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

SURVIVAL FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

A. CRASH INFORMATION

Location:	Lanetown Rd and Buckingham Branch Grade Crossing near Crozet, Albemarle County, Virginia
Vehicle 1:	2018 Freightliner refuse truck
Operator 1:	Time Disposal of Ruckersville, VA
Vehicle #2:	AMTRAK "Congressional Special Amtrak Train 923", consisting of 2 locomotives and 10 cars
Operator #2:	National Railroad Passenger Corporation (AMTRAK)
Date:	January 31, 2018
Time:	Approximately 11:16 a.m. EST
NTSB #:	**HWY18MH005**

B. SURVIVAL FACTORS GROUP

Sheryl Harley, Survival 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 SURVIVAL FACTORS INVESTIGATION

The Survival Factors investigation focused on the elements of the crash related to survivability to include the utilization of the available occupant restraint system, victim injury causation and the timely, effective and efficient the effective, efficient response of the emergency responders and the availability of training for emergency responders regarding operations on railroad property, equipment and rail safety.

1. AMTRAK CONGRESSIONAL SPECIAL TRAIN 923

The train consist was comprised of two locomotives, one in the front and one in the rear; ten passenger cars. There were an unknown number of passengers aboard the train and ten members of the operations crew.[1]

1.1. The Consist

1.1.1. The lead locomotive

The lead locomotive was a 2001 General Electric Diesel Electric locomotive. At the time of the collision, the lead locomotive was occupied by three on-duty Amtrak employees that included; the locomotive engineer, the road foreman of engines, and a locomotive technician and a United States Capitol police officer. Because of the collision with the trash truck, the lead locomotive sustained extensive damage to the area comprising the knuckle and the pilot; extending upward towards the front windshield. The locomotive's interior did not sustain any damage in the collision. The first axle of the locomotive derailed in the crash. (**Photo 1).**

Photo #1: FBI photo showing exterior damage to lead locomotive.

1.1.2. Passenger cars

None of the passenger cars sustained damage in the collision. A momentary power disruption was experienced; however, emergency power restored lighting to all parts of the train.

[1] Note: Due to the special nature of the train, a passenger manifest was not available and the exact number of passengers on the train was not provided by the security detail.

1.1.3. Rear locomotive

The rear locomotive sustained no damage in the collision and was removed from the scene under its own power. The rear locomotive was unoccupied at the time of the crash.

1.2. Crew Injuries

Because of the crash, the three Amtrak employees in the lead locomotive were thrown to the floor of the locomotive cab and sustained minor injuries. The fourth occupant in the lead locomotive was able to brace himself in anticipation of the impact and was uninjured.

A train conductor, located in the first coach car, reported sustaining minor injury when he was thrown from his seat during the impact.

1.3. Passenger Injuries

A passenger in one of the two café cars sustained minor injuries when he fell to the floor following the collision. A second passenger was reported to have been standing in the aisleway of a coach car when the collision occurred. This passenger reportedly sustained minor injury after falling to the floor of the train car. Neither of these two passengers consented to be interviewed. All information regarding their injuries was obtained through witnesses. A third passenger sustained minor injury when he struck his head against the seatback during the collision. This passenger was in one of the coach cars and had been sitting in a rearward facing seat.

2. THE 2018 FREIGHTLINER REFUSE TRUCK WITH 28-YARD HOPPER

The Freightliner trash truck, operated by Time Disposal, was occupied by a driver and two helpers. The trash truck services neighborhoods and businesses on both sides of the railroad tracks. During pick-up operations, the helpers ride the exterior rear steps to expediate trash pick-up. During periods where the truck is transitioning from one neighborhood to another, it is customary for the helpers to ride inside of the trash truck with the driver. Approximately five minutes prior the crash, the trash truck was observed driving through the Crozet Volunteer Fire Department rear parking lot with at least one helper riding the driver's side exterior rear step. At some point; the truck stopped, and this helper got inside the cab of the truck.

Because of the impact with the train, the two helpers were ejected out the passenger door and were found lying on the ground, adjacent to the passenger side of the trash truck. The passenger door was found open. The driver remained in the truck and self-extricated after the collision.

2.1. Damage profile

2.1.1. Exterior damage

The Freightliner sustained extensive structural damage during the crash sequence. In addition to the collision damage caused by the train and the subsequent impact with several

mailboxes and support posts; the hopper was torn from the main body of the truck. During the separation of the hopper from the truck, the truck frame experienced significant twisting and the loss of structural integrity to the truck cab.[2] **(Photo 2)**

Photo #2: Exterior front view of truck and the detached Hopper in background

2.1.2. Interior damage

The interior cab design of the Freightliner provides seating for the driver as well as two passengers on a bench seat. All seating positions, in the trash truck, are equipped with seatbelts; lap and shoulder belts for the driver and the right seat passenger and a lap belt for the middle seat occupant. A post-crash examination of the seatbelts revealed no evidence of use by the truck occupants. The driver's seatbelt and the right passenger seatbelt were found locked in the stowed position. The seatbelt designated for the middle occupant was found under the displaced bench seat and entangled around the bottom of the driver's seat that shifted during the crash. The post-crash examination revealed that the occupant located in the right seat adjacent to the passenger door, had struck the front windshield with his head causing extensive damage to the windshield glass.

