HUMAN PERFORMANCE FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

Chesterfield, New Jersey

HWY-12-MH-007

(25 pages)

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

HUMAN PERFORMANCE FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

A. ACCIDENT

Location:	Bordentown-Chesterfield Road (Burlington County Route 528) and Old York Road (Burlington County Route 660), Chesterfield Township, Burlington County, New Jersey
Vehicle #1:	2012 International 54-Passenger School Bus
Operator #1:	Garden State Transport Incorporated
Vehicle #2:	2004 Mack Granite Roll Off Truck
Operator #2:	Herman's Trucking, Incorporated
Date:	February 16, 2012
Time:	Approximately 8:15 a.m. EST
NTSB #:	**HWY-12-MH-007**

B. HUMAN PERFORMANCE FACTORS GROUP

Dennis Collins, Senior Human Performance Investigator, Group Chairman
NTSB Office of Highway Safety
490 L'Enfant Plaza SW, Washington, D.C. 20594

C. ACCIDENT SUMMARY

For a summary of the accident, refer to the *Accident Summary* report in the docket for this investigation.

D. DETAILS OF THE HUMAN PERFORMANCE FACTORS INVESTIGATION

The Human Performance factual investigation focused on the behavioral, medical, operational, and environmental factors associated with the drivers of the 2012 International School Bus and the 2004 Mack truck. Each driver is discussed in separate sections below.

1. Factors Associated With the 2012 International School Bus Driver

1.1. Behavioral Factors

1.1.1. Activities Prior to the Accident

Based on interviews of the driver conducted by detectives from the Burlington County Prosecutor's Office and NTSB investigators,[1] a route schedule provided by the carrier,[2] and the driver's cell phone records,[3] the following table of the driver's activities preceding the accident was generated.

Table 1. 2012 International School Bus driver activities prior to the accident

Sunday, February 12, 2012		
Time	Event	Source
5:46 pm	Driver receives incoming call (last call of day)	Cell Records
~10:45 pm	Driver goes to bed	Interview
unknown	Driver gets up to use bathroom	Interview
Monday, February 13, 2012		
Time	Event	Source
4:30 am	Driver awakes	Interview
5:30 am	Leaves home for work	Interview
~5:50 am	Arrives at Garden State Transportation (GST)	Mapquest
unknown	Performs pre-trip inspection	Interview
6:15 am	Departs GST for first route	Interview
6:39 am	First scheduled high school pickup	Schedule
7:12 am	Last scheduled high school pickup	Schedule
7:16 am	Drop students at Northern High School	Schedule
7:29 am	Driver makes outgoing call (first of day)	Cell Records
7:50 am	Depart Northern High School	Schedule
7:55 am	First scheduled elementary pickup	Schedule
8:12 am	Last scheduled elementary pickup	Schedule
8:15 am	Drop students at Chesterfield Elementary	Schedule
8:20 am	Arrives at Chesterfield Elementary	Interview
8:25 am	Scheduled departure from Chesterfield Elementary	Schedule
9:10 am	Arrives at GST	Interview
unknown	Returns home, has lunch	Interview
unknown	Driver takes 10-15 minute nap	Interview
~12:40 pm	Departs home for GST	Interview
1:00 pm	Arrives at GST	Interview
unknown	Does afternoon pre-trip inspection	Interview
1:45 pm	Arrives at Northern High School	Interview
~2:15 pm	Loading begins	Interview

[1] Human Performance Factual Attachment 1: Transcripts of Investigative Interviews.
[2] Human Performance Factual Attachment 2: Morning Bus Schedules.
[3] Human Performance Factual Attachment 3: School Bus Driver Cellular Telephone Records.

Monday, February 13, 2012 (continued)		
Time	Event	Source
2:20 pm	Departs High School	Interview
2:45 pm	Last High School drop-off is made	Interview
3:05 pm	Arrives at Chesterfield Elementary	Interview
~3:20 pm	Loading begins	Interview
3:30 pm	Departs Chesterfield Elementary	Interview
4:00 pm	Arrives at GST	Interview
unknown	Performs post-trip inspection, turns in paperwork and keys	Interview
4:20 pm	Departs GST for trip home and errands	Interview
5:00 pm	Arrives home	Interview
7:12 pm	Driver receives incoming call (last of day)	Cell records
~11:15 pm	Driver goes to bed	Interview
unknown	Driver gets up to use bathroom	Interview
Tuesday, February 14, 2012		
Time	Event	Source
4:30 am	Driver awakes	Interview
5:30 am	Leaves home for work	Interview
~5:50 am	Arrives at Garden State Transportation (GST)	Mapquest
unknown	Performs pre-trip inspection	Interview
6:15 am	Departs GST for first morning route	Interview
6:39 am	First scheduled high school pickup	Schedule
7:12 am	Last scheduled high school pickup	Schedule
7:16 am	Drop students at Northern High School	Schedule
7:50 am	Depart Northern High School	Schedule
7:55 am	First scheduled elementary pickup	Schedule
8:12 am	Last scheduled elementary pickup	Schedule
8:15 am	Drop students at Chesterfield Elementary	Schedule
8:20 am	Arrives at Chesterfield Elementary	Interview
8:25 am	Scheduled return to GST	Schedule
9:10 am	Arrives at GST	Interview
unknown	Returns home, has lunch	Interview
unknown	Driver takes 10-15 minute nap	Interview
~12:40 pm	Departs home for GST	Interview
1:00 pm	Arrives at GST	Interview
unknown	Does afternoon pre-trip inspection	Interview
1:45 pm	Arrives at Northern High School	Interview
~2:15 pm	Loading begins	Interview
2:20 pm	Departs High School	Interview
2:45 pm	Last High School drop-off is made	Interview
3:05 pm	Arrives at Chesterfield Elementary	Interview
~3:20 pm	Loading begins	Interview
3:30 pm	Departs Chesterfield Elementary	Interview
4:00 pm	Arrives at GST	Interview
unknown	Performs post-trip inspection, turns in paperwork and keys	Interview

