SURVIVAL FACTORS
GROUP CHAIRMAN'S FACTUAL REPORT

Multiple Fatality Motorcoach Collision
With Vertical Poles Supporting an Overhead Bridge Sign
New York, NY; 03/12/2011

HWY-11-MH-005
(27 Pages)

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C. 20594

SURVIVAL FACTORS
GROUP CHAIRMAN'S FACTUAL REPORT

A. ACCIDENT

LOCATION:	Interstate 95 (I-95) New England Thruway, at Mile Marker 3.2, in New York, Bronx County, New York
VEHICLE 1:	1999 Prevost H3-45 56-Passenger Motorcoach
OPERATOR:	World Wide Travel of Greater New York Ltd.
DATE:	March 12, 2011
TIME:	Approximately 5:37 a.m. EST
NTSB #:	**HWY-11-MH-005**

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C. SUMMARY OF SURVIVAL FACTORS INVESTIGATION

The Survival Factors Factual report provides information obtained during the collection of documents, detailed inspection of the accident bus, and interviews conducted with victims and emergency responders. The accident site was inspected on March 13th 2011, and the 1999 Prevost motorcoach (bus) was inspected at New York State Police Troop K headquarters in Salt Point, NY, between March 13th and 18th, 2011. The deceased were taken to the New York Medical Examiner's Office, surviving victims were taken to Saint Barnabas Hospital and Jacobi Medical Center both located in Bronx, New York.

Interviews were conducted when possible; documents were collected or requested via letter or subpoena. The condition and damage to the exterior and interior of the bus pertinent to survival factors was examined and documented.

The report is organized as follows.

D. DETAILS OF THE INVESTIGATION

1. 1999 Prevost Model H3-45, 56-passenger bus and Accident Sequence

The accident motorcoach was a 1999 Prevost Model H3-45, 56-passenger bus operated by World Wide Travel. The rear engine, diesel powered, 52,060 lbs Gross Vehicle Weight Rating (GVWR) bus contained a single driver seat opposite the front loading stairs and door. The passenger seats were elevated, situated above the baggage compartment, fuel tank, and engine. Fourteen rows of double place passenger seats were located on each side, separated by a center aisle. The rows of seats on the right hand side of the bus were staggered ahead of the left side rows with a lavatory positioned at the right rear of the bus.

The accident sequence was a series of events over a distance of several hundred feet. The bus veered off the road, mounted a curb, and struck a guardrail and road signs as it rolled onto it's right side. The bus slid along the guardrail and impacted an overhead sign stanchion, which intruded the passenger windows nearly the full length of the bus. The right front corner of the bus was crushed at the loading door. No other significant deformation to the lower half of the bus was evident. Intrusion of the sign stanchion was the primary mechanism of physical damage, and nearly separated the roof from the body of the bus at the passenger windows.

2. Bus Exterior

2.1 Front

The windshield originally had four laminated windscreen panes of equal size, with two lower panes clear, and two upper panes tinted. The windshield panes were destroyed with the exception of the lower left (driver's side) windscreen, which remained in the frame with the glass shattered and retained by the laminate[1]. This report will refer to the left half of the bus as the driver side, and the right half of the bus as the passenger side. The driver side mirror, headlights and windscreen wipers were all intact. The passenger side windscreen wiper was in place, but the arm was bent 90 degrees upwards toward the roof. The passenger side headlights were intact and the right turn/running light bulbs were intact with bezel and lens smashed.

The outside section of the right bumper was displaced aft at approximately a 40 degree angle, and the trim piece was scratched and displaced. The right front firewall was displaced aft about 12 inches at the outside edge, and was also at approximately a 40 degree angle relative to the flat front surface of bus[2]. The forward frame of the loading door was displaced aft. The narrowest space remaining was 14 inches wide, and was at the midpoint of the door due to the hinge structure mounted in the middle of the door. This portion of the hinge was still attached to a portion of door.

The roof section at the front and above the driver and loading area was lightweight, with fiberglass "A" pillars supporting the windshield. The "B" pillars, located just aft of the driver

[1] See Survival Factors Photo No. 1: Right Front View of Bus Exterior.
[2] See Survival Factors Photo No. 1: Right Front View of Bus Exterior.

and at the aft edge of the loading door frame were large, 6 inch wide steel. The other roof support pillars were 3 inch wide steel.

The A pillars separated upon impact with the sign stanchion just above the lower windshield pane on the driver's side and just above the loading door on the passenger side. The B pillars and other roof support pillars were folded back or separated due to the intrusion of the sign stanchion, and exhibited distinctive impact marks from the sign stanchion. The stanchion impact level on the driver side and front was above the passenger window frame in line with the headrests. As the intrusion moved further aft, the driver side impact marks on the support pillars moved upwards to the level of the parcel racks.[3] The stanchion impact into the passenger side pillars was just below the parcel racks.[4]

2.2 Side Windows

The side windows were constructed of Prevost-patented thermopane frameless-sided windows, with tinted exterior glazing and clear interior glazing. Two windows next to the driver and the loading door windows were not tinted. The first side passenger windows were of a small triangular shape and the second and ninth side windows were of a smaller rectangular shape. These first, second, sixth, ninth and tenth window (small window on driver side opposite lavatory) were fixed, while the rest were emergency egress windows. The emergency egress windows opened from the bottom with a top hinge.

All of the side windows except for the ninth and tenth side windows on the driver side were broken out during the crash. The ninth side window on the passenger side had the outer tinted glass missing, but the clear interior glass was in place.

2.3 Exterior Sides

The driver side of the bus below the windows sustained minor scratches from broken glass. The right side exterior was heavily scratched from sliding along the guardrail, concentrated just above the wheel wells. Panels above the front and rear wheels were torn away.[5] The side wall was not significantly punctured or intruded below the level of the passenger windows, except for the front corner in the region of the loading door, which is described in a separate section of this report. The tires remained inflated.

2.4 Loading Door

The loading door was constructed of steel and fiberglass with large glass panels, the glass was completely gone and the door was fractured into several pieces. Scene photos indicated that the mid-point of the door was displaced aft due to intrusion of guardrail support posts near the front of the bus.[6] The steel portion of the door frame remained attached to hinge on the front wall of the bus.

