



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

Penwell, Texas

HWY15MH004

(13 pages)

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

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

A. CRASH INFORMATION

Location: Interstate 20 (I-20) near milepost 103, near Penwell, Ector County, Texas
Vehicle #1: 2015 Bluebird prison transport bus
Operator #1: Texas Department of Criminal Justice (TDCJ)
Date: January 14, 2015
Time: Approximately 7:50 a.m. Central Standard Time (CST)
NTSB #: **HWY15MH004**

B. HUMAN PERFORMANCE FACTORS GROUP

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

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 HUMAN PERFORMANCE FACTORS INVESTIGATION

This crash involved a 2015 Bluebird prison bus (hereafter referred to as the bus) departing its lane of travel, entering the median, and passing between two overpasses. The bus went airborne, impacted an earthen area at the base of a concrete slope, and continued on to strike the side of a trailer on an eastbound Union Pacific train passing underneath the overpasses. The Human Performance factual investigation focused on the behavioral, medical, operational, and environmental factors associated with the driver of the bus. Due to the circumstances of the crash, human performance factors associated with the crew of the Union Pacific train were not considered.

1. Factors Associated with the Driver of the Bus

The driver of the bus was a 45 year old male.¹ He was fatally injured in the crash. The only persons residing with the driver were his two minor children; due to the emotional nature of the crash, investigators did not interview the children.

1.1. Bus Driver Activities Prior to the Crash

Using the driver's cellular telephone records,² information from an interview and follow-up questions with Texas Department of Criminal Justice (TDCJ) management,³ Global Positioning System (GPS) data,⁴ and the police crash report, investigators generated a table of the driver's activities prior to the crash. Times in the table are Central Standard Time (CST) unless otherwise noted.

¹ Driving duties are divided up by the officers working the transport and are not scheduled. Two corrections officers were in the front of the bus at the time of the crash; however, as a result of catastrophic damage to the front of the bus, it could not initially be determined which was the driver. The surviving officer stated he could not recall anything from that day, including who was driving. Ultimately, the Texas Department of Public Safety and the NTSB identified the driver based on injury patterns.

² Human Performance Attachment 1: 2015 Bluebird Driver's Cellular Telephone Records.

³ Human Performance Attachment 2: Narratives and Transcripts of Investigative Interviews.

⁴ Human Performance Attachment 3: GPS and Stop Report.

Table 1. Bus Driver Activities Prior to the Crash

Sunday, January 11th		
<u>Time</u>	<u>Description</u>	<u>Source</u>
8:46 p.m.	Driver makes outgoing call (last call of day)	Cell Records
Monday, January 12th		
<u>Time</u>	<u>Description</u>	<u>Source</u>
3:00 a.m.	Estimated time of driver awakening	ESTIMATE ⁵
4:00 a.m.	Driver's scheduled shift start	Abilene Schedule
2:11 p.m.	Driver receives incoming call (first answered call of day)	Cell Records
2:15 p.m.	Driver's shift ends	TDCJ Interview
7:23 p.m.	Driver receives incoming call (last answered call of day)	Cell Records
Tuesday, January 13th		
<u>Time</u>	<u>Description</u>	<u>Source</u>
3:30 a.m.	Estimated time of driver awakening	ESTIMATE
4:30 a.m.	Driver's scheduled shift start	Abilene Schedule
2:00 p.m.	Driver's shift ends	TDCJ Interview
2:21 p.m.	Driver makes outgoing call (first outgoing call of day)	Cell Records
2:57 p.m.	Driver sends outgoing text message (first outgoing of day)	Cell Records
6:33 p.m.	Driver sends outgoing text message (last outgoing of day)	Cell Records
7:15 p.m.	Driver receives incoming call (last activity of day)	Cell Records
Wednesday, January 14th		
<u>Time</u>	<u>Description</u>	<u>Source</u>
3:00 a.m.	Estimated time of driver awakening	ESTIMATE
4:00 a.m.	Driver's scheduled shift start	Abilene Schedule
4:11 a.m.	Bus is turned on at the Middleton Transfer Facility	GPS Data
4:39 a.m.	First GPS ping with bus in "travel" status	GPS Data
6:59 a.m.	Bus stops in Midland, TX	GPS Data
7:13 a.m.	First ping after stop with bus in "travel" status	GPS Data
7:37 a.m.	Last GPS ping. Bus speed listed as 62 mph	GPS Data
7:50 a.m.	Reported Time of Crash near Penwell, TX	Police Report