Tuesday, February 14, 2012 (continued)		
Time	Event	Source
4:20 pm	Departs GST for home	Interview
unknown	Arrives home	Interview
~11:15 pm	Driver goes to bed	Interview
unknown	Driver gets up to use bathroom	Interview
Wednesday, February 15, 2012		
Time	Event	Source
4:30 am	Driver awakes	Interview
5:30 am	Leaves home for work	Interview
unknown	Driver returns home for a folder; heads back to work	Interview
unknown	Performs pre-trip inspection	Interview
6:15 am	Departs GST for first morning route	Interview
6:39 am	First scheduled high school pickup	Schedule
7:12 am	Last scheduled high school pickup	Schedule
7:16 am	Drop students at Northern High School	Schedule
7:50 am	Depart Northern High School	Schedule
7:55 am	First scheduled elementary pickup	Schedule
8:12 am	Last scheduled elementary pickup	Schedule
8:15 am	Drop students at Chesterfield Elementary	Schedule
8:20 am	Arrives at Chesterfield Elementary	Interview
8:25 am	Scheduled return to GST	Schedule
9:10 am	Arrives at GST	Interview
9:59 am	Driver calls his voicemail (first call of day)	Cell Records
unknown	Returns home, has lunch	Interview
unknown	Driver takes 10-15 minute nap	Interview
~12:40 pm	Departs home for GST	Interview
1:00 pm	Arrives at GST	Interview
unknown	Does afternoon pre-trip inspection	Interview
1:13 pm	Driver calls his voicemail (last call of day)	Cell Records
1:45 pm	Arrives at Northern High School	Interview
~2:15 pm	Loading begins	Interview
2:20 pm	Departs High School	Interview
2:45 pm	Last High School drop-off is made	Interview
3:05 pm	Arrives at Chesterfield Elementary	Interview
~3:20 pm	Loading begins	Interview
3:30 pm	Departs Chesterfield Elementary	Interview
4:00 pm	Arrives at GST	Interview
unknown	Performs post-trip inspection, turns in paperwork and keys	Interview
4:20 pm	Departs GST for home	Interview
unknown	Arrives home	Interview
~11:15 pm	Driver goes to bed	Interview
unknown	Driver gets up to use bathroom	Interview

Thursday, February 16, 2012		
Time	Event	Source
4:30 am	Driver awakes	Interview
5:30 am	Leaves home for work	Interview
~5:50 am	Arrives at Garden State Transportation (GST)	Mapquest
unknown	Performs pre-trip inspection	Interview
6:13 am	Driver makes an outgoing call (first call of day)	Cell Records
6:15 am	Departs GST for high school morning route	Interview
6:39 am	First scheduled high school pickup	Schedule
6:40 am	Driver makes first high school pickup	Interview
7:12 am	Last scheduled high school pickup	Schedule
7:15 am	Arrives at Northern High School	Interview
7:16 am	Drop students at Northern High School	Schedule
7:50 am	Depart Northern High School	Schedule
7:55 am	First scheduled elementary pickup	Schedule
8:15 am	**Accident Occurs**	

1.2. Medical Factors

As part of the investigation, the school bus driver's medical records were obtained and reviewed by a medical doctor. Information from that review is covered in an addendum to this report.

1.2.1. Commercial Driver Fitness Determination Exam

Commercial drivers in the United States are required by the Federal Motor Carrier Safety Regulations (FMCSRs) to be medically certified as being physically qualified to drive.[4] Specific information from that exam regarding the driver's general health, vision, hearing, and medications is contained in sections 1.2.2 through 1.2.5.

Commercial driver fitness examinations result in one of four outcomes with respect to medical qualification:

- The driver is found to meet the standards in 49 CFR §391.41 and is given a 2-year certificate;[5]
- The driver is found to meet the standards, but requires periodic evaluation for one or more conditions and is qualified for 3 months, 6 months, or 1 year;
- The driver is temporarily disqualified due to a condition or medication; or;
- The driver is found to not meet the standards.

[4] 49 Code of Federal Regulations §391.41.

[5] For more information on who must be examined and the examination process, please see 49 CFR § 391.43 and 49 CFR § 391.45.

The school bus driver's most recent examination prior to the crash was conducted in January of 2012 by a doctor of chiropractic medicine in Marlton, New Jersey.[6] In that exam,[7] the school bus driver indicated "YES" to the following conditions:

- Illness/Injury in the last 5 years;
- Heart disease or heart attack, other cardiovascular condition. He further indicated he was taking Toprol XL;
- Heart surgery, valve replacement/bypass, angioplasty, or pacemaker. The driver lined through "replacement" and wrote in "repair";
- Digestive problems;
- Nervous or psychiatric disorders, e.g. severe depression. The driver lined through "severe" and wrote in "mild" and indicated he was taking clonazepam for the condition;
- Spinal injury or disease; and
- Regular, frequent alcohol use.