The overall interior damage sustained by the truck was documented. The overall height of the roof in the undamaged area, measured from the cab floor is 60 inches. In several locations, the structural integrity of the roof had been compromised and the interior height was decreased to

[2] See Vehicle Factors Group Chairman report for additional information.

41 inches at its lowest point in the truck cab. Directly in front of the steering column, the floor of the truck had been deformed and deflected upwards into the passenger compartment by 4 inches.

The measurements of the driver seat found that the seat-pan was 20 ½ inches in length, 18 inches wide and the seat back was 18 inches in height. The distance from the bottom of the seat pan to the cab floor was 13 ¾ inches. The driver's seat had been rotated slightly to the right and rearwards so that the top of the seat was protruding out the rear window of the cab, which had broken during the crash. The passenger bench seat-pan was 41 inches in length, 18 inches wide and the seat back was 18 inches in height. The rear truck bulkhead sustained extensive damage in the crash and penetrated the interior of the cab, pushing the bench seat forward. The bench seat had been displaced so that at the center most point of the seat, it was only 3 inches away from the center console. The distance of the bench seat from the center console at the passenger door was 8 inches. **(Photo 3 and 4)**

Photo #3: Interior of truck cab showing seat positions and rear window damage.

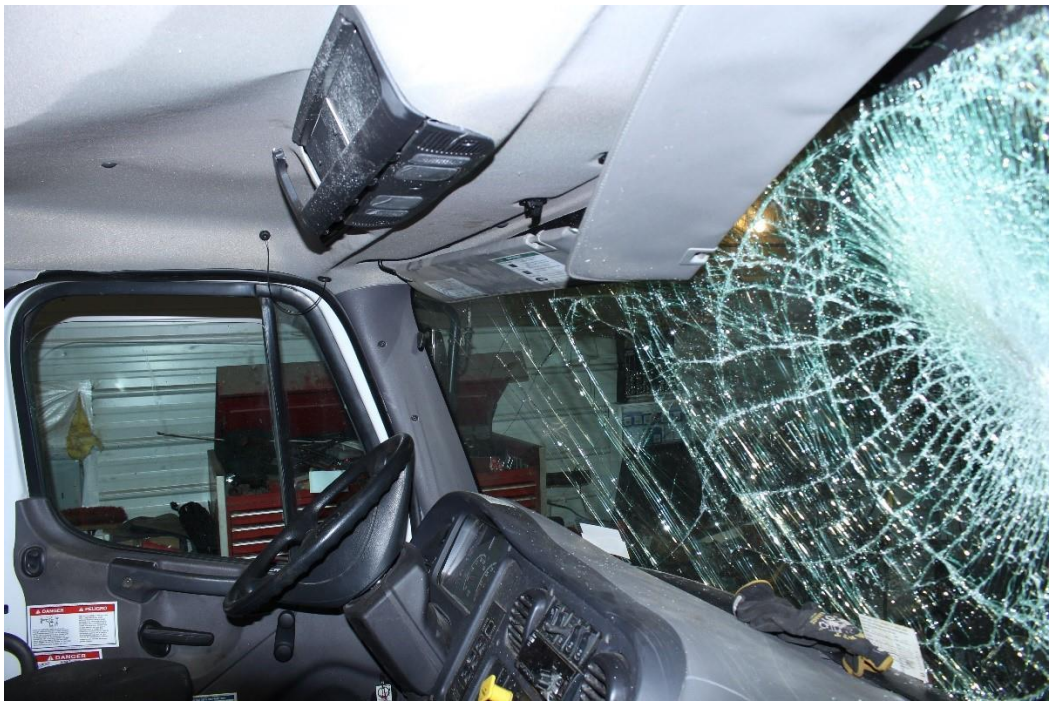

Photo #4: Interior of truck cab showing head strike to windshield by passenger.

2.2. Occupants and Injuries

2.2.1. The Driver

The driver of the Freightliner was a 30-year old male and was unbelted at the time of the crash. The train struck the trash truck on the left rear side. After the impact with the train, the trash truck began to rotate. The driver was thrown forward and to the right; colliding with the helper occupying the middle seat. The driver was found lying across the bench seat after the collision. He sustained minor injuries.