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[3] See Survival Factors Photo No. 2: Driver Side View of Bus Exterior with B Pillars.
[4] See Survival Factors Photo No. 3: Passenger Side View of Bus Exterior with B Pillars.
[5] See Survival Factors Photo No. 1: Right Front View of Bus Exterior.
[6] See Survival Factors Photo No. 4: Front and Top View of Bus at Final Rest.

3. Bus Interior

The Prevost technical information indicated that all factory installed interior materials meet the US federal regulation for fire resistance, FMVSS 302. The DOT certification label was affixed to the modesty panel behind the driver's seat, indicating that the coach was manufactured by Prevost Car Inc. and complies with all Federal Motor Vehicle Safety Standards at the time of manufacture. The interior was 95 inches wide, 72 inches high, and the floor to window measured 32.7 inches.[7]

3.1 Driver Area, Entry Steps, Privacy Panels

The tilt steering wheel was found at mid position with no deformation and no knee contact marks. The seat attachment to the floor was intact, and the seatback angle was measured to be 109 degrees. The seat height adjuster knobs were found to be broken (non-functional). The plastic shroud on the seatback exhibited a 1x1 inch triangular hole/crack near the right shoulder. The driver seat was fitted with a lap belt restraint, consisting of a push button release, plastic housing buckle on the right hip, and an inertia reel retractor on left hip. The buckle and inertia reel were found in functioning condition. The male (tongue) side of belt exhibited fraying along the edges from use, and the female (connector) side showed evidence of wear. Driver seat and restraint equipment details are given in section 4.0.

The entry area of the bus consisted of 5 steps behind the front wall of the bus, a platform area next to the driver seat, and 3 more steps leading to the passenger floor level. The entry was reduced by the crushing of the front of the bus as described in section 2.1. The steps were intact and trim panels were deformed and damaged. The bus was delivered with a folding conductor's seat which is mounted to wall in the entry, and has a provision for a lap belt. The seat is removable. There was no evidence of the conductor's seat found during the inspection.

The left side privacy panel located directly behind driver was displaced into the first row of passenger seats.[8] Inspection revealed that the driver side B pillar was displaced aft and in direct contact with the privacy panel. The panel was displaced aft to the point of touching the front of the first row window seat cushion, and with a 3 inch gap between the seat cushion and panel at the aisle seat. Measurements between the first row aisle seat and the left privacy panel indicated 20 inches from the front of panel to the Cushion Reference Point (CRP)[9] and 11.5 inches between the CRP and the front of the panel shelf. The window seat measurements were 16.5 inches between the front of the panel and the CRP, 10 inches between the CRP and the front of the panel shelf. Blood and tissue were present on the floor and on the panel in front of the aisle seat. A white scuff mark was present on the panel in front of the aisle seat, and a 3 inch long scrape was present on the panel shelf.

The right side privacy panel (behind the loading door) was displaced aft in a similar fashion as the left privacy panel.[10] Measurements between the panel and the seats were 31.5 inches

[7] See Survival Factors Attachment 1: Bus Cross Section Drawing.
[8] See Survival Factors Photo No. 4: Front and Top View of Bus at Final Rest.
[9] The Cushion Reference Point is the intersection of the seat pan and seat back cushions.
[10] See Survival Factors Photo No. 4: Front and Top View of Bus at Final Rest.

between the front of the panel and CRP for the aisle seat and 27.75 inches between the front of the panel and the CRP for the window seat. The privacy panel had a 10 inch long black scuff in front of the aisle seat side and a 6 inch black scuff located in front of the midpoint between the two seats. The privacy panel also had a black scuff 3 inches long on top of the shelf (near the edge) in front of the aisle seat.

3.2 Parcel Racks

The parcel racks were of the closed bin type, supported by extruded aluminum frames. The bus manufacturer indicated that each section of parcel rack had a design load capacity of 330.7 lbs (150 kg) for each section, and were tested to achieve a minimum static load of 1,000 lbs, and the ultimate load was not established during the tests, according to Prevost. The bottom of the parcel racks are 62.5 inches from the floor, and the distance between racks is 36.5 inches.[11] Scene photos indicated that the parcel rack frame on the passenger side remained in place, but was heavily damaged.[12] The parcel racks on the driver side and front portion of bus were displaced, while the parcel racks remained in place in the back half of the bus. The left front corner of the roof was folded down. The driver side parcel rack doors were detached. The forward endcap was missing due to the stanchion intrusion. The attachment brackets were fractured and the rear endcap had broken anchor points. The passenger side parcel rack doors remained attached but fractured at the attachment points. The forward endcap was found broken and crushed due to intrusion. The rear endcap appeared intact.

3.3 Passenger Seats

Each set of double passenger seats had a common frame with individual cushions and backrests divided by armrests (except for one row near the rear). Each set was attached to the floor via a leg under the aisle seat and to the sidewall by a forward and aft anchor roughly at the level of the seatpan. A row of club seating was available in the second to last row on the driver side, and in the last row on the passenger side. Club seating features a folding table and a row of seats that can be mounted in the aft facing position. This row was found in the forward facing configuration on both sides. The table on the driver side was found in the folded configuration, and the table from the passenger side was found in the debris pile.

Dimensions of the bus and interior arrangements are contained in the bus technical specifications.[13] Pre-crash seat and layout dimensions are provided in this report as follows. The “seat pitch” (distance between a point on a seat to the same point on the seat in the next row) ranged from 31 to 36 inches, depending on the location. The corresponding space between the front of the seat cushion and the back of the next seat ranged from 10 to 15 inches. The pre-crash distance at the first row of seats between the seat cushion and the privacy panel was 13.125 inches on the left (driver) side and 13 inches on the right (passenger) side. The seat cushion height was nominally17.75 inches, seatback height 41.75 inches, and each seat is 17 inches deep and 18 inches wide and 2 inch wide armrests located on each side and in the middle of each double seat. Several seats were found cut by first responders to aid in the extrication of

[11] See Survival Factors Attachment 2: Bus Cross Section Drawing.
[12] See Survival Factors Photo No. 5: Front and Interior View with Stanchion Intrusion and Parcel Rack Frame.
[13] See Vehicle Attachment 1 - Final Record and Technical Specifications for the Accident Bus.

deceased.[14] These seatbacks are annotated in section 3.3.2 Table 1. Several passenger seat armrests were found broken, also annotated in section 3.3.2 Table 1.[15] There was no evidence of saw marks indicating that the armrests were not cut by first responders.