The school bus driver's height was recorded at 6 feet 1 inches (73 inches) and his weight was recorded as 216 pounds, which corresponds to a Body Mass Index (BMI) of 28.5.[8] The medical practitioner performing the exam indicated he observed no abnormalities in any of the driver's general body systems.[9]

The school bus driver involved in the Chesterfield accident was qualified for one year due to hypertension, with his medical certificate expiring in January 2013. He was also only qualified while wearing his corrective lenses.

1.2.2. General Health

When interviewed,[10] the school bus driver described his health as "okay" and said that he felt "good" on the day of the accident, except for his "normal arthritis pain". He said he did not experience any health issues, including allergies, on the day of the accident.

1.2.3. Vision

In the school bus driver's January 2012 Commercial Driver Fitness Determination, the driver's corrected Snellen distant visual acuity[11] was recorded as

[6] Human Performance Factual Attachment 4: School Bus Driver Commercial Driver Fitness Examination.
[7] See Attachment 4.
[8] For BMI information, see: http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.
[9] General appearance, eyes, ears, mouth and throat, heart, lungs and chest, abdomen and viscera, vascular system, genito-urinary, extremities, spine and other musculoskeletal, and neurological.
[10] See Attachment 1.
[11] Snellen fractions are a measure of visual acuity (sharpness of sight). In the Snellen fraction, the first number represents the test distance (20 feet) and the second represents the distance at which the average eye could see the letters on a certain line of the chart. A fraction of 20/20 is considered normal vision.

20/30 for the left eye and right eye, and as 20/25 for both eyes together.[12] The driver's horizontal field of vision was noted as 100° with both the right and left eye. The performing physician indicated the driver could distinguish red, green, and amber colors.[13] The school bus driver told police and NTSB investigators he was wearing his glasses, prescribed for astigmatism and visual acuity[14] at the time of the accident. \

1.2.4. Hearing

In the school bus driver's most recent Commercial Driver Fitness Determination,[15] he was noted to be able to hear a forced whispered voice at 6 feet with both his left and right ears.

1.2.5. Medications (Prescription, Over-the-Counter, Other)

Through an interview[16] with the driver and a review of medical records, investigators determined the school bus driver had current[17] prescriptions for the following medications:

- Simvastatin 40 mg, a prescription medication commonly used to treat high LDL cholesterol;[18]
- Clonazepam 1mg, a prescription medication commonly used to treat certain types of seizures and to relieve panic attacks;[19]
- Tramadol HCl 50mg, a prescription medication commonly used to relieve moderate to moderately severe pain;[20]
- Citalopram 20mg, a prescription medication commonly used to treat depression;[21]
- Pristiq 50 mg, a prescription medication commonly used to treat depression;[22]
- Metoprolol ER 50mg, a prescription medication commonly used to treat angina, hypertension, and heart attack;[23]

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[12] The bus driver's uncorrected visual acuity was recorded as 20/100 with each eye individually and as 20/70 using both eyes.
[13] See Attachment 4.
[14] See Attachment 1.
[15] See Attachment 4.
[16] See Attachment 1.
[17] In this context, current means the prescription was last prescribed on a date, in a quantity, that the driver would have been taking it on the day of the accident if taking it as prescribed.
[18] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000911/, accessed on March 29, 2012.
[19] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000635/, accessed on March 29, 2012.
[20] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000960/, accessed on March 29. 2012.
[21] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001041/, accessed on March 29, 2012.
[22] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000449/, accessed on March 29, 2012.
[23] U.S. National Library of Medicine: http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000795/, accessed on March 29, 2012.

- Over-the-counter vitamins;
- Over-the-counter fish oil; and
- Aspirin.

In addition, the driver said he was taking Nexium, a prescription medication commonly used to treat gastroesophageal reflux disease (GERD); however, investigators were unable to locate a current prescription for that medication.

The school bus driver normally takes two anxiety pills[24] in morning and one anxiety pill when he gets home in the evening. He takes his other medications in the evening. He confirmed he took his regular medications on the day of the accident. He told investigators that although some of his medications warn against driving while taking the medications he is not suffering any side effects and has been on the medications for long enough that he is accustomed to their effects. His prescribing physicians did not place any restrictions on his driving.[25]

1.2.6. Alcohol and Drug Consumption

The school bus driver told investigators he does not take illicit drugs and had not consumed alcohol on the day of the accident. His last drink was what he estimated to be two "double scotches" (he does not measure the alcohol), which he consumed between 7:30 pm and 11:30 pm Wednesday night, prior to going to bed.[26] He indicated this was his normal nightly practice.

1.2.7. Post-accident Toxicology

1.2.7.1. Law Enforcement

Following the accident, the school bus driver agreed to provide a blood sample to law enforcement authorities. That sample was split, and the split portion was transferred to the Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Oklahoma. See section 1.2.7.3 for the results of that testing.

1.2.7.2. Department of Transportation Required Post-accident Drug and Alcohol Testing

Under Federal regulations,[27] the employers of commercial drivers involved in an accident resulting in the loss of human life are required to test their surviving drivers for alcohol and controlled substances. According to the school bus driver's employer, the accident driver was taken to the hospital following the accident and the hospital drew blood from the driver at the request of law enforcement (see above). The blood was drawn at noon (12:00 pm). According to documentation from the hospital, this was the

[24] The driver did not provide the names of his medication when interviewed.
[25] See Attachment 1.
[26] See Attachment 1.
[27] 49 CFR § 382.303 requires the testing of blood for alcohol and urine for five classes of drugs of abuse.

only blood draw performed; the hospital did not perform one for diagnostic purposes. No additional samples were taken from the driver for testing.