2.2.2. The Right Seat Passenger

The helper occupying the right seat, adjacent to the passenger door, is a 27-year old male who was unbelted at the time of the crash. This passenger sustained serious blunt impact trauma to the head and torso. Because of the collision with the train and the rotation of the truck, the helper was thrown forward, striking his head on the windshield. After striking the windshield, the helper was ejected out of the passenger side door and onto the ground. This occupant also sustained injuries from the impact with other occupants or objects within the interior of the truck cab.

2.2.3. The Middle Seat Passenger

The helper riding in the middle position on the bench seat was a 28-year old male who was not wearing a seatbelt at the time of the crash. The helper shared the bench seat with the right seat passenger and was positioned just to the left of a computer terminal installed in the truck. The

computer terminal is designed to be pulled forward and positioned, allowing the occupants of the truck to access it. The post-crash examination revealed that the computer terminal had sustained damage from the impact with one or more occupants inside of the truck cab. The middle seat helper was ejected out of the passenger side door after the right seat passenger and was found unresponsive lying on the ground, on his side. This individual succumbed to his injuries and was pronounced dead on the scene.

3. RAILROAD OPERATIONS

3.1. Amtrak

3.1.1. Post-crash crew operations

Following the collision, Amtrak personnel walked through all the passenger cars to determine passenger injuries and the need for medical intervention. Several members of the crew were equipped with portable radios that allowed communications between crew members and the dispatcher. After completing the interior inspection of the train; several Amtrak employees inspected the exterior of the train for damage once it was determined that it was safe to do so. The damage to the train was limited to the lead locomotive.

Arriving emergency responders were confronted by security personnel who were unable to provide any information about the train or its passengers. Eventually, emergency responders were able to locate and speak with Amtrak personnel from the train. However; the Amtrak employees were unable to provide a passenger manifest or an accurate count of the number of passengers onboard the train or their injuries. The emergency responders boarded the train and conducted an independent search of the train cars to determine the injury to passengers and the need for medical intervention.

3.2. CSX

The railroad tracks that run through the community of Crozet, Virginia are owned by CSX railroad. CSX leases their track to the Buckingham Branch Railroad who, under agreement, assumes responsibility for all track operations to include the movement of trains, maintenance and communications.

3.3. Buckingham Branch Railroad (BBR)

3.3.1. Operations and Responsibility

The Buckingham Branch Railroad operates approximately 275 miles of track in the heart of central Virginia. The railroad exercises authority over all the tracks that run through the community of Crozet. The Buckingham Branch Railroad dispatch center monitors the movement of trains throughout their territory and the adjacent territory belonging to CSX. Emergency calls are routed to the dispatcher through onboard radio systems on trains and from emergency contact

information provided by the Emergency Notification Systems (ENS) signs located at each of their highway grade crossings.

3.3.2. Training for Emergency Responders and the local communities

Amtrak in partnership with the Buckingham Branch Railroad provides rail safety training to the local first responders. The program has been in effect for several years and the last training session was held in Augusta, Virginia in September 2017.

The Buckingham Branch Railroad also provide community rail safety programs through the local high school students, the Boy Scouts of American and other local civic organizations. The training is announced through printed flyers and distributed by the Buckingham Branch Railroad training coordinator. These flyers are provided to the Albemarle County Emergency Communications Center for distribution to local fire departments and law enforcement agencies. However, the notification of available training frequently is not provided to local first responders in adjacent jurisdictions. At the time of the collision, no training had been conducted within Albemarle County or the community of Crozet.[3]

4. EMERGENCY RESPONSE

The community of Crozet, Virginia is situated approximately 12 miles west of Charlottesville, Virginia and 21 miles east of Staunton, Virginia. The population of the community is approximately 5,600 people. The Crozet Volunteer Fire Department and the Western Albemarle Rescue Squad provide fire and emergency medical services to the community. Both agencies are staff around the clock by an all-volunteer force. Adjacent to Crozet, is the city of Charlottesville which employs both volunteer and paid staff for fire and emergency medical services. In addition to mutual aid agreements with the city of Charlottesville, other neighboring communities provided support to Crozet during the incident. Additional resources and manpower were provided by the communities of Ivy, Hollymead and Earlysville. The City of Charlottesville and the Charlottesville-Albemarle Rescue Squad provided additional emergency medical services units.

4.1. Fire/EMS services

The Crozet Volunteer Fire Department is located approximately one and a half miles from the scene. The organization is a full-time volunteer operation with approximately 60 active members that man the station around the clock. The fire department's first due area encompasses approximately 176 square miles. A majority of the area is either rural, not densely populated or part of the adjacent national forest. The Crozet Fire Department is a fire suppression station with extrication capabilities. It does not provide ambulance service and the minimum medical training requirement for its members is CPR certification. Because of the area, many the volunteer members

[3] See Operations Group Chairman report for additional information.

are career firefighters in adjacent jurisdictions and possess Emergency Medical Technician (EMT-B) skills.