1.2. Medical Factors

Information in this section is based on records obtained from the driver's commercial medical examiners and other medical providers.⁶

⁵ The driver's time of awakening was estimated based on his scheduled start of shift, an approximately 30 minute drive time from his home to his workplace, and an additional 30 minutes for morning activities (showering, dressing, eating, etc.).

⁶ Per NTSB policy, medical records are not part of the public docket. A Medical Officer will review the records and generate a factual report of any relevant information, if necessary.

1.2.1. General Health

The driver of the bus was a 45 year-old male. No information regarding his health could be obtained from the driver as he was fatally injured in the crash. Records obtained from a local clinic indicate infrequent visits for acute illnesses.

1.2.2. Medical Examination Report for Commercial Motor Vehicle Driver Fitness Determination

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 a commercial vehicle.⁷ These examinations result in one of four outcomes with respect to medical qualification:

- The driver is found to meet the standards in 49 *Code of Federal Regulations* (CFR) §391.41 and is given a 2-year certificate;⁸
- 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 not to meet the standards.

As an agency of the state of Texas, the TDCJ is considered an "exempt" motor carrier. Drivers for the TDCJ, including the driver involved in this crash, are considered to be "excepted" drivers. The federal government does not require "excepted" drivers to undergo the medical examination listed above; however, TDCJ requires their drivers to do so through an internal policy.⁹

Investigators located three instances where the driver of the bus underwent a Commercial Driver's License (CDL) medical exam. All three were performed by an examiner in Abilene, Texas. The exams were performed in January 2015, January 2013, and January 2011.

1.2.2.1. January 2015 Examination

In this exam the driver marked all items in the health history as "NO". The driver indicated he was taking Atorvastatin¹⁰ 40 mg, Vitamin D, and aspirin. The examiner commented the medications were discussed and the driver indicated he was being treated by his primary care physician for hyperlipidemia¹¹ and a family history of the same. The driver had no history of myocardial infarction. The examiner encouraged the driver to use diet and exercise in addition to the medications. The driver's vision and hearing were within normal limits with no

⁷ 49 Code of Federal Regulations §391.41.

⁸ For more information on who must be examined and the examination process, please see 49 CFR §391.43 and 49 CFR §391.45.

⁹ See Attachment 2 to this report.

¹⁰ The generic form of the medication Lipitor®.

¹¹ An abnormally high concentration of lipids (fats) in the blood.

deficiencies noted. The driver's height was recorded as 69 inches (five feet nine inches) and his weight was recorded as 206 pounds. With this height and weight, the driver's Body Mass Index (BMI)¹² would be 29.

The driver was found to meet the standards in 49 CFR §391.41 and was issued a 2-year certificate.

1.2.3. January 2013 Examination

In this exam the driver marked all items in the health history as “NO”. The driver indicated he was taking Lipitor®. The examiner commented the driver had been discovered to have elevated lipids that year and had been started on Lipitor® without side effects.

The driver’s vision and hearing were found to be within normal limits with no deficiencies noted. The driver's height was recorded as 69 inches (five feet nine inches) and his weight was recorded as 186 pounds. With this height and weight, the driver's Body Mass Index (BMI) would be 27.5.

The driver was found to meet the standards in 49 CFR §391.41 and was issued a 2-year certificate.

1.2.4. January 2011 Examination

In this exam the driver marked all items in the health history as “NO”. The driver listed no medications. The examiner commented the driver denied any medical history and stated he was on no medications.

The driver’s vision and hearing were found to be within normal limits with no deficiencies noted. The driver's height was recorded as 70 inches (five feet ten inches) and his weight was recorded as 195 pounds. With this height and weight, the driver's Body Mass Index (BMI) would be 28.

The driver was found to meet the standards in 49 CFR §391.41 and was issued a 2-year certificate.