1.2.7.3. Civil Aerospace Medical Institute

Testing of the split sample from the school bus driver by the Civil Aerospace Medical Institute[28] was negative for alcohol and major drugs of abuse, and was positive for 7-Amino-clonazepam [0.031 ug/mL], Desmethylvenlafaxine (O-) [no level reported], and Tramadol (0.029 ug/mL).

1.2.8. Psychological Factors

In his interview, the school bus driver told investigators his brother-in-law (his sister's husband) had passed away Tuesday evening, two days prior to the accident. The driver was close to his brother-in-law, and while discussing the death, he was visibly upset. He also told investigators he was experiencing financial concerns, which was why he had sought employment as a school bus driver.[29]

1.2.9. Sleep Habits

When interviewed, the school bus driver stated he typically feels "relatively" rested and slept well Sunday, Monday, Tuesday, and Wednesday nights prior to the accident. He has never been any diagnosed with any sleep problems, including insomnia, sleep apnea, or restless legs syndrome. His wife tells him he snores once in a while. It is typical for him to awake 1-2 times a night to go to the bathroom. He said he believes he should go to bed earlier and that he sleeps until 6:30 a.m. on Saturday and Sunday. When asked about napping, the school bus driver told investigators that he takes a 10 to 15 minute nap every day at lunch, and that he finds doing so to be refreshing. He does not nap in the evening. Although he routinely uses an alarm clock, he sometimes wakes on his own before the alarm sounds.[30]

Based on the school bus driver's statements during the interview, he received the following sleep the four nights prior to the accident:

- A minimum of 5.25 hours;
- A maximum of 5.75 hours;
- A total of 21.5 hours; and
- An average of 5.375 hours.

[28] Human Performance Factual Attachment 5: School Bus Driver Final Fatal Toxicology Report.
[29] See Attachment 1.
[30] See Attachment 1.

1.3. Operational Factors

1.3.1. Licensing

The driver of the school bus was a 66 year-old male. At the time of the crash he held a valid New Jersey Class "B" Commercial Driver's License (CDL) issued January 2012 and expiring in October 2013.[31] He held "P" (passenger) and "S" (school bus) endorsements and was subject to both corrective lenses and air brake restrictions.[32] He held a current medical card (see above).

1.3.2. Training / Experience

1.3.2.1. General Experience

The driver said in his interview that he first received a driver's license (non-commercial) in 1962 at the age of 17. He never held a commercial driver's license or any endorsements prior to accepting employment as a school bus driver approximately three weeks prior to the accident.[33]

1.3.2.2. Training

When asked how he began driving a school bus, the 2012 International driver stated he saw an advertisement in the newspaper. He went to Garden State Transportation (GST) and completed an application in September 2011. He was then sent to the Department of Motor Vehicles (DMV) to get a Class "B" permit[34] as well as the "S" and "P" endorsements. The permit and each endorsement required a written test. He was given a study guide for each. The school bus driver stated he studied for and took the tests one at a time. When he had passed all three (permit and two endorsements), he made an appointment for the road test. He then returned to GST for training. He took the road test in a GST bus. After passing the road test, he was issued his commercial license.

When asked about his training with GST, the school bus driver told investigators that once he had taken and passed the DMV written tests, he returned to GST and was trained on the bus. This training covered emergency evacuation and operation of the bus. When he was proficient, he made the appointment with DMV for the road test. He described his training after passing the road test as two days with on-bus supervision.[35]

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[31] The New Jersey Class B license allows the operation of any vehicle with a Gross Vehicle Weight Rating (GVWR) of 26,001 or more pounds; or a vehicle with a gross vehicle weight rating of 26,001 or more pounds towing a trailer with a gross vehicle weight rating of 10,000 or less pounds; or, a bus with GVWR of 26,001 pounds or more designed to transport 16 or more passengers; including the driver, and Class "C" vehicles, with the proper extra endorsements.
[32] See Motor Carrier Attachment 16.
[33] See Attachment 1.
[34] Although the driver called this a class "D" license when interviewed, it is in fact a class "B" license.
[35] See Attachment 1.

According to GST, their drivers receive in-service training, once every two years and at the start of the school year. The school district for the accident route also offers quarterly training to GST drivers; however, very few GST drivers participate.[36]

1.3.2.3. Specific Experience

1.3.2.3.1. Route Experience

When interviewed,[37] the school bus driver told investigators he was assigned to the same four routes (two morning routes and two afternoon routes) every day except his first day. He drove the accident route under the supervision of another driver on his second day and drove the accident route unsupervised from his third day on.

A closer look at his schedule and routes indicated he had driven the accident route four times his first week with GST (Tuesday-Friday), five times his second week (Monday-Friday), and four times his third week, including the day of the accident (Monday-Thursday). Therefore, the accident occurred approximately the 13th time he had driven that route.

1.3.2.3.2. Vehicle Experience

According to the school bus driver, after his first two or three days of work, he always drove the accident bus, vehicle #1215. He never had any problems with the bus, except for the fact that he did not like the electronically operated loading door because he was not able to control when the yellow warning lights came on. The driver said that on the day of the accident the bus was in "excellent" condition with everything working fine.[38]

1.3.3. Accident / License History

A National Driver Registry inquiry indicated no adverse information[39] for the school bus driver.[40] For additional information on the school bus driver's history, please see the Motor Carrier Group Chairman's Factual Report.