The Western Albemarle Rescue Squad is an all-volunteer organization that provides Basic and Advanced Life Support medical services to the community of Crozet. The rescue squad is staff around the clock by its 80 active members and is located approximately 1.1 miles from the crash scene. An ambulance from the rescue squad was the first emergency unit to arrive on the scene.

The University of Virginia (UVA) Medical Center helicopter, Pegasus, and the UVA Medical Center ground support ambulance were dispatched to the scene in response to the incident. The University of Virginia Medical Center is a designated Level One Trauma Center located on the UVA campus; approximately 15 miles, by ground, from the crash scene.

4.2. Law Enforcement response

The Albemarle County Police Department (ACPD) is the lead law enforcement agency for the area encompassing the collision. The ACPD has a staff of approximately 145 officers assigned to approximately 750 square miles of area.

The department participates in county sponsored Mass Casualty Incident (MCI) drills. The last MCI drill was held in 2017. However, none of the police officers have received training in rail safety or handling rail emergencies as part of or in conjunction with the Albemarle County Police Department. Many of the county's police officers lack basic knowledge about railroad operation such as signage and the proper notification procedure in the event of an emergency on railroad property or at highway grade crossings.

The initial call was dispatched to an ACPD police officer who was approximately one and a half miles from the scene. The officer arrived on the scene within minutes of being dispatched. The police officer, who was also a volunteer firefighter, immediately began first aid and upon arrival of the fire department turned the rescue operation over to them. Additional personnel from ACPD were dispatched to the scene. An investigation into the crash was conducted and a report was generated.[4]

4.3. Event Timeline

The event timeline was generated from interviews with railroad personnel and the Albemarle County Emergency Communications Center 911/CAD report.[5]

- **11:16 a.m. Collision occurred**

[4] Survival Factors Attachment: Commonwealth of Virginia Police Crash Report
[5] Survival Factors Attachment: Albemarle County Emergency Communications Center 911/CAD report

- **11:16 a.m. Road foreman calls Buckingham Branch dispatcher to report collision**
- **11:17:39 a.m. Albemarle County E.C.C. receives 911 call reporting crash.**
- **11:18:30 a.m. Albemarle County E.C.C. dispatches fire department and law enforcement units to the scene.**
- **11:20:42 a.m. First Albemarle County Police Department unit arrives on the scene.**
- **11:23:05 a.m. West Albemarle Rescue Squad ambulance arrives on the scene.**
- **11:25:00 a.m. E.C.C. reports that UVA medevac helicopter is in the air and available.**
- **11:26:19 a.m. Crozet Volunteer Fire Department engine company arrives on scene.**
- **11:26:22 a.m. E.C.C. notified of active MCI by ACPD unit on the scene.**
- **11:27:05 a.m. Senior officer on engine company assumes command and establishes a command post. Fire call changed from MCI Level 2 to MCI Level 1.**
- **11:27:10 a.m. Incident Commander requests medevac helicopter "Pegasus".**
- **11:31:25 a.m. E.C.C. Notifies University of VA hospital of MCI incident.**
- **11:33:27 a.m. E.C.C. reports that medevac helicopter "Pegasus" is in route to the scene.**
- **11:35:13 a.m. E.C.C. reports "Pegasus" ground support ambulance in route to the scene.**
- **11:39:29 a.m. Augusta Medical Center notified of MCI incident.**
- **11:47:21 a.m. Incident cleared**

5. INTERVIEWS

5.1. Law Enforcement Response

An interview was conducted with the first arriving law enforcement officer from the Albemarle County Police Department.

The officer reports that he was parked in the rear of the Crozet Volunteer Fire Department station when the trash truck drove through the parking lot. He observed one of the helpers riding the exterior rear step of the truck. Approximately one minute after the trash truck drove through the parking lot, he heard the train approaching the center of Crozet. Approximately one minute later, he received the call for the crash. The fire station was approximately 1 ½ miles from the crash scene. He traveled in a northwesterly direction to the scene and stopped on the north side of the tracks. The crossing gate arms were down upon his arrival. Initially, his view of the south side of the tracks was blocked by the rear of the train. When he ran around the rear of the stopped train; he observed the trash truck. He also observed two males lying on the ground. One male was obviously deceased. The second male had facial wounds and a large quantity of blood on his face. The officer noted that he was having difficulty breathing and provided first aid until the arrival of the fire department approximately 5 minutes later.

The officer advised that he did not personally speak to any of the injured passengers onboard the train. He was advised by fire department personnel that several of the passengers had been injured but 2 or 3 had refused transport. It was difficult to determine who was in charge because the police and fire department agencies were operating on different radio frequencies. The Albemarle County Emergency Communications Center had the ability to "patch" together the various agencies to allow direct communications over one frequency. However, this did not occur.