3.3.1 Occupant Marks

Blood pooling was evident at the bottom of the stairwell and blood was present on the bottom two steps. The passenger side seat at row 3 (found in the debris pile) had blood splatter on the center armrest. Blood was also pooled on the floor in row 3, and a large (24 inches long by 14 inches wide) blood and tissue smear was found on the sidewall in row 3 at the foot level. Blood and tissue were found on the wall below the window on the passenger side of the bus in row 4, on the seat in row 6, and on the wall and seat in row 7. The headrest of the driver side seat at row 12 had signs of impact and blood. The passenger side headrest at row 11 had marks from impact and blood. Blood also was found on the passenger side folding table (located in the debris pile).

Several seats exhibited occupant impact marks on the seatback. Examples include the passenger side aisle seat at row 2 with an impact mark on the center of the seatback of row 1[16], and both passenger side seats in row 6 with impact marks on the back of the row 5 seats.[17] The other seat rows exhibiting occupant impact marks on the seatback in front were: driver side aisle seat at row 8, both driver side seats at row 9, 11, 12, and both passenger side seats at row 13.

3.3.2 Seat Construction and Attachments

The seats are mounted to a floor track located approximately under the middle of the aisle seats. Prevost described the floor track as: type 304 stainless steel, 1.5 inch wide "C" channel fixed to 14 gauge stainless steel recessed floor using self tapping screws spaced 4.5 inches apart.[18] Each seat leg consisted of two interconnected extruded aluminum boxes 2 inches wide by about 6 inches long, creating a single pedestal 11 inches long. These were fixed to the floor track by a steel plunger type foot at the front of each box with a 0.375 inch diameter steel bolt. The outside edge of the seats was mounted to an aluminum channel on the sidewall of the bus at the level of the seatpan. Two steel "C" shaped brackets were fixed to the seat pan using two 0.3125 inch diameter screws. The floor attachment of the driver side seat at row 3 was broken, and all other driver side attachments were found intact. The row 3 passenger side double seat assembly was outside the bus, found in the debris pile. The row 4 aisle seat anchors were found intact but the floor track was pulled out of the floor and deformed protruding vertically up from the floor. A section of the track approximately two feet long was cut by first responders at the scene. The floor track section pulled out of the floor a joint between two sections of track.[19] The passenger seat construction was described by Prevost as base frames constructed with a combination of welded steel 14 gauge rectangular tubes measuring 0.75 inches by 1.5 inches and 1 inch by 1.5

[14] See Survival Factors Photo No. 6: View of Seatbacks Cut During Extrication.
[15] See Survival Factors Photo No. 7: View of Broken Armrests.
[16] See Survival Factors Photo No. 8: View of Row 2 Passenger Side with Occupant Impact Mark.
[17] See Survival Factors Photo No. 9: View of Row 6 Passenger Side with Occupant Impact Mark.
[18] Survival Factors Photo No. 8 and No. 10 include views of the seat floor track attachments.
[19] See Survival Factors Photo No. 10: View of Row 3 and 4 Passenger Side Seat Track and Video Monitor Bracket.

inches. The seat back construction was 16 gauge rectangular steel tubes measuring 0.5 inch by 1 inch. The frames had a 20 gauge steel sheet skin covered in foam and upholstery. Passenger seat measurements and damage notes are given in Table 1. Passenger seat manufacturer and model are given in section 4.0. During the inspection of the bus the roof was removed. Photos were taken from an aerial viewpoint using an elevated platform.[20]

Table 1: Post Crash Condition of Passenger Seats

Row	Seat	Side	Location	Seat back Angle	Headrest condition	Footrest position	Armrest and other information
1	1	Right	Window	141°	OK	n/a	Seat pan deformed to right
	2	Right	Aisle	132°	OK	n/a	Outside armrest broken off
	3	Left	Window	118°	Cushion missing	n/a	Armrest bent down
	4	Left	Aisle	143°	Cushion missing	n/a	Armrest broken, seat deformed toward aisle
2	5	Right	Window	123°	OK	Up	seat deformed to right, rear wall mount loose
	6	Right	Aisle	122°	OK	Down	seat deformed to right
	7	Left	Window	162°	OK	n/a	No visible damage
	8	Left	Aisle	153°	OK	n/a	No visible damage
3	9	Right	Window	n/a	OK	Up	Seat out of bus
	10	Right	Aisle	n/a	OK	Down	Seat out of bus
	11	Left	Window	133°	OK	Up	Aisle armrest upward position and broken off
	12	Left	Aisle	121°	OK	Down	Floor anchor broken
4	13	Right	Window	116°	OK	Down	Wall anchors loose
	14	Right	Aisle	112°	Cushion missing	Missing	Tear at L shoulder on seatback, aisle armrest broken off, floor anchor pulled out, track cut
	15	Left	Window	125°	OK	Down	Armrest up position, broken off
	16	Left	Aisle	158°	OK	Down	No visible damage
5	17	Right	Window	111°	OK	Down	Armrest OK, wall tracks loose
	18	Right	Aisle	111°	OK	Up	Armrest off, floor track out of sub floor
	19	Left	Window	124°	Cushion missing	Up	No visible damage
	20	Left	Aisle	137°	OK	Down	Parcel rack on headrest, armrest facing up
6	21	Right	Window	116°	OK	Down	Seatback torqued toward right
	22	Right	Aisle	114°	OK	Down	Seatback deformed to right, aisle seat flr anchor pulled out, wall anchors pulled out
	23	Left	Window	120°	Cushion missing	Up	No visible damage
	24	Left	Aisle	122°	See notes	Down	Armrest broken, parcel rack on headrest
7	25	Right	Window	123°	OK	Missing	No visible damage
	26	Right	Aisle	115°	OK	Missing	No visible damage
	27	Left	Window	102°	OK	Down	Pillar 4 down into seatpan
	28	Left	Aisle	110°	See notes	Down	Parcel rack compressed onto headrest

[20] See Survival Factors Photo No. 11: Aerial View of Bus Interior and Removed Inverted Roof.