1.3.4. Vehicle Controls

Investigators documented the post-accident position of the controls of the school bus. A description of the findings can be found as an attachment to this report.[41]

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[36] For more information on the company's training program, please see the Motor Carrier Group Chairman's Factual Report.
[37] See Attachment 1.
[38] See Attachment 1.
[39] No record of revocation, suspension, or conviction of a serious traffic violation such as driving while impaired by alcohol or drugs.
[40] Human Performance Factual Attachment 6: E-mail on search of National Driver Register Problem Driver Pointer System.
[41] Human Performance Factual Attachment 7: 2012 International School Bus Control Positions.

1.4. Task Factors

1.4.1. Accident Trip

At the time of the accident, the 2012 school bus driver was engaged in his second run of the day,[42] picking up students to take them to Chesterfield Elementary. According to the driver, as he approached the intersection of CR 528 and Old York Road, nothing seemed out of the ordinary. He stopped beyond the white stop line on the pavement, somewhere between the line and the overhead beacon[43]. When asked why he stopped there, he stated this was because he learned the first time he drove the route that trees blocked his view to the left if he stopped at the white line. He could not be more specific about where he stopped on the day of the accident; all he could say was that he was between the line and beacon and that he stopped "where I feel safe". He could see well to both the left and right. He demonstrated to investigators how he turned his head to the left approximately 90 degrees to look for traffic from that direction. He told investigators he looked left, then right, and then left again. He saw no traffic, so he proceeded into the intersection. He could not recall if there was any crossing traffic as he approached the intersection, or if there was traffic on the opposite side of the intersection. The school bus driver's first indication that something was wrong was feeling an impact to the rear driver's side of the bus. The bus went into the air, striking the beacon. He looked into the mirror and saw kids "bouncing" around. The bus then struck something else, which the driver later learned was the pole.[44] The second impact was to the rear passenger side.[45]

1.4.2. Workload / Distraction

When interviewed, the school bus driver was asked about distractions at the time of the accident, including distractions internal to the vehicle (AM/FM radio, passengers, CB radio, GPS devices, cell phones, etc.) and distractions external to the vehicle (other traffic, pedestrians, glare/light, signs, billboards, etc.). In addition, investigators conducted an independent evaluation of distractions.

1.4.2.1. External Workload / Distraction

NTSB investigators made observations of the external conditions at the accident site on February 18, 2012 at approximately the same time as the accident. The external environment was found to be unremarkable, with no unusual or distracting features in the school bus driver's direction of travel. When interviewed, the driver told investigators there was nothing distracting in the external environment.

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[42] His first run of the day, a high school run, did not include the intersection of CR 528 and Old York Road.
[43] A beacon is a highway traffic signal with one or more signal sections that operates in a flashing mode as a supplement to other traffic control devices. In this application, a red flashing signal was evident to the school bus driver.
[44] For additional information on the accident scene, please see the Highway Group Chairman's Factual Report.
[45] See Attachment 1.

1.4.2.2. Internal Workload / Distraction

1.4.2.2.1. Portable Electronic Devices

The driver owned a cell phone and had it in his possession at the time of the accident. Records from the driver's service provider identified the school bus driver's phone as an LG-VX5500 and indicated the driver was not using his cell phone at or near the time of the accident.[46]

The told investigators he did not have a Global Positioning System (GPS) device in the school bus at the time of the accident.[47] According to GST, the school bus was not equipped with such a device.[48]

1.4.2.2.2. Other Distractions Internal to the Vehicle

When interviewed, the school bus driver stated that the younger children make a lot of noise, but that he tries to tune it out. He was not distracted by this in general or at the time of the accident.[49]

[46] See Attachment 3.
[47] See Attachment 1.
[48] Please see the Motor Carrier Group Chairman's Factual Report.
[49] See Attachment 1.

2. Factors Associated With the 2004 Mack Truck Driver

2.1. Behavioral Factors

2.1.1. Activities Prior to the Accident

Based on interviews of the Mack truck driver conducted by NTSB investigators[50] and his cell phone records,[51] the following table of his activities preceding the accident was generated.

Table 2. 2004 Mack truck driver activities prior to the accident

Sunday, February 12, 2012		
Time	Event	Source
7:46 a.m.	Driver sends text message (first of day)	Cell records
10:29 a.m.	Driver checks voicemail (first call activity of day)	Cell records
6:15 p.m.	Driver checks voicemail (last call activity of day)	Cell records
6:34 p.m.	Driver sends text message (last of day)	Cell records
10:00 p.m.	Driver goes to bed	Interview
Monday, February 13, 2012		
Time	Event	Source
~6:00 a.m.	Driver is awoken by his fiancée	Interview
6:04 a.m.	Driver sends text message (first of day)	Cell records
~6:30 a.m.	Driver leaves home for work	Interview
10:56 a.m.	Driver makes outgoing call (first call activity of day)	Cell records
~3:30 p.m.	Driver finishes working	Interview
5:32 p.m.	Driver makes outgoing call (last call activity of day)	Cell records
~5:45 p.m.	Driver has dinner	Interview
7:06 p.m.	Driver sends text message (last of day)	Cell records
~9:30 p.m.	Driver goes to bed	Interview
Tuesday, February 14, 2012		
Time	Event	Source
~5:45 a.m.	Driver awakes	Interview
5:54 a.m.	Driver sends text message (first of day)	Cell records
6:29 a.m.	Driver receives incoming call (first call activity of day)	Cell records
~6:30 a.m.	Leaves home for work	Interview
3:43 p.m.	Driver receives text message (last of day)	Cell records
3:51 p.m.	Driver receives incoming call (last call activity of day)	Cell records
~4:00 p.m.	Driver finishes work for day	Interview
~9:30 p.m.	Driver goes to bed	Interview
Wednesday, February 15, 2012		
Time	Event	Source
5:30 a.m.	Driver awakes	Interview