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

Investigators canvassed the four pharmacies in the area of the driver's residence. No prescription records in the driver's name were located. Additional pharmacies in Abilene, Texas were queried and no records were located.

As described above, shortly before the crash, the driver told a medical examiner he was taking Atorvastatin 40 mg, Vitamin D, and aspirin.

¹² For BMI information, see: http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.

1.2.6. Alcohol and Drug Consumption

No direct information on the driver's alcohol and drug consumption, either in general or in the days preceding the crash, could be gathered.

1.2.7. Post-Crash Toxicology

Following the crash, an autopsy was performed on the driver.¹³ At the request of the NTSB, a Federal Aviation Administration (FAA) toxicology box was completed and sent to the Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Oklahoma for analysis. In the CAMI analysis, no ethanol was detected in the blood. Atorvastatin was detected in the driver's blood and liver.¹⁴ CAMI did not test for carbon monoxide or cyanide.¹⁵

1.2.8. Previous Toxicological Testing

As a condition of his employment with the TDCJ, the bus driver was subject to pre-employment and random drug testing. NTSB investigators obtained copies of the results from 10 tests performed on the subject driver:

- A pre-employment test in July of 1998; and
- Random tests in:
 - January of 2000;
 - June 2000;
 - February 2006;
 - March 2006;
 - May 2006;
 - July 2006;
 - September 2006;
 - November 2010; and
 - May 2013

The tests from 1998 - 2006 checked for amphetamines, marijuana metabolites, phencyclidine (PCP), cocaine metabolites, and opiates. The 2010 and 2013 tests added heroin/opiates metabolite and ecstasy. All tests resulted in negative results.

¹³ For details on the autopsy, please see the Survival Factors Group Chairman's Factual Report.

¹⁴ CAMI also tested for amphetamines, opiates, marihuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, and antihistamines.

¹⁵ See Human Performance Factual Report Attachment 4: 2015 Bluebird Driver CAMI Report.

1.2.9. Psychological Factors

Nothing could be gathered regarding the driver's mental state on the day of the crash; although one of his co-workers survived the crash, that officer had no memory of that day.

1.3. Sleep Habits

As a result of the bus driver sustaining fatal injuries, no information was available on his sleep habits, either in general or in the days preceding the crash. Based on the available sources of information (see Section 1.1), the driver of the 2015 Bluebird had the following opportunity for rest:

Table 2. Bus Driver's Opportunity for Rest

From		To		Elapsed Time
Date	Time	Date	Time	
1/11/15	8:45 p.m.	1/12/15	4:00 a.m.	7 hours 15 minutes
1/12/15	7:30 p.m.	1/13/15	3:00 a.m.	7 hours 30 minutes
1/13/15	7:30 p.m.	1/14/15	3:00 a.m.	7 hours 30 minutes

1.4. Operational Factors

1.4.1. Licensing

A check of the bus driver's license history with the Texas Department of Public Safety (DPS) indicated he held a Class B Texas Commercial Driver's License with the "P" endorsement and a special restriction limiting him to government commercial vehicles, interstate only. His license would have expired in October of 2016. The state of Texas considered him eligible to drive at the time of the crash.¹⁶

A check with the National Driver Register found no records for this driver.¹⁷

1.4.2. Training/Experience

No information on the driver's training and experience could be gathered.

1.5. Task Factors

1.5.1. Crash Trip

At the time of the crash, the bus was travelling from the John Middleton Transfer Facility in Abilene, Texas to the Rogelio Sanchez State Jail in El Paso, Texas, a distance of approximately 461 miles and a projected travel time of approximately 7 hours (without stops). At the time of the crash, the bus had travelled approximately 196 miles in approximately 3 hours.

¹⁶ Human Performance Attachment 5: State of Texas Driver's Record for 2015 Bluebird Driver.

¹⁷ Human Performance Attachment 6: National Driver Register Search Report.