Row	Seat	Side	Location	Seat back Angle	Headrest condition	Footrest position	Armrest and other information
8	29	Right	Window	Cut	OK	Down	Seatback deformed to right side, extrication cuts on seatback, seatback deformed flat
	30	Right	Aisle	Cut	OK	Down	Armrest missing, casting broken; seatback cut off
	31	Left	Window	119°	See notes	Down	Parcel rack compressed onto headrest
	32	Left	Aisle	119°	See notes	Down	Impact into seatback, Parcel rack on headrest
9	33	Right	Window	Cut	OK	Down	Armrest casting broken, steel cut
	34	Right	Aisle	Cut	OK	Down	Armrest casting broken, steel cut center armrest missing
	35	Left	Window	111°	OK	Down	Center armrest up
	36	Left	Aisle	111°	See notes	Down	Parcel rack compressed onto headrest
10	37	Right	Window	Cut	OK	Missing	Seatback cut in half
	38	Right	Aisle	Cut	OK	Up	Seatback cut in half by FD
	39	Left	Window	115°	OK	Broken, in place	No visible damage
	40	Left	Aisle	123°	OK	Up	No visible damage
11	41	Right	Window	Cut	OK	Missing	Seatback cut in half by FD
	42	Right	Aisle	Cut	OK	Missing	Armrests gone, seatback cut off
	43	Left	Window	109°	OK	Missing	No visible damage
	44	Left	Aisle	109°	OK	Missing	center armrest up
12	45	Right	Window	112°	OK	Down	No visible damage
	46	Right	Aisle	103°	OK	Down	No visible damage
	47	Left	Window	110°	OK	Down	No center armrest- swivel seat
	48	Left	Aisle	110°	OK	Down	No center armrest- swivel seat, aisle armrest up
13	49	Right	Window	112°	OK	n/a	Armrest missing, no footrest – for table
	50	Right	Aisle	94°	OK	n/a	Armrest missing, no footrest– for table
	51	Left	Window	110°	OK	n/a	No footrest by design – for table
	52	Left	Aisle	110°	OK	n/a	No footrest by design – for table
14	53	Right	Window	106°	OK	n/a	No footrest by design – for table
	54	Right	Aisle	106°	OK	n/a	No footrest by design – for table
	55	Left	Window	105°	OK	n/a	No footrest by design – for table
	56	Left	Aisle	105°	OK	n/a	No footrest by design – for table

3.3.3 Seat Layout and Seating Chart

Identification of each seat occupant was not possible due to several factors including: lack of a seating manifest or assigned seats, fatalities, inability for some survivors to communicate due to injury severity, inability to locate some survivors for post accident interviews, language barriers, and lack of passenger seat belts. The partial seating chart provided below contains the known seating locations of bus occupants. All occupants have been assigned a letter designation for reference. The large number of occupants whose seat position prior to the crash could not be identified is listed in the chart according to their letter designation and severity of injury. Section 5 provides occupant information and injury tables organized by known seating positions, survivors, and fatalities.

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New York City, New York

F = FEMALE M = MALE # = AGE
+International Civil Aviation Organization

SAMPLE

+INJURY LEVEL
AGE
GENDER
Letter Designation
(For Identification)

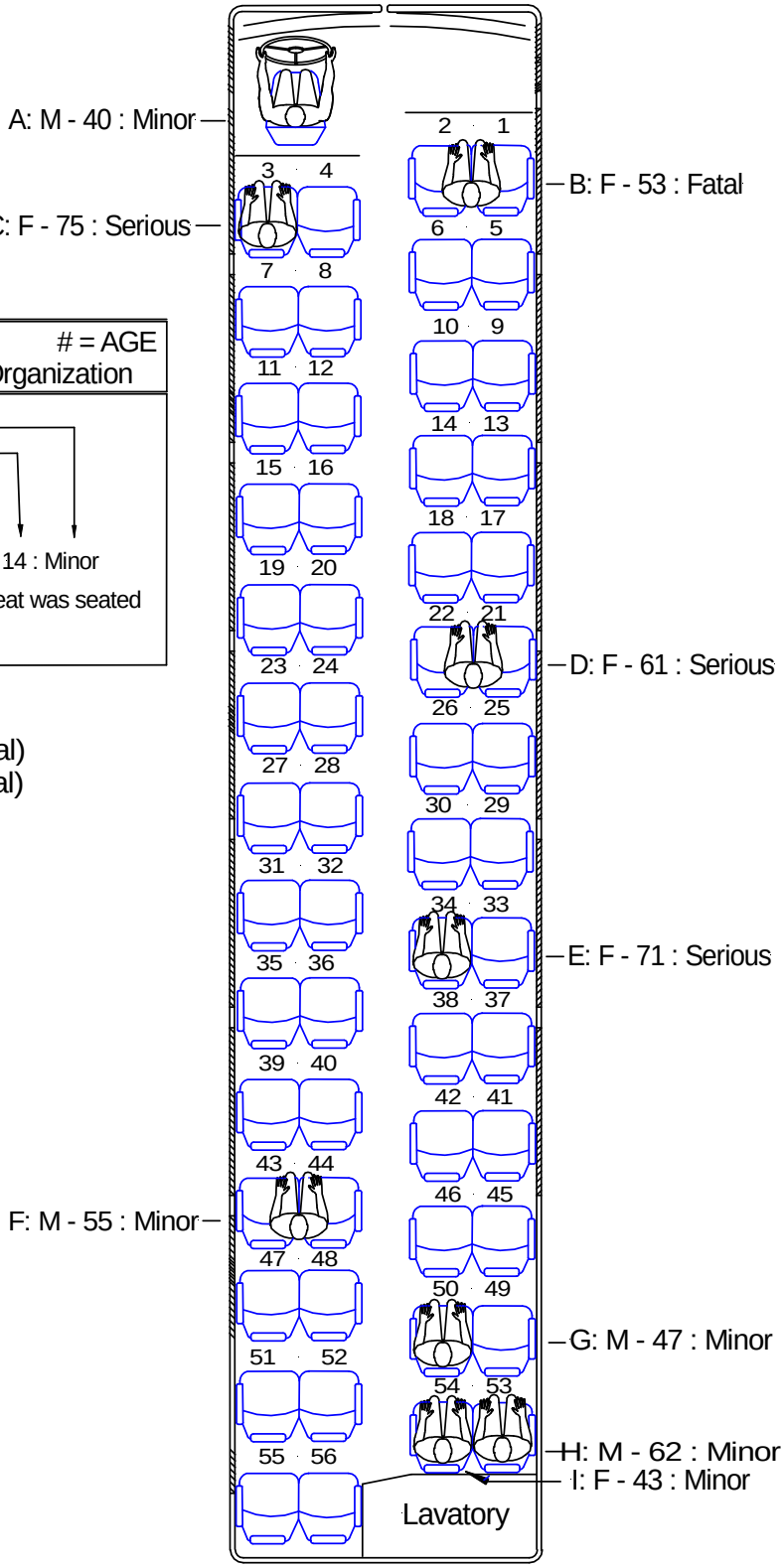
A: F - 14 : Minor

Note: Occupant shown in center of seat was seated in either window or aisle seat.