[50] See Attachment 1.
[51] Human Performance Factual Attachment 8: Mack Truck Driver Cellular Telephone Records

Wednesday, February 15, 2012 (continued)		
Time	Event	Source
~6:30 a.m.	Driver leaves home for work	Interview
7:09 a.m.	Driver receives incoming call (first call activity of day)	Cell records
9:56 a.m.	Driver receives text message (first of day)	Cell records
~4:00 p.m.	Driver finishes work	Interview
6:37 p.m.	Driver makes outgoing call (last call activity of day)	Cell records
8:49 p.m.	Driver sends text message (last of day)	Cell records
~9:30 p.m.	Driver goes to bed	Interview
Thursday, February 16, 2012		
Time	Event	Source
~1:30 a.m.	Driver awakes for a drink	Interview
6:00 a.m.	Driver is awoken by his fiancée	Interview
6:30 a.m.	Driver leaves his home for work	Interview
~6:40 a.m.	Driver arrives at work	Interview
6:48 a.m.	Driver makes outgoing call (first call activity of day)	Cell records
Unknown	Driver completes pre-trip inspection	Interview
Unknown	Driver leaves yard for construction site	Interview
Unknown	Driver arrives at construction site	Interview
~7:10 a.m.	Driver leaves site for yard	Interview
~7:30 a.m.	Driver arrives at yard	Interview
~7:40 a.m.	Departs yard for construction site	Interview
7:58 a.m.	Driver receives incoming call (last call activity before accident)	Cell records
~8:00 a.m.	Driver arrives at construction site	Interview
~8:10 a.m.	Driver exchanges empty container for full and leaves yard	Interview
8:15 am	**Accident Occurs**	

2.2. Medical Factors

As part of the investigation, the Mack truck driver's medical records were obtained. A preliminary review of these records by the Human Performance Investigator did not reveal any evidence of current medical conditions that would be expected to be a factor in this accident.

2.2.1. Commercial Driver Fitness Exam

The Mack truck driver's most recent medical certification prior to the crash was conducted in March of 2010 by a physician specializing in internal medicine in Cream Ridge, New Jersey.[52] Specific information from that exam regarding the Mack truck driver's general health, vision, hearing, and medications is contained in sections 2.2.2 through 2.2.5 (below).

[52] Human Performance Factual Attachment 9: Mack Truck Driver Commercial Driver Fitness Examination.

In that March 2010 commercial driver medical exam,[53] the Mack truck driver answered "NO" to all of the conditions listed under the "Health History" section. The Mack truck driver's height was recorded as 71 inches and his weight was recorded at 164 pounds, which corresponds to a Body Mass Index (BMI) of 22.9.[54] The physician performing the exam indicated he observed no abnormalities in any of the driver's general body systems.[55]

The Mack truck driver involved in the Chesterfield accident was qualified for two years, with his medical certificate expiring in March of 2012.

2.2.2. General Health

When interviewed, the Mack truck driver told investigators he did not have any medical conditions and did not go to the doctor much. He also said he did not experience any medical events on the day of the accident. The driver also reported having no allergies.[56]

2.2.3. Vision

In the Mack truck driver's March 2010 Commercial Driver Fitness Determination, the driver's uncorrected Snellen distant visual acuity[57] was recorded as 20/30 for the left eye, 20/25 for the right eye, and as 20/25 for both eyes together.[58] The driver's horizontal field of vision was not noted. The performing physician indicated the driver could distinguish red, green, and amber colors.[59]

When interviewed, the Mack truck driver described his vision as "good" and does not need or use glasses or contact lenses. The driver does not have a vision care provider.[60]

2.2.4. Hearing

In the Mack truck driver's most recent Commercial Driver Fitness Determination, he was noted to be able to hear a forced whispered voice at 8 feet with both his left and right ears.[61]

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[53] See Attachment 9.
[54] For BMI information, see: http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.
[55] General appearance, eyes, ears, mouth and throat, heart, lungs and chest, abdomen and viscera, vascular system, genito-urinary, extremities, spine and other musculoskeletal, and neurological.
[56] See Attachment 1.
[57] Snellen fractions are a measure of visual acuity (sharpness of sight). In the Snellen fraction, the first number represents the test distance (20 feet) and the second represents the distance at which the average eye could see the letters on a certain line of the chart. A fraction of 20/20 is considered normal vision.
[58] The Mack driver's uncorrected visual acuity was recorded as 20/25 with the right eye, 20/30 with the left eye, and as 20/25 using both eyes.
[59] See Attachment 9.
[60] See Attachment 1.
[61] See Attachment 9.

2.2.5. Medications (Prescription, Over-the-Counter, Other)

When interviewed, the Mack truck driver specifically told investigators he does not take any prescription drugs, herbal supplements, or over the counter medications, both in general and specifically on the day of the accident. Pharmacy records did not indicate any current[62] prescriptions.[63]

2.2.6. Alcohol and Drug Consumption

When interviewed, the Mack truck driver told investigators he does not take any illicit drugs, both in general and specifically on the day of the accident. He drinks "socially", a couple of times a week and a couple of drinks on the weekend. He typically drinks beer. The last time the driver consumed alcohol before the accident was two days prior to the accident on Tuesday night.[64]

2.2.7. Post-accident Toxicology

2.2.7.1. Law Enforcement

Following the accident, the Mack truck driver agreed to provide a blood sample to law enforcement authorities.[65] That sample was split, and split portion was transferred to the Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Oklahoma. See section 2.2.7.3 for the results of that testing.