1.5.2. Workload/Distracted

No direct information on the driver's workload or possible distractions could be gathered. A review of the driver's personal cellular telephone records indicated he was not on a telephone call at or near the time of the crash. The driver was also not actively using the data functions of his phone or sending/receiving a text message at or near the time of the crash.¹⁸ A similar review of the department-issued cellular phone on the bus indicated it was not being used at or near the time of the crash.¹⁹

2. Other Factors

2.1. Accident Location

NTSB investigators used the compass application on an iPhone 5s running iOS version 8.1.2 to record the approximate Global Positioning System (GPS) coordinates of the accident scene. The recorded coordinates were:

Latitude: 31° 45' 5" N

Longitude: 102° 33' 34" W

2.2. Astronomical Factors

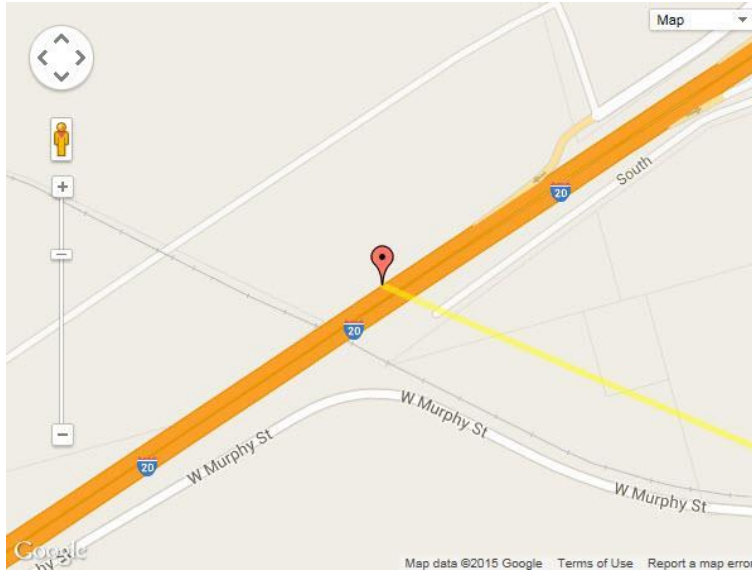
According to the U.S. Naval Observatory (USNO), for the accident date and location, civil twilight began at 7:24 a.m. and sunrise was 7:51 a.m. Therefore, the crash occurred during civil twilight. Additional data from the USNO states the sun was at an altitude of -0.9 degrees (i.e. was 0.9 degrees below the horizon) and was at an azimuth of 114.6 degrees east of true north.²⁰ The sun's position at the time of the crash is depicted graphically in Figure 1.

¹⁸ See Attachment 1 to this report.

¹⁹ There were only two calls for the work phone on January 14, 2015. Neither was at or near the time of the crash. See Human Performance Factors Report Attachment 7: Work-Issued Cellular Telephone Records.

²⁰ Human Performance Factors Report Attachment 8: USNO Sun/Moon Data.

Figure 1. Graphic Representation of Sun Position at the Time of the Crash



2.3. Weather

Data from weather station KTXODESS11 in Odessa, Texas for January 14, 2015 was downloaded from Weather Underground, <http://www.weatherunderground.com>. This weather station is approximately 15 miles east of the crash location as the crow flies. Data for observations closest to the time of the crash is shown in Table 3.

Table 3. Basic Weather Data

Time (CST)	7:42 a.m.	7:58 a.m.
Temperature	29.8° F	29.8° F
Dew Point	29.6° F	29.6° F
Humidity	99%	99%
Pressure	30.21 in	30.21 in
Wind Dir.	NE	ESE
Wind Speed	2.7 mph	3.7 mph
Wind Gust Speed	N/A	N/A
Precipitation	N/A	N/A
Accumulated Precipitation	0	0

More detailed weather information was provided by a meteorologist from the NTSB's Office of Aviation Safety and can be found in the docket for this investigation.

2.4. Environment

Using the GPS coordinates and sun position data from above, NTSB investigators drove through the accident scene at a time when the sun was in approximately the same position as at the time of the crash. Investigators noted the sun was below the horizon to their left rear when travelling in the same direction as the 2015 Bluebird. Overhead roadway lighting was present at the crash location. No billboards or other non-roadway related signage was noted. All visible signage was roadway related and appeared to be typical. No reflections or large reflective surfaces were noted. Video was recorded and still photographs were taken to document conditions.²¹ It must be noted that while the sun was in approximately the same position as the time of the accident, an exact duplication of position was not possible. Also, other factors, such as cloud cover, either could not be reproduced or were unknown.