Source: NTSB

Occupants of Unknown Seat Location:

J: M - 70 : Fatal (at Hospital)
K: F - 59 : Fatal (at Hospital)
L: M - 65 : Fatal
M: M - 55 : Fatal
N: M - 81 : Fatal
O: M - 59 : Fatal
P: M - 76 : Fatal
Q: M - 83 : Fatal
R: M - 62 : Fatal
S: M - 40 : Fatal
T: F - 50 : Fatal
U: F - 74 : Fatal
V: F - 67 : Fatal
W: F - 65 : Fatal
X: F - 47 : Serious
Y: M - 61 : Serious
Z: M - 68 : Serious
AA: M - 76 : Serious
BB: M - 50 : Minor
CC: M - 53 : Minor
DD: M - 59 : Minor
EE: M - 61 : Minor
FF: M - 58 : Minor
GG: M - 50 : Minor



4. Safety Equipment and Egress

A fire extinguisher and first aid kit were found mounted to the floor on the right side of the bus in row 1. The fire extinguisher was fully charged, Kidde 3.5 lb Dry Chemical Model H110G, Serial number AC-972865, Class 1-A, 10-B:C. The first aid kit had a worn label that was unreadable, and was incomplete.

The driver seat was an Isringhausen manufactured Tour model 6800, "ISRI" air-operated adjustable suspended seat.[21] The driver seat was equipped with a driver lap belt mounted to the seat. According to Prevost, the lap belt conformed to FMVSS 209 and the driver seat to FMVSS 207 and 210. The lap-belt label was illegible on the connector side, but the seatbelt buckle was stamped with the brand name IMMI, and "Conforms to FMVSS 209, 302 OCT-10". The label on the buckle side webbing was marked with the following: Part No. F07342 Lot ID 1777953, 860607-860977-860606.

The passenger seats were manufactured by Prevost, and were the Tourismo 42 model with folding armrests. The passenger seats were not equipped with seat belts. Seat belts became standard equipment on Prevost motor coaches in 2009, although the customer can optionally specify no passenger belts. According to Prevost, the passenger seats were tested as described in FMVSS 210 as an internal design specification to satisfy a 3,000 lbs forward longitudinal load for each double seat assembly.

The primary egress route by design is the loading door of the bus. Secondary exits are provided by two roof escape hatches and the emergency windows as described in section 2.2. Each roof hatches measured to be 24 inches square and were located above the aisle and roughly over the first and twelfth row of passenger seats. The loading door was not used for evacuation as the bus was on laying on the right side, blocking the door. The separation of the roof provided ample space for evacuation.[22]

The evacuation path for occupants in the middle and rear of the bus was either at the front, or to crawl up and out of the broken window gap on the left side of the bus. Survivor interviews indicated that at least one or more people evacuated by crawling to the top (left side) of bus. Both roof hatches were found removed from the bus. At least one passenger indicated that they exited through a roof hatch prior to first responder arrival. The first responders cut around the rear roof hatch of the bus, and expanded the opening from 24 inches square to approximately 32 inches wide by 45 inches long.[23] It was later expanded again to approximately 7.5 feet long. A cut approximately 4 feet long was made by responders to expand the front roof hatch, but was not completed because it was not deemed necessary.

[21] See Survival Factors Attachment 1: Driver Seat Manual.
[22] See Survival Factors Photo 4: Front and Top View of Bus at Final Rest.
[23] See Survival Factors Photo 12: Roof Overview

5. Medical and Pathological Information

At the time of the accident, the bus contained 33 occupants including the driver. There were 11 occupants with minor injuries, 7 with serious injuries, and 15 with fatal injuries.[24] Thirteen occupants were pronounced dead at the scene, one died in surgery the day of the accident, and another died in the hospital the day following the accident. Five survivors were transported to Saint Barnabas Hospital and 14 were transported to Jacobi Medical Center. The deceased were transported to the Office of the Chief Medical Examiner, City of New York. Table 2 provides a summary of injuries and fatalities for the driver and passengers.

Table 2. Injury Table

Injuries[1]	Driver	Passengers	Total
Fatal	0	15	15
Serious	0	7	7
Minor	1	10	11
None	0	0	0
Total	1	32	33

5.1 Occupant Information and Injury Description

The bus occupant information including age, gender, height, weight, and a brief description of injuries is provided in the following tables. Table 3 has this information for occupants whose seating position is known. Tables 4 and 5 have this information for occupants of unknown seating positions for fatalities and non-fatalities, respectively. All of the occupants have been given a letter designation: A through I for the occupants of known seat position, J through W for occupants of unknown seat position which were fatalities, and X through GG for the occupants of unknown seating position which survived.

Table 3. Occupant Information for Known Seating Positions

Row	Occupant	Age	Gender	Height	Weight	Medical
NA	**Driver**	40	male	5’8”	230	Minor
Occupant A	Injuries: Chest pain, stomach pain, abrasions to forehead and left side of abdomen, right eye subconjunctival hemorrhage (broken blood vessel in eye) Emergency Response: Ambulance on route 6:22 am, on scene 6:47 am, left scene 7:00 am,					

[24] Title 49 CFR 830.2 defines a fatal injury as: any injury that results in death within 30 days of the accident. A serious injury as: an injury which requires hospitalization for more than 48 hours commencing within seven days from the date the injury was received; results in a fracture of any bone (except simple fractures of the fingers, toes, or nose); causes severe hemorrhages, nerve, muscle, or tendon damage; involves any internal organ; or involves second or third degree burns, or any burns affecting more than 5 percent of the body surface.