2.2.7.2. Department of Transportation Required Post-accident Drug and Alcohol Testing

Under Federal regulations,[66] the employers of commercial drivers involved in an accident resulting in the loss of human life are required to test their surviving drivers for alcohol and controlled substances. NTSB investigators contacted the Mack truck driver's employers and were told that the Mack driver was not sent for testing beyond the sample taken by law enforcement.

2.2.7.3. Civil Aerospace Medical Institute

Testing of the split sample from the Mack truck driver by the Civil Aerospace Medical Institute was negative for alcohol and major classes of illicit and performance-impairing drugs.[67]

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[62] In this context, current means the prescription was last filled on a date, in a quantity, that the driver would have been taking it on the day of the accident if taking it as prescribed.
[63] See Attachment 1.
[64] See Attachment 1.
[65] The driver provided this sample on the day of the accident; however, no documentation of the time the sample was taken was found.
[66] 49 CFR § 382.303 requires the testing of blood for alcohol and urine for five classes of drugs of abuse.
[67] Human Performance Factual Attachment 10: Mack Truck Driver Final Fatal Forensic Toxicology Report.

2.2.8. Psychological Factors

When interviewed, the 2004 Mack driver indicated the only stressor in his life was his three-month-old child, but told investigators he has adapted to the life change. He also said he had not experienced any deaths in the family or other major relationship changes recently.[68]

2.2.9. Sleep Habits

When interviewed, the Mack truck driver described the quality of his sleep as 7 or 8 on a scale from 1 to 10. His fiancée usually wakes the driver before his alarm clock goes off. His time of awakening can vary, and he sleeps until 7:30 or 8:30 a.m. on Saturday and Sunday. He occasionally wakes at night to get a drink or something to eat, but does not have trouble falling back to sleep afterwards. He has a three-month old child at home, but he stated the baby does not disturb his rest.[69]

Based on the Mack truck driver's statements during the interview, he received the following sleep the four nights prior to the accident:

- A minimum of 8 hours;
- A maximum of 8.5 hours;
- A total of 32.75 hours; and
- An average of 8.1875 hours.

2.3. Operational Factors

2.3.1. Licensing

The driver of the 2004 Mack truck was a 38-year old male. At the time of the crash he held a valid New Jersey Class "A" Commercial Driver's License (CDL) issued in December 2010 and expiring in December of 2014.[70] He held no endorsements and was subject to no restrictions. He held a current medical card (see above).

2.3.2. Training / Experience

2.3.2.1. General Experience

According to the Mack truck driver, at the time of the accident, he had held a Commercial Driver's License for approximately 10 years. He first obtained a CDL while working for Herman's Trucking, Inc. (Herman's), his employer at the time of the

[68] See Attachment 1.
[69] See Attachment 1.
[70] The New Jersey Class A CDL allows the operation of a tractor trailer; or, a truck and trailer with a gross combination weight rating (GCWR) of 26,001 or more pounds, provided the GCWR of the vehicle being towed is more than 10,000 pounds. A Class A license also allows the operation of Class B and C vehicles, with the proper extra endorsements.

accident. He worked for Herman's as a driver for approximately five years and then spent the next two to two and a half years doing the same kind of work for another company. The driver returned to Herman's, and has been employed there for the last two to three years.[71]

2.3.2.2. Training

When interviewed, the Mack truck driver told investigators he had not attended a driving school. His training was through Herman's after he got his CDL permit. He started with Herman's as a yard worker, then got a CDL permit, trained with the company, and began driving. He has had some training through Herman's, but had only had one training session since returning to work there.[72]

2.3.2.3. Specific Experience

2.3.2.3.1. Route Experience

At the time of the accident, the driver of the Mack truck was hauling construction waste back to Herman's, a run he was very familiar with and had made many times before.[73]

2.3.2.3.2. Vehicle Experience

According to the Mack truck driver, the truck he was operating at the time of the crash was his usual truck; he had driven it for at least the past two years. He drives it if there is a load that requires the roll-off container. If there is no work for the roll-off, he will drive a dump truck.

The Mack truck driver did not have any problems with the truck's controls, both in general and specifically on the day of the accident. He said there was nothing unusual about the truck's field of view. [74]

2.3.3. Accident / License History

A National Driver Registry inquiry indicated no adverse information for the Mack truck driver.[75]

[71] See Attachment 1.
[72] See Attachment 1.
[73] See Attachment 1.
[74] See Attachment 1.
[75] See Attachment 6.

2.3.4. Vehicle Controls

NTSB investigators documented the post-accident position of the Mack truck's controls. For a detailed description of the findings, please see the Vehicle Group Chairman's Factual Report.