2.5. Witness Statements²²

In an interview conducted by an NTSB investigator, a driver heading westbound on I-20 in the left lane stated that as he approached the location of the crash he saw a section of guardrail in his lane. He swerved into the right lane, stating he barely missed the guardrail lying in the road. He estimated that it was sticking out into the lane about three-fourths of the way. The witness stated the road was not icy and he did not lose control when he swerved. He estimated he was between three and five minutes ahead of the bus.

A second witness, travelling westbound on I-20 in the left lane also encountered a section of guardrail in the lane at the crash location. He estimated it was two feet into the lane. He stated he swerved into the right lane to avoid the rail, as did the semi behind him. After crossing the overpass, he observed what he thought was a trailer go off the overpass. He later learned the vehicle he observed was the bus.

2.6. Police Video

A Texas Department of Public Safety (DPS) trooper was investigating a previous crash in the area of this crash when the bus departed the roadway. The trooper was stopped on the right shoulder of the westbound roadway more than 600 feet east of the overpass. His vehicle was equipped with a forward-facing dash camera that recorded video footage of the traffic as it traveled toward the overpass, including a portion of the crash sequence.²³ NTSB staff from the Office of Highway Safety²⁴ and Office of Research and Engineering²⁵ examined that portion of the footage.

When the bus enters the camera's field of view it is traveling in the left lane behind a truck tractor-semitrailer combination. These two vehicles pass another combination vehicle in the right lane and a faint image of a portion of the median guardrail can be seen being displaced

²¹ Please see Human Performance Photographs and Video in the docket for this crash.

²² Please see Survival Factors Group Chairman's Factual Report, available in the docket.

²³ Since the video shows the actual crash, per NTSB policy, it will not be available in the docket.

²⁴ The video was reviewed by the Human Performance and Technical Reconstruction Group Chairmen. For additional details on the video, including still frames, please see the Technical Reconstruction Group Chairman's Factual Report.

²⁵ See section 2.6.1 of this report for details.

vertically. The position of the guardrail in relation to the left travel lane could not be discerned in the video. The bus then veers leftward into the median. The bus can be seen for a total of about 6.9 seconds.

2.6.1. Following Distance

Analysis of the video was performed to calculate the speed of the bus and the headway between the bus and the lead truck.²⁶ Staff was able to estimate the speed of the bus as 57 ± 2 miles per hour (MPH). The speed of a tanker combination vehicle immediately ahead of the Bluebird in the same lane was estimated to be 61 ± 3 MPH. Using two seconds of the video, from six seconds before impact to four seconds before impact, staff was able to estimate the distance between the rear of the tanker combination and the front of the bus as between 69 and 93 feet.²⁷

²⁶ For additional information on how these items were calculated, please see the Video Study, available in the docket for this investigation.

²⁷ Actual computed estimates were 87 ± 5 feet for a 40 foot trailer and 74 ± 5 feet for a 53 foot trailer.

E. DOCKET MATERIAL

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

LIST OF ATTACHMENTS

Human Performance Attachment 1 -	2015 Bluebird Driver's Cellular Telephone Records
Human Performance Attachment 2 -	Narratives and Transcripts of Investigative Interviews.
Human Performance Attachment 3 -	GPS and Stop Report.
Human Performance Attachment 4 -	2015 Bluebird Driver CAMI Report.
Human Performance Attachment 5 -	State of Texas Driver's Record for 2015 Bluebird Driver.
Human Performance Attachment 6 -	National Driver Register Search Report.
Human Performance Attachment 7 -	Work-Issued Cellular Telephone Records.
Human Performance Attachment 8 -	USNO Sun/Moon Data.

LIST OF PHOTOGRAPHS

Human Performance Photo 1 -	View of Crash Location Under Similar Lighting Conditions
Human Performance Photo 2 -	View of Crash Location Under Similar Lighting Conditions, Showing Overhead Lighting

LIST OF VIDEOS

Human Performance Video 1 -	Video of Crash Location Under Similar Lighting Conditions
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END OF REPORT

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