The officer advised that though the Albemarle County Police Department regularly participates in Mass Casualty Incident training; the department hasn't participated in any rail related safety training. To his knowledge, the local railroad has never offered this training to law enforcement. He advised that he participated in a similar course approximately three years ago but that his participation was part of his work as a volunteer firefighter. Despite this prior training, the officer was unaware of the Emergency Notification Systems (ENS) signs located at the grade crossing that provided instructions on how to contact the railroad dispatcher in the event of an emergency at that grade crossing.

5.2. Fire/EMS Responders

Interviews were conducted with members of the Crozet Volunteer Fire Department regarding the emergency response to the incident and the agency's overall response to rail related emergencies and the availability of training.

5.2.1. Crozet Volunteer Fire Department, Incident Commander

The lieutenant advised that he was at the fire station when he received the call at 11:17:39. Notification to members of the Crozet Volunteer Fire Department is performed in two ways; by pager and the setting off the house bells. In addition to himself, the engine driver was at the fire station. Shortly thereafter, a third firefighter arrived at the station and the first piece of apparatus from that station responded to the scene. The lieutenant noted that additional equipment from the station also responded.

He advised that E-52 arrived on the scene and was positioned on the north side of the railroad tracks. Personnel from the local rescue squad were already on the scene and treating the

victims. He immediately set up the Incident Command and confirmed the need for the medevac helicopter from the University of Virginia Medical Center. Per protocol, he ordered a hose line pulled and absorbent material applied to control the hazardous material spill caused by the damaged trash truck.

The lieutenant advised that during the incident, two radio frequencies were utilized for the rescue operation. One frequency was designated for the medevac helicopter and the other for the triage operation. A unified command was established with the Albemarle County Fire Department that included representatives from the responding fire, ems and police agencies. The lieutenant advised that getting additional resources to the scene had been an issue; due to the location of the incident and the limited access points. Special emphasizes had to be placed on the routing of each additional piece of equipment that responded to the scene. He turned over the command of the incident to Battalion Chief 13 at 11:31:49.

5.2.2. Crozet Volunteer Fire Department, Emergency Responders

The emergency responders advised that the crossing gate arms were in the down position and the flashing warning lights were activated upon their arrival. No audible warning was heard by any of the crewmembers. The emergency responders implemented established protocols regarding Mass Casualty Incidents.[6] These protocols included ensuring scene safety, requesting additional resources and the setting up the incident command system. The designated safety officer retrieved each emergency responder's "pass tag or passport" which allowed for the accounting of all personnel on the scene of the incident.

The emergency responders advised that no representative from the train's security detail approached them to assist with the identification of potential victims onboard the train. The first responders had to conduct their own search of the train cars to identify potential victims. The emergency responders advised that they attempted to communicate with the security detail but none of the officers would speak to them. The inability to communicate delayed the identification of victims and prevented the emergency responders from being able to obtain an accurate accounting of the number of victims involved.

Though members of the Crozet Volunteer Fire Department have participated in joint training operations with neighboring fire departments; none of that training has included rail safety or a familiarization with emergency protocols when dealing with railroad property and equipment.

The emergency responders advised that several issues were encountered during the rescue operation. These issues included the difficulty the ambulance crews encountered trying to access the scene and to transport patients. Because of the incident location and the limited access provided by the roadway; several ambulances were blocked in by newly arriving apparatus.

Another issue encountered by the members of the Crozet Volunteer Fire Department was a lack of effective communications between fire and police department personnel on the scene. The fire and police departments operated off separate radio frequencies during the incident; despite the

[6] www.tjems.org/s/Thomas-Jefferson-EMS-Council-MCI-Plan-2017

ability of the units to be "patched" in together, to communicate over a common frequency. The reason the units were not patched together during the incident was unknown.

Most members of the Crozet Volunteer Fire Department have never participated in a railroad related training drill. None of the personnel have knowledge of the correct procedure to notify the railroad in the event of an emergency at a highway grade crossing.

An After-Action report was drafted by the Crozet Volunteer Fire Department. The report outlined the on-scene operation and addressed those issues identified by department personnel.[7]

5.3. Passengers

5.3.1. Passengers in train cars

Most of the passengers on the train were uninjured and were taken to their destination prior to the arrival of NTSB investigators. Two of the injured passengers refused to be interviewed and no interview was conducted. A third passenger consented to an interview and provided information regarding his injuries and the post-crash activities of the Amtrak crew.

The passenger advised that there had been no warning given about the impending crash. He had been seated in one of the coach cars and was in the last row facing the exterior lavatory wall on the right side; facing the direction of travel for the train. He sat in the aisle seat and was facing backward. At the time of the crash, he was twisted in the seat, facing the window. Because of the collision, his head fell back against the seat. The passenger advised he sustained a closed head injury but never lost consciousness. He advised that after the collision, members of the train crew came through the train car and checked on the welfare of the passengers.

