1.3. Operational Factors**

### **1.3.1. Licensing**

At the time of the crash, the SUV driver held a valid New York Class D non-commercial driver's license<sup>9</sup>. The license was initially issued on March 27, 1995. The current license had an expiration date of on March 27, 2020. The license had a corrective lenses restriction.<sup>10</sup>

---

<sup>7</sup> See Human Performance Attachment 4: Forensic Toxicology Report

<sup>8</sup> See the CAMI Drug Information Web Site for additional information <http://jag.cami.jccbi.gov/toxicology/>.

<sup>9</sup> A New York class "D" driver's license allows the operation of a passenger cars and trucks with a Gross Vehicle Weight Rating (GVWR) of 26,000 or less or a combination vehicle in which the towed vehicle that has a maximum gross weight of 10,000 pound, or if more than 10,000 pounds the combined weight of the two vehicles is 26,000 pounds or less. .

<sup>10</sup> The New York Department of Motor Vehicles (DMV) requires a driver who needs eye glasses or contact lenses to pass the required vision test receives a "corrective lenses" restriction on their license.

### **1.3.1.1. License History**

A driver's license inquiry through the New York Department of Motor Vehicles indicates the SUV driver had 3 points assessed against her driving record at the time of the crash. The points were assessed for a November 2013 conviction for having passed a red light. There was no record of convictions or accidents in the National Driver Registry.<sup>11</sup>

### **1.3.2. Training/Experience**

There was no information discovered regarding the initial driver training for the SUV driver.

The SUV driver's husband stated in an interview with NTSB investigators that his wife has been a licensed driver since she was a teenager. He further stated that he has known her since she was 25 years old and in that time she has been a safe driver. He recalls her being involved in two minor accidents but no major crashes. He also stated that his wife does not typically encounter grade crossing and that she was not familiar with them.

## **1.4. Task Factors**

### **1.4.1. Crash Trip**

The route of travel for the crash trip was identified through information provided by the SUV driver's husband. In an interview with NTSB investigators, the SUV driver's husband stated on the day of the crash his wife left her job in Chappaqua, New York to meet a potential business client at a coffee shop in Scarsdale, New York. The approximate distance of the trip was 13 miles. In an interview with Metropolitan Transportation Authority Police investigators, the potential business client stated that the meeting was to take place at 6:30 p.m.<sup>12</sup> The SUV driver's husband indicated in his statement that he spoke with his wife as she was driving to meet the potential business client. She was unfamiliar with the area and as they discussed directions to the meeting, he thought of "the best way there" and gave her directions which coincided with the crash trip.

From the vicinity of her job, the SUV driver is believed to have traveled southbound on Saw Mill River Parkway to southbound Taconic State Parkway. As she reached the vicinity of Taconic State Parkway and Lakeview Avenue, she encountered traffic congestion. Unable to continue traveling southbound on Taconic State Parkway, she turned off of Taconic State Parkway westbound onto Lakeview Avenue and then northbound on Commerce Street. Based on witness accounts, she encountered a traffic queue on Commerce Street, which continued until she reached the grade crossing and the crash occurred. The approximate distance from the trip origin to the crash site is approximately 7 miles. The crash occurred approximately 26 minutes after the SUV driver's work shift ended.

---

<sup>11</sup> The National Driver Register (NDR) is a database containing information on U.S. drivers who have had their licenses revoked or suspended, or have been convicted of serious traffic violations.

<sup>12</sup> See Human Performance Attachment 5: Metropolitan Transportation Authority Police Witness Interview.

### **1.4.2. Vehicle Familiarity**

Of interest to the investigation is whether the driver's familiarity with the electronic shift selector may have caused a delay in her moving the vehicle from the active grade crossing. According to the SUV driver's husband, the accident vehicle was purchased in December 2014. She drove the vehicle daily, as it was her primary means of transportation. He stated, the SUV driver liked driving the vehicle and did not experience any difficulties or problems manipulating the controls of the vehicle.

### **1.4.3. Cell Phone Use/Distracted**

NTSB investigators focused on what influence cell phone use by the SUV driver may have had on her actions at the grade crossing. Information from her cell phone records indicate she was not using her cell phone when the accident occurred. According to her husband, the driver utilized the vehicle's integrated hands free Bluetooth technology to talk on her phone while in the vehicle. The SUV driver's husband stated that the vehicle's hands free phone technology is such that when the vehicle senses a paired cell phone when it enters the vehicle and automatically connects.

The SUV driver's cell phone records show approximately 15 minutes prior to the crash the SUV driver received a phone call from her husband. Her husband stated that during the call he provided her with directions to her destination. Based on their discussion, he does not believe she utilized the vehicle's GPS navigation system to find her way.

## **1.5. Environmental Factors**

Global Positioning System (GPS) coordinates for the accident grade crossing were utilized to determine relevant environmental conditions in the vicinity of the accident site. The Federal Railroad Administration (FRA) grade crossing location coordinates were:

Latitude: 41.0862756

Longitude: -73.7880329

### **1.5.1. Weather Information**

Historical data for weather station KHPN (Westchester County Airport) located on 240 Airport Road, White Plains, NY, approximately 4.3 miles from the crash site, was retrieved and examined. Observations for February 3, 2015, near the time of the accident are shown in **Table 3**.<sup>13</sup>

---

<sup>13</sup> Data obtained from <http://www.wunderground.com>.