Row	Occupant	Age	Gender	Height	Weight	Medical
	at Hospital 7:17 am					
Row 1	**Seat 1 or 2**	53	female	5'1"	168	Fatal
Occupant B	Injuries: Blunt impact of the head and neck with abrasions, contusions and lacerations Multiple facial fractures, Atlanto-Occipital Dislocation with transaction of the c1-c2 spinal cord, laceration of the pontomedullary junction, fracture of the dens (c2), vertebral body fracture at c7-8 and contusion of the underlying spinal cord, laceration of the proximal trachea, blunt impact of the torso with abrasions contusions and lacerations, multiple rib and sterna fractures, T12 Vertebral body fracture with contusion of the underlying spinal cord, left clavicular and scapular fractures, comminuted fractures of the pelvis, and lacerations of the liver, spleen, and lung, blunt impact of the extremities with traumatic amputation of the left upper extremity, left femoral shaft fracture, left tibia and fibula fractures Emergency Response: Not Recorded					
Row 1	**Seat 3**	75	female	5'0"	144	Serious
Occupant C	Injuries: Multiple face and scalp lacerations, right ear avulsion, metallic fragment in right ear, hip pain on right side, fracture of the right 6th rib, bruising on upper arms Emergency response: Arrival recorded at hospital 6:56 am					
Row 6	**Seat 21 or 22**	61	female	4'9"	110	Serious
Occupant D	Injuries: right arm fracture Emergency Response: Not Recorded					
Row 9	**Seat 34**	71	female	5'3"	101	Serious
Occupant E	Injuries: Comminuted distal tibia and fibular fractures, Complained of chest pain with small pericardial effusion on CT, partial right foot amputation, neck pain Emergency Response: Assigned call and enroute at 6:16 am, on scene 6:33 am, left scene 6:53 am, at hospital 6:58 am, transported 3 miles. Vital signs recorded at hospital 7:03am.					
Row 11	**Seat 43 or 44**	55	male			minor
Occupant F	Injuries: Laceration right hand 2 inches, back pain, right shoulder pain Emergency response: Dispatched 6:21 am, En Route 6:21am, On scene 6:40 am, Patient contact 6:56 am, left scene 7:09 am, at destination 7:22 am.					
Row 13	**Seat 50**	47	Male	5'8"	179	Minor
Occupant G	Injuries: Right shoulder pain, laceration to face Emergency Response: Ambulance arrived 8:06 am Admitted to Hospital 8:18 am.					
Row 13	**Seat 53**	62	male	Not recorded	Not recorded	minor
Occupant H	Injuries: Back Pain First Response: Arrived at hospital 8:20 am.					
Row 14	**Seat 54**	43	Female	5'2"	118	minor
Occupant I	Injuries: Pain right side of head, lower back Emergency response: not recorded					

Table 4. Occupant Information for Unknown Seating Positions, Fatalities

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
J	Unknown	70	male	5'6"	165	Fatal (Deceased March 15th)
	Injury Description from Hospital Doctor: Extensive facial trauma, punctate bleed on the brain, liver and spleen damage,					

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
	bilateral pulmonary contusions, bilateral rib and bilateral hip fractures. His injuries appeared to be blunt force trauma and did not have penetrating injuries. Injury Description from Autopsy: Blunt Impact of head with contusions lacerations and abrasions, subscalpular and subgaleal hemorrhages, subarachnoid hemorrhage, hemorrhagic cerebral contusion Blunt impact of torso with abrasions, sternal, rib and vertebral fractures, splenic lacerations Blunt impact of extremities with abrasions and contusions and femur fractures Emergency response: Hospital log time 6:54am.					
K	Unknown	59	female	5'7"	193	Fatal (Deceased in emergency surgery on March 12th.)
	Injury Description from Hospital: Facial Injuries, Chest Contusions, Rib Fracture with pneumothorax, pelvic fracture, left femoral neck fracture Injury Description from Autopsy: Blunt force trauma of head with abrasions, contusions, lacerations of face, subgaleal hemorrhage, brain with subarachnoid hemorrhage Blunt force trauma of torso with abrasions and contusions of skin, multiple fractures Blunt force trauma of extremities, abrasions and contusions of skin, compound fracture of lower right leg Emergency response: Hospital noted that she arrived at approximately 7:00am.					
L	Unknown	65	male	5'5"	157	Fatal
	Injuries: Blunt force trauma to head, scalp lacerations, abrasions and contusions of face, lacerations of left ear, diffuse subscalpular hemorrhage, multiple comminuted skull fractures, multiple fracture lacerations of frontal lobes, subarachnoid hemorrhage, blunt force trauma of torso, abrasions of skin, multiple right side rib fractures, right clavicular fracture, right pneumothorax, dislocation of symphysis pubis, multiple lacerations and pulpification of liver, hemoaspiration, hemoperitoneum, blunt force trauma to extremities, multiple abrasions, factures of right radius and ulna, fracture of left humerus, fractures of left radius and ulna					
M	Unknown	55	male	6'1"	183	Fatal
	Injuries: Blunt force trauma of the torso, cutaneous contusions, abrasions and lacerations, multiple bilateral rib fractures and sternum fracture, lacerations of the lungs, heart, liver, aorta, and intestines, multiple vertebral column fractures with transaction of spinal cord, superficial scalp laceration, right wrist abrasion with laceration, right knee abrasion					
N	Unknown	81	male	5'9"	153	Fatal
	Injuries: Blunt force trauma of head with contusions, abrasions, lacerations, brainstem transaction, subarachnoid hemorrhage, blunt force trauma of torso with abrasions, rib, sterna, and vertebral fractures, pulmonary contusions and laceration, transaction of the ascending aorta, hepatic and splenic lacerations, hemothoraces, blunt force trauma of extremities with traumatic amputation of right upper extremity, abrasions					
O	Unknown	59	male	5'3"	156	Fatal
	Injuries: Blunt force trauma of head, abrasions, contusions, lacerations of skin, fractures of skull and					