He advised that he had no memory of the train losing power after the collision but advised that it was a bright day, the train car windows were uncovered, and the sunlight would have provided adequate illumination inside of the train car.[8]

5.4. Witnesses

5.4.1. Passenger in lead locomotive

The police officer positioned in the lead locomotive advised that he observed the Amtrak employees from the time they boarded the train until the crash. He advised that two of the Amtrak personnel, located in the forward jump seats, communicated frequently with one another and that the individual on the left side of the train was in constant radio communications with the dispatcher. The employee seated in the rear jump seat on the left side did not interact with the other two individuals. From his vantage point, the officer advised that he had an unobstructed view of the

[7] Survival Factors Attachment: Emergency Responder interviews
[8] Survival Factors Attachment: Passenger Interview

console in front of the engineer and the gauges. He advised that from the signs that were visible to him and the gauge indicators, the train was being operated within legal limits.

The police officer advised that after the train rounded a sharp curve; he and the Amtrak personnel observed the trash truck on the tracks. The truck was moving across the tracks but suddenly stopped, leaving the rear portion of the truck on the track. The truck didn't move again. The engineer sounded the train horn several times, but the truck didn't move. The officer observed the engineer reach for something which he assumed was the brake. The officer advised that he attempted to warn his colleagues of the impending crash by radio, but that there hadn't been enough time before the collision occurred. He advised that he grabbed the overhead handle adjacent to the ceiling on the right side of the locomotive and braced himself for the impact. He was able to maintain his balance and sustained no injury. The three Amtrak employees; however, were thrown to the floor and all of them had sustained injuries. He believed that no more than ten seconds elapsed from the time that the Amtrak personnel first observed the trash truck on the track until the collision.

The officer advised that after the impact, the train decelerated and stopped quickly. Upon exiting the locomotive cab with the Amtrak crew, he observed the trash truck and the two individuals lying on the ground. It was at this time that he noticed that the front axle of the locomotive had derailed.

5.4.2. Non-involved motorist stopped at the grade crossing

The motorist advised that at about 11:15 a.m. he turned onto Lanetown Road from Mint Springs Road. When he arrived at the grade crossing; the gate was down and the "red light" was blinking. He observed the trash truck already stopped on the crossing; positioned perpendicular to the track. He believed that the truck was no more than 30 feet from his vehicle. Within seconds of his arrival at the grade crossing, the motorist reported that he observed the train approaching from his left. He advised that the truck had not moved since he arrived and did not move prior to the impact.

Once the train had stopped, he ran to the truck and saw the two victims lying unconscious on the ground, approximately ten feet from the truck. He advised that these two men had been ejected from the vehicle. The third man was observed inside of the truck, slumped over to the right and unconscious. He called 911 and his cell phone captured the call at 11:17 a.m. He ran over to the train to inform the passengers that help was on the way. When he turned back to the trash truck, the male subject that had been unconscious inside of the truck cab; was now standing outside of the truck. A local nurse had arrived on the scene and was providing first aid to the two injured truck occupants.

5.4.3. Resident #1

The resident advised that her home backs up to the railroad tracks on the south side of the tracks. On the day of the collision, she and her son were at home and on the first-floor level of the residence. She and her son heard an explosion. She observed the train as it passed the grade crossing and saw what she believed to be gravel and trash flying. The train had quickly slowed and

came to a stop. She stepped outside her residence and observed the trash truck stopped on the south side of the railroad tracks. She called 911 before running to the trash truck.

As she approached the trash truck, she observed a female, she believed it was someone who resided in the neighborhood, in a maroon colored car stopped at the corner. The woman appeared to be in shock and did not respond to any of the interrogatives the resident asked her. The resident advised that it wasn't until later that she realized that the woman had left the scene. She sent her son to the home of the nurse that lived next door to ask for assistance. The neighbor had not been at home. However, the neighbor soon pulled up in her car. The neighbor provided CPR to one of the victims. Additional neighbors responded to the scene to assist. She advised that approximately 4 minutes later, the first of the emergency responders arrived on the scene. She advised that she had been on the scene approximately 30 minutes before she noticed that the crossing gate arms were down.

The resident advised that the day of the crash was the normal trash pick-up day for her neighborhood. At approximately 10:30 a.m. that morning; the trash truck had come by and collected the trash from in front of her home. Though she didn't remember the specifics of that day, the resident advised that normally she would see the two helpers riding the exterior rear step of the vehicle as it traveled through her neighborhood to pick-up trash.

The resident advised that she had not experienced any recent problems regarding the grade crossing. Two years ago; she arrived at the grade crossing and found the crossing gate arms lowered. There had been no train despite the activation of the grade crossing warning system. The resident advised that she had been uneasy about driving around the lowered gates, so she took a circuitous route, through town to her home. She noted that when she arrived home, the gate was still in the down position, and no train had approached. *(The route the resident took would have taken approximately ten minutes.)* She advised that her neighbor across the road, who lived adjacent to the railroad tracks, had frequently complained about the "malfunctioning" crossing gate. He had advised her that he frequently drove around the lowered gate arms. Due to the infrequency of the malfunctions, she had never reported the incident. She advised that she didn't know who to contact to report the problem with the grade crossing.