**Table 3.** Weather Data from Westchester County Airport (KHPN)

<b>Time (EDT)</b>	5:56 p.m.	6:56 p.m.
<b>Temperature</b>	21.9° F	21.0° F
<b>Dew Point</b>	7.0° F	8.1° F
<b>Humidity</b>	53%	57%
<b>Pressure</b>	30.29 in	30.29 in
<b>Visibility</b>	10 mi	10 mi
<b>Wind Dir.</b>	WSW	West
<b>Wind Speed</b>	3.5 mph	4.6 mph
<b>Wind Gust Speed</b>	N/A	N/A
<b>Precipitation</b>	N/A	N/A
<b>Conditions</b>	clear	clear

### 1.5.2. Astronomical Data for February 3, 1015

Using the GPS coordinates listed above, astronomical data for the crash location and date was downloaded from the United States Naval Observatory<sup>14</sup> (USNO). Downloaded astronomical data is summarized in the table below.

Table 4. Sun and Moon Date for White Plains, NY for February 3, 2015

<b>Event</b>	<b>Time</b>
Begin civil twilight <sup>15</sup>	6:53 a.m.
Sunrise	7:04 a.m.
Sun Transit	12:09 p.m.
Sunset	5:14 p.m.
<b>ACCIDENT</b>	6:26 p.m.
End civil twilight	5:43 p.m.

### 1.5.3. Visibility

The crash occurred during nighttime environmental conditions; the grade crossing was illuminated by several artificial light sources. A key factor in the SUV driver's behavior at the grade crossing was her ability to see and perceive the approaching train. Due to the lack of roadway evidence, the position of the SUV and its angle of approach to the crossing could not be determined. Additionally, as the train approached the grade crossing, the SUV driver exited her vehicle, walked rearward towards the gate, and then reentered her vehicle. Her positions during these actions, relative to the moving train, could not be determined. There were competing light sources in the area of the grade crossing; roadway lighting, perimeter lighting from a building adjacent to the grade crossing, and the headlamps of the approaching train. The influence of the three light sources is dependent to the relative positions of the SUV Driver. Because of the

<sup>14</sup> Data obtained from <http://www.usno.navy.mil/USNO>

<sup>15</sup> Morning civil twilight begins when the geometric center of the sun is 6° below the horizon and ends at sunrise.

uncertainty of the evolving environment faced by the SUV driver, a sight distance analysis was not conducted.

#### **1.5.4. Sound Conditions**

Of interest to the investigation is how the environment influenced the driver's ability to hear the approaching train. The NTSB Office of Research and Engineering conducted a sound study at the grade crossing crash site utilizing an exemplar 2011 Mercedes Benz ML350. For more information, *see the NTSB Sound Study* in the docket for this investigation.

During the sound study, audiometers were used to determine the difference in sound levels of trains approaching from the direction of the accident train. Sound levels were measured from inside and outside of the exemplar vehicle simultaneously. In an attempt to assimilate the conditions of the SUV driver, the exemplar vehicle was placed in the likely position as the accident vehicle. However, the inability to determine all variables which would have affected the audibility of the approaching train made it impossible to fully recreate the conditions the driver faced at the time of the crash.

The data in the test indicates that the sound levels taken on the inside of the car were, on average, 20 dB(A) less than readings of the same sound source taken from outside the car. Sound levels on each side of the grade crossing were compared. The test indicates sound levels on the side opposite the accident driver (northbound) was 10 dB(A) increase higher.

#### **1.6. Witness Information**

NTSB investigators conducted an interview with a driver that was immediately behind the SUV driver in traffic when the crash occurred. His observations provide insight into the actions of the accident driver in the moments leading up to the crash.

The witness indicates as he proceeded north on Commerce Street towards Taconic State Parkway, he encountered a traffic queue ahead. Traffic was slowly moving and the vehicle ahead of him was on the grade crossing. As the vehicle ahead of him reached the tracks he observed the grade crossing become active as the lights began flashing and the crossing gate began to lower. The witness stated at this point, due to the contour of the road and the size of the SUV ahead of him, he could not see whether the traffic ahead of the SUV driver was able to move. The crossing gate struck the top rear corner of the vehicle and came to rest against the back window of the accident car. Realizing the car ahead of him needed to move off of the tracks, the witness backed his vehicle up approximately a car length. He then saw the accident driver get out of her car, walk towards the rear of her car, and touch the gate. The witness stated he motioned with his hands for the SUV driver to move away from the tracks while moving his car in reverse as if to say "do what I'm doing". After pausing for a moment the accident driver re-entered her car and moved forward; subsequently the crash occurred. The witness noted when the SUV driver got out her vehicle and moved about the crossing, she was not moving in a hurried or panicked manner.

When asked if there were audible warnings of the approaching train, the witness stated he did not hear anything which indicated the train was approaching. He specifically did not remember hearing the train horn or bells. He stated that he had all of his windows up with the

exception of the driver's window which was open approximately an inch. Although he didn't specifically remember, he said he probably had his radio on.

**E. DOCKET MATERIAL**

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

LIST OF ATTACHMENTS

Human Performance Factors Attachment 1 -	Narrative/Transcripts of Investigative Interviews
Human Performance Factors Attachment 2 -	2011 Mercedes Benz Driver's Employee Time and Attendance Records
Human Performance Factors Attachment 3 -	2011 Mercedes Benz Driver's Cellular Telephone Phone Records
Human Performance Factors Attachment 4 -	Forensic Toxicology Report
Human Performance Factors Attachment 5-	Metropolitan Transportation Authority Police Witness Interview

END OF REPORT

---

Kenneth J. Bragg  
Human Performance Investigator