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
	jaw bones, brain with subdural hemorrhage, subarachnoid hemorrhage, blunt force trauma of torso with abrasions and contusions of skin, multiple rib fractures, flail chest					
P	Unknown	76	male	5’5”	153	Fatal
	Injuries: Blunt force trauma of head and neck, fracture of nasal cartilage, contusions and abrasions of face, hemorrhage of right sternocleidomastoid muscle, subdural hemorrhage bilateral Blunt force trauma of torso, contusions of anterior torso, fractures of multiple ribs bilateral, hematoma of liver, subscapsular right, superficial fractures of spine C6-7, T2-3, T6-7 Blunt force trauma of extremities, lacerations of left forearm and right hand contusions of right arm and left knee, abrasions of right knee, superficial incised wounds of left leg					
Q	Unknown	83	male	5’3”	139	Fatal
	Injuries: Blunt force trauma of head with subscalpular and subgaleal hemorrhages, skull fractures, subarachnoid hemorrhage, blunt force trauma of torso with rib fractures and vertebral fracture, blunt force trauma of extremities with abrasions, contusions, and lacerations					
R	Unknown	62	male	5’7”	164	Fatal
	Injuries: Blunt force trauma to torso with multiple abrasions and contusions of skin, multiple bilateral rub fractures, left clavicular fracture, thoracic vertebral fracture with transaction of spinal cord, multiple pelvic fractures injuries to heart, lungs, liver, left hemothorax, hemoperitoneum, blunt force trauma to head, minor, blunt force trauma to extremities, abrasions of skin of upper and lower extremities, lacerations of left hand, fracture of left humerus					
S	Unknown	40	male	5’6”	156	Fatal
	Injuries: Blunt force trauma of head and neck, fractures of mandible (bilateral) and nose, lacerations, abrasions, and contusions of face, contusions of deep scalp and right temporalis muscle Soft tissue hemorrhage of neck, bilateral, blunt force trauma of torso, multiple rib fractures (bilateral), lacerations of parietal pleura and left lung, hemothoraces bilateral, fracture of sternum, lacerations of pancreas, spleen, left renal vessels, and small bowel mesentery, perforations of small bowel, contusions of left lung and small bowel, gastric hemorrhage, Blunt force trauma of extremities, abraded lacerations of left hand, abrasions of right hand and bilateral lower extremities, contusions of left leg					
T	Unknown	50	Female	5’6”	156	Fatal
	Injuries: Blunt force injuries of head, multiple abrasions, contusions, lacerations, fractures of skull, fracture lacerations of brain, blunt force injuries of torso, multiple abrasions and contusions, fractures of sternum and ribs, transections of spinal column and spinal cord and aorta, lacerations of heart and liver and spleen, fractures of sacroiliac joints, left ileum and pubic symphysis, laceration of bladder, blunt force injuries of extremities, multiple lacerations, abrasions, and contusions, fracture of right humerus, complete amputation of distal right arm and hand					
U	Unknown	74	Female	5’1”	144	Fatal
	Injuries: Blunt force injuries of head, multiple abrasions, contusions, lacerations, fractures of skull, fractures of mandible, laceration of brainstem, contusions of brain, blunt impact of torso with multiple rib and sterna fractures, pulmonary contusion, T7 Vertebral fracture and softening of thoracic spinal cord Blunt impact of upper extremities with contusions and lacerations, facture of left humerus,					

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
	traumatic amputation of distal left upper extremity, fractures of right radius and ulna					
V	Unknown	67	Female	5’2”	147	Fatal
	Injuries: Blunt force injuries of head, multiple abrasions, contusions, lacerations, fracture of mandible, transaction of anterior longitudinal ligament of cervical spine, transaction of brainstem, blunt impact injuries of torso, multiple abrasions and contusions, fractures of sternum and ribs, transactions of spinal column, laceration of spinal cord and heart and right pulmonary artery and right main bronchus and liver, blunt impact injuries of extremities, multiple lacerations and contusions, partial amputation of right arm with disarticulation of humerus					
W	Unknown	65	female	5’2”	118	Fatal
	Injuries: Blunt force trauma of head with scalp laceration, diffuse subscalpular hemorrhage, multiple compound comminuted fractures of calvarium and skull base including hinge fracture through middle cranial fossa, multiple fracture lacerations of brain, brainstem and cerebellum, blunt force trauma of torso with multiple rib fractures, bilateral pulmonary contusions, laceration of right lung and pericardium and heart, multiple liver lacerations, bilateral hemothorax, hemoperitoneum					

Table 5. Occupant Information for Unknown Seating Positions, Non-Fatalities

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
X	Unknown	47	female	Not Recorded	120	Serious
	Injuries: Laceration in liver, multiple rib fractures, right pneumothorax, bilateral hemothorax, right acetabulum fracture, right L2 transverse process fracture Emergency response: Left scene 6:28 am, arrived at hospital 6:33 am, Registered at hospital 645 am,					
Y	Unknown	61	male			Serious
	Injuries: bilateral upper extremity traumatic amputations and right humerus fracture Emergency Response: Ambulance assigned 5:50 am, enroute 5:50 am, on scene 6:00 am, left scene 6:33 am, Hospital received call to prepare at 6:30 am, 6:50 am arrived at hospital					
Z	Unknown	68	Male			serious
	Injuries: not recorded First Response: not located					
AA	Unknown	76	Male			serious
	Injuries: not recorded First Response: not located					
BB	Unknown	50	Male	5’4”	170	minor
	Injuries: Abrasion on forehead, lateral abrasion left knee, pain in back and leg and head. Treated and released. First Response: Hospital log time 7:59 am					
CC	Unknown	53	Male	Not rec.	Not rec.	minor
	Injuries: Not admitted to hospital, treated and released. First Response: Not Recorded.					
DD	Unknown	59	Male	6’0”	170	minor
	Injuries: Right back pain, stomachache and headache First Response: Hospital log time 8:00 am					

Occupant	Seat Position	Age	Gender	Height	Weight	Medical
EE	Unknown	61	Male	5'4"	150	minor
	Injuries: Right Shoulder dislocation, head pain First Response: Hospital log time 7:51 am					
FF	Unknown	58	Male	4'11"	112	minor
	Injuries: Non bleeding abrasions over left hand, lower back and jaw pain, treated and released. First Response: Hospital log time 8:23 am					
GG	Unknown	50	Male	5'10"	240	minor
	Injuries: Pain in right lower back, treated and released. First Response: Hospital log time 8:19 am					

5.2 Occupant Ejections

No occupants were ejected from the bus during the initial contact and slide along the guardrail. Occupants were partially ejected in the region of the pole impact, and occupants were found on the ground in the area of the broken windows, trapped under the roof section of the bus at the final resting spot.

6. Emergency Response

6.1 New York State Police

The factual information makes reference to the Traffic Management Center (TMC). This center is located at the State Police Headquarters in Albany New York and is jointly operated by the New York State Police and the New York Department of Transportation. The center monitors inputs such as 911 calls and enables the authorities to respond to roadway emergencies.