Her son advised that he observed the trash truck collecting the trash in the neighborhood at 9:00 a.m. that morning. He advised that on several occasions, the crossing's warning system would activate; the warning lights would flash, and the gate arms would lower when no train was approaching. The occurrence was well known to the local kids who played on the tracks.

Neither the resident nor her son was aware that information regarding how to contact the railroad was available on posted Emergency Notification Systems (ENS) signs at the grade crossing.

5.4.4. Resident #2

The resident advised that two days prior to the collision, she had attempted to traverse the railroad tracks at the accident grade crossing. When she arrived at the crossing between 8:00 a.m.

and 9:30 a.m., the warning system was activated; lights were flashing, and the crossing gate arms were lowered. She sat for several seconds before a man approached her and informed her that the gate arms had been lowered for several hours and to drive around them. She advised that she did as the man suggested and drove around the lowered gate arms.

On the following day, the resident arrived at the grade crossing and observed the crossing gate arms lowered once more. She believed that it was around the same time as the day before. She advised that this was a highly unusual event. In the 17 years that she resided in the area, she had only observed the grade crossing malfunction approximately 5-6 times. She had never seen a malfunction occur twice within a 24-hour period. She discussed her concerns with family members but elected not to notify the authorities.

The resident advised that approximately two years ago, she attempted to report a malfunction with the crossing gate. She did not know who to call and called 911 to report the problem. The 911 call taker informed her that she had contacted the wrong agency and would forward her complaint to the proper authorities. The resident never received a follow up phone call but had not expected to receive one. She advised that she had never seen the Emergency Notification Systems (ENS) signs posted at the grade crossing.

5.4.5. Resident #3

The resident advised that he has resided in the area for approximately 25-27 years. His property is adjacent to the railroad tracks on the south side of the crossing. He witnessed the Buckingham Branch Railroad installing the current crossing gate approximately 4-5 years ago. Though the grade crossing warning system had never failed to activate when a train was present, the resident advised that on numerous occasions, he observed the crossing warning system activate, the lights would begin to "flash" and the crossing gate arms would lower despite there being no train in the vicinity. The resident advised that he never reported the incident because a worker from the railroad would arrive on the scene shortly after these incidents would occur. The railroad employee would be seen working in "the little metal hut by the tracks". The resident advised that he thought the crossing sent an alert to the railroad, automatically, when it malfunctioned.

He advised that the last occurrence had been two days prior to the crash, on Monday morning. The crossing gate arms came down and no train was present. It was down for a significant period and he had directed several of his neighbors to go around the lowered arms. He advised that he also drove around the lowered crossing gate arms. The resident doesn't remember whether, on that Monday, a worker from the Buckingham Branch Railroad had responded out to the grade crossing to fix the problem with the gate. He advised that he was not at home on the following Tuesday and was unaware of the crossing gate malfunctioning on that day.

On the day of the crash, the resident advised that he was eating a meal when he observed the train stopped on the tracks adjacent to his property. He advised he thought he heard a train whistle but that was not unusual. It wasn't until he observed several people running along the track that he realized that something had happened.

He exited his residence and observed the aftermath of the collision. He estimated that it was approximately 8-10 minutes after observing the stopped train that he stepped outside of his residence to investigate.[9]

5.5. Buckingham Branch Railroad

5.5.1. Railroad dispatcher

The dispatcher has been employed with the Buckingham Branch Railroad (BBR) for approximately 4 years. Prior to her employment with BBR, she worked for BNSF Railroad in Texas.

On the day of the crash, the dispatcher believed that she received the call reporting the collision from the train crew at about 11:15-11:20 a.m. The crewmember that radioed in did not use the word "emergency" but went straight into reporting the collision. The crewmember did not report any injuries to the dispatcher. She called the Albemarle County Emergency Communications Center and provided the information given to her by the crew.

The dispatcher advised that when an emergency call is received at the BBR dispatch center, her terminal screen changes color to provide a visual alert to the dispatchers of the incoming emergency communications. The telephone numbers for all the Emergency Communications Centers within the railroad's territory are pre-programmed into the dispatch center to provide a quick reference for the dispatchers in the event of an emergency.

5.5.2. Supervisor of Rail Traffic Controller

The RTC supervisor is responsible for the operation of the dispatch center and its personnel. From his office, the supervisor monitors the dispatch operations by utilizing a computer terminal that mirrors the dispatcher's screen. This allows the supervisor to see what the dispatcher sees, in real time. He also has access to the dispatch screen for the CSX railroad which operates in conjunction with BBR. This allows him to monitor the movement of CSX trains as they approach BBR territory. On any given day, the BBR dispatch center monitors and controls the movement of approximately 6 freight trains and 4 passenger trains. Depending on the type of train, speeds vary from 30 miles per hour to 60 miles per hour through BBR's territory.