2.4. Task Factors

2.4.1. Accident Trip

At the time of the accident, the Mack truck driver was taking a load of construction waste from a construction site along the New Jersey Turnpike back to Herman's. He described the weather at the time as cloudy and a little damp, but it had not started raining. The roadway was dry and he estimated his speed as 45 MPH. He was wearing his seatbelt. As he approached the intersection of CR 528 with Old York Road, he saw the school bus at the intersection. He could not tell investigators if the bus had just pulled up to the intersection, as a line of pine trees obscured his vision of Old York Road. He said he was not certain the school bus had made a complete stop. The school bus pulled into the intersection and he knew immediately that he would not be able to stop. The Mack truck driver could not say how far away from the bus he was when it entered his path of travel. He stated he veered to the left, as there was no on-coming traffic and applied the brakes. His brakes locked and the truck hit the bus.[76]

2.4.2. Workload / Distraction

When interviewed, the truck driver was asked about distractions at the time of the accident, including distractions internal to the vehicle (AM/FM radio, passengers, CB radio, GPS devices, cell phones, etc.) and distractions external to the vehicle (other traffic, pedestrians, glare/light, signs, billboards, etc.). In addition, investigators conducted an independent evaluation of distractions.

2.4.2.1. External Workload / Distraction

NTSB investigators made observations of the external conditions at the accident site on February 18, 2012 at approximately the same time as the accident. The external environment was found to be unremarkable, with no unusual or distracting features in the Mack truck driver's direction of travel.

2.4.2.2. Internal Workload / Distraction

2.4.2.2.1. Portable Electronic Devices

The driver owned a cell phone and it was in his possession at the time of the accident. When interviewed, the driver stated he does not use a hands-free device. Records from the driver's service provider identified the Mack truck bus driver's phone

[76] See Attachment 1.

as a Casio GZONE Ravine. The records also indicated the last activity prior to the accident on the Mack driver's phone was at 7:58 a.m. and lasted for 514 seconds (8 minutes and 34 seconds), ending between 8:06 a.m. and 8:07 a.m. The truck driver's first call after the accident was at 8:17 a.m.[77]

The Mack truck driver told investigators he had his personal GPS in the truck at the time of the accident, and it may have been turned on, but he was not using it to navigate during the accident trip, as he was very familiar with his destination.[78]

2.4.2.2.2. Other Distractions Internal to the Vehicle

The Mack truck driver told investigators the truck was only equipped with an AM/FM radio/CD player unit. It did not have a CB radio, Qualcomm, XDATA, or any other electronic communication devices.[79]

[77] See Attachment 8.
[78] See Attachment 1.
[79] See Attachment 1.

3. Factors Common to All Drivers

3.1. Environmental Factors

In order to acquire accurate weather and illumination information, NTSB investigators used a Garmin® eTrex Global Positioning System (GPS) unit to obtain the coordinates of the accident scene. The following values were recorded:

Latitude:	N 40° 07.836’
Longitude:	W 74° 39.723’

3.1.1. Illumination

Using the GPS coordinates obtained by NTSB investigators, astronomical data for the accident location was downloaded from the United States Naval Observatory[80] (USNO). Downloaded astronomical data is summarized in the table below.

Table 3. Sun and Moon Data for Chesterfield, NJ for February 16, 2012

Event	Time
Begin civil twilight[81]	6:23 a.m.
Sunrise	6:51 a.m.
Accident	**8:15 a.m.**
Sun transit	12:12 p.m.

According to the USNO, on February 16, 2012, at 8:00 a.m., in the area of the accident the sun was at an altitude of 11.6° above the horizon and was 117.3° east of true north. [82]

3.1.2. Weather

When asked about the weather at the time of the accident, the school bus driver told police and NTSB investigators it was cloudy, but not raining. The road surface was dry. In general, the sun is ahead and to the right of the school bus driver at that time of day. On the day of the accident, the cloudy weather conditions obscured the sun. The school bus driver did not report having any problems with the sun, light, or reflections.[83]

Weather data for February 16, 2012 was located for a weather station KNJCHEST3 (Chesterfield Downs) in Chesterfield, New Jersey. A summary of that data for the time closest to the reported time of the accident appears in the table below.[84]

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[80] http://www.usno.navy.mil/USNO/astronomical-applications

[81] Morning civil twilight begins when the geometric center of the sun is 6° below the horizon and ends at sunrise.

[82] Human Performance Factual Attachment 11: USNO Sun and Moon Data.

[83] See Attachment 1.

[84] Human Performance Factual Attachment 12: Weather Data, station KNJCHEST3, for February 16, 2012.

Table 4. Weather Data, KNJCHEST3, 8:00 A.M.

Temperature	31.8° F
Dew Point	30.0° F
Pressure	30.27 in
Wind	CALM
Wind Speed	N/A
Wind Gust	N/A
Humidity	93%
Rainfall Rate (hourly)	0.00 in

E. ACCIDENT DOCKET MATERIAL

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

LIST OF ATTACHMENTS

Attachment 1: Transcripts of Investigative Interviews.

Attachment 2: Morning Bus Schedules.

Attachment 3: School Bus Driver Cellular Telephone Records

Attachment 4: School Bus Driver Commercial Driver Fitness Examination.

Attachment 5: School Bus Driver Final Forensic Toxicology Report.

Attachment 6: E-mail on search of National Driver Register Problem Driver Pointer System.

Attachment 7: 2012 International School Bus Control Positions.

Attachment 8: Mack Truck Driver Cellular Telephone Records

Attachment 9: Mack Truck Driver Commercial Driver Fitness Examination.

Attachment 10: Mack Truck Driver Final Forensic Toxicology Report

Attachment 11: USNO Sun and Moon Data.

Attachment 12: Weather Data, station KNJCHEST3, for February 16, 2012

LIST OF PHOTOGRAPHS

NONE

END OF REPORT

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