5.5.3. Manager of Transportation

The Transportation manager advised that he was unaware of any reports regarding the malfunction of the crossing gates at the crash location. Recently, reports of malfunctions at the grade crossing were reported by the media, but the railroad had never received a complaint about the grade crossing. He advised that the equipment at the grade crossing was relatively new and well maintained. The railroad had posted the required Emergency Notification Systems (ENS)

[9] Survival Factors Attachment: Witness Interviews

signage at the grade crossing to provide citizens with the required information to report a problem at the crossing.

He advised that the Buckingham Branch Railroad in conjunction with Amtrak and LifeSavers sponsors several community rail safety events and every two years sponsors a rail safety training course for emergency responders. He advised that notification of upcoming training opportunities is provided by using printed flyers. These flyers are delivered to the Albemarle County ECC building for distribution to the local fire and law enforcement agencies. In some instances, he has hand delivered flyers to various fire houses in the county with limited success. He acknowledged that in September 2017 when a rail safety course was offered in Augusta, no one from Albemarle County either law enforcement of from the various fire and rescue departments attended.

5.5.4. Superintendent of Operations

The superintendent advised that the Buckingham Branch Railroad had never received any complaints regarding the possible malfunction of the grade crossing warning system or the inadvertent activation and lowering of the crossing gate arms.

He advised that the Buckingham Branch Railroad sponsors training for emergency responders. The last training sessions was conducted in the fall of 2017 in Augusta County, Virginia.

5.5.5. Safety and Compliance Supervisor

The supervisor advised that Buckingham Branch Railroad has a safety training program that, in conjunction with Life Savers, provides training to the community and to groups such as the Boy Scouts of America. BBR also provides rail safety training seminars to emergency responders. The last presentation was conducted for the communities of Staunton, Augusta and Louisa and Rockingham, Counties.

The railroad provides community updates through of Twitter, Linked-in and Facebook. In addition to social media, the railroad has provided outreach through media outlets on railroad safety, and basic knowledge regarding highway grade crossings. Recently, the supervisor participated in an interview conducted by the local newspaper regarding rail safety.

After the crash in Crozet, representatives from BBR discussed conducting more community advocacy in Crozet. Up until that point, most community advocacy was conducted in larger communities for wider exposure. However, the railroad concluded that despite Crozet relatively small size, additional programs would be conducted to include more community, local governments and emergency responder exposure.

5.6. Medical Pathology

5.6.1. State Office of the Chief Medical Examiner, Richmond, Va.

On February 2, 2018, the attending medical examiner was interview regarding the injuries sustained by the deceased passenger, the cause of death and toxicology testing.[10]

The medical examiner advised that the autopsy conducted on the decedent revealed extensive internal injuries with massive internal blood loss. She didn't observe any injury that could be used as a telltale sign to indicate the mechanism of injury or the position of the victim at the time of the crash. She advised that the cause of death was blunt impact trauma to the head, neck and torso with significant injury to the abdomen.

6. POST-CRASH ACTIVITY

Representatives of the Buckingham Branch Railroad met with investigators from the NTSB on April 10, 2018 to discuss the findings from emergency response and resident interviews regarding the highway grade crossing and the need for improved outreach in rail safety.

During the meeting, representatives from BBR advised that the railroad sponsored a rail safety course that was held at the Albemarle County Police Department headquarters, in March 2018. The course was offered to emergency responders from Albemarle County, and the adjacent counties in Virginia. The course was also opened to local government agencies, such as the Albemarle County Emergency Management Agency, to educate these entities on what to do in the event of a railroad emergency.

The railroad has also participated in additional community outreach programs that not only included the use of social media but mainstream media outlets to raise community awareness and provide education regarding grade crossing safety. Future training initiatives include outreach programs for emergency responders at the various service academies.

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

LIST OF ATTACHMENTS

Survival Factors Attachment- Commonwealth of Virginia police crash report

Survival Factors Attachment- Albemarle County E.C.C. 911/CAD report

[10] Survival Factors Attachment: Medical Examiner interview notes

Survival Factors Attachment- Emergency responder interviews

Survival Factors Attachment- Passenger interview

Survival Factors Attachment- Witness interviews

Survival Factors Attachment- Medical Examiner interview

LIST OF PHOTOGRAPHS

Survival Factors Photo 1- Exterior frontal view of striking locomotive.

Survival Factors Photo 2- Exterior view of truck with cargo/dump in background.

Survival Factors Photo 3- Interior view of truck cab and damaged rear window.

Survival Factors Photo 4- Interview view of truck cab and damaged front windshield.

END OF REPORT

Sheryl Harley
Survival Factors Group Chairman