6.1.1 Bureau of Investigations (Hawthorne)

The New York State Police Bureau of Investigations, located in Hawthorne New York, was a party to the investigation and provided a variety of information. Information obtained on-scene included: Scene Photos, Troop T Incident History Detail[25], and Statements from State Police interviews.[26]

6.1.2 New York State Police Collision Reconstruction Unit (Salt Point)

The New York State Police Collision Reconstruction Unit, located in Salt Point New York, was a party to the investigation and provided information, assistance, and access to the accident bus. The bus was retained at the impound yard at Salt Point and made available for detailed inspection.

[25] See Survival Factors Attachment 3: Troop T Incident History Redacted.
[26] See Survival Factors Attachment 4: Statements to State Police Redacted.

6.2 New York City Police Department (NYPD)

The New York City Police department provided 911 call logs and dispatch records.[27] At 5:38 am the New York City Police department received 911 calls from drivers on Northbound I-95 and Southbound I-95 who witnessed the accident and aftermath. New York City Police had two Emergency Service Units (ESU) with four officers on scene which arrived after the New York Fire Department and assisted in the removal of passengers.

6.3 New York Fire Department (FDNY)

The New York City Fire Department Bureau of Legal Affairs provided an Incident History Report.[28] At 5:37 am the Traffic Management Center (TMC) received a 911 call reporting a rolled over bus. This call was immediately transferred to the FDNY alarm box located at New England Throughway and Hutchinson River Parkway, Bronx, New York, an alarm was initiated 5:37 am. FDNY assigned two engines, two ladder trucks and a Battalion Chief at 5:38 am. The FDNY Battalion Chief was the first authority to arrive on scene followed closely by New York State Police. The Battalion Chief arrived on scene at 5:47 am and became the incident commander. By 5:50 am another engine and ladder truck as well as a rescue unit and Division Chief were also assigned. The Battalion Chief did not invoke mass casualty plan (code 1060) because he felt sufficient units had responded. A Division Chief arrived at 6:01 am and became incident commander. Later in the event, command had a supervisor and sub-commanders for operations, rescue, and EMS operations.

6.3.1 Fire Department Equipment and Responders:

A list of the FDNY Equipment and responders was provided by the Bronx Borough Command.[29] A Battalion Chief vehicle with a battalion chief and his driver was the first FDNY vehicle on scene. Ladder Truck 50 followed immediately after. Ladder Truck 39 and Squad 61 were the next to arrive. Interviews were conducted in person or by telephone with the Incident Commander and the initial responders on-scene as well as responders involved in extrication.

6.3.2 New York Fire Department Ambulance Units:

The New York City Fire Department Bureau of Legal Affairs provided the ambulance dispatch logs.[30] FDNY dispatched a total of 16 EMS units between 5:38 am and 6:10 am, with the first arriving on scene at 5:50 am and the second at 6:00 am. Three of the FDNY ambulances transported patients to local hospitals, eleven participated in the response but did not transport patients, and two were cancelled.

[27] See Survival Factors Attachment 5: NYC 911 Redacted.
[28] See Survival Factors Attachment 6: FDNY Incident History Report Redacted
[29] See Survival Factors Attachment 7: FDNY Responders Redacted.
[30] See Survival Factors Attachment 8: FDNY Ambulance Dispatch Logs Redacted

7. Other Information

7.1 Hospitals

Saint Barnabas Hospital located at 4422 Third Ave, Bronx, New York 10457 treated the driver and passengers. Jacobi Medical Center located at 1400 Pelham Pkwy S., Bronx, New York 10461 treated passengers. Medical records from both hospitals were used for information provided in section 5.0.

7.2 Private Emergency Response Services

Three private Ambulance companies were called starting at 6:21 am arriving on scene starting at 6:43 am. Six total private ambulances (two from each company) responded and assisted with triage and transported stable patients to hospitals.

New York Hospital of Queens Ambulance had an Advanced Life Support unit receive the call at 6:22 am and arrive on scene at 6:43 am. Two paramedics treated one multi-trauma patient identified as the driver at the scene and then transported the driver to Saint Barnabas Hospital, arriving at 7:17 am. A basic life support unit received the call at 6:21 am and arrived on scene at 6:52 am. They were initially assigned to TRIAGE then transported 5 stable patients to Jacobi Hospital, and one additional patient refused transport to the hospital. They arrived at the hospital at 7:48 am.

Flushing Hospital Ambulance had two units which transported victims to Jacobi Hospital and St. Barnabas Hospital.

Albert Einstein Hospital Ambulance had two units which transported victims to Jacobi Hospital and St. Barnabas Hospital.

7.3 Medical Examiner

New York City Office of Chief Medical Examiner, located at 520 First Avenue, New York, NY 10016, provided autopsy records for the deceased and this information was used for section 5.0. Identification and proper names for several victims was difficult to establish due to the lack of a set assignment or roster, and the lack of identity cards or other information recovered at the scene.

7.4 New York City Office of Emergency Management

The New York City All Hazards Mass Fatality Management Plan and the Pandemic Influenza Surge Plan were obtained. Both plans are scheduled for revision to bring them into alignment with the recently development Catastrophic Mass Fatality Response System Plan. Note that the interview with incident commander indicated that the mass fatality plan was not implemented because it was not required.

7.5 Local Police Departments

The Pelham Manor Police Department had a unit arrive on scene at approximately 0715 and responded to a call for people in the forest near the accident scene. The New Rochelle Police Department did not have units involved in the initial response or the assistance of the occupants.

7.6 Local Fire Departments

The Westchester County Fire Department received a call at 6:21 am and attempted to get to the scene. Sufficient equipment was already on scene and traffic was blocking access, and thus they returned. Other local fire departments who were either contacted and found not to have responded or were not able to be contacted included: Engine 66, N. Bronx Fire House, NYC Fire Department, Edgewater Volunteer Fire Department, FDNY Engine 83.

E. INTERVIEWS

1. Interviews with Driver and Passengers of the Accident Bus

The driver (occupant A) was interviewed by the New York State Police and the NTSB, information is available in the Human Factors Factual Report in the docket for this accident. The driver's initial statements to the New York State Police and passenger statements to the New York State Police are included in Survival Factors Attachment number 4.[31]

The statements made to the New York State Police which were pertinent to the survival factors investigation are summarized below.

A 75 year old female (occupant C) was interviewed at St. Barnabas Hospital. She indicated she was sitting in the front row of the bus behind the driver, by the window. She indicated there was another woman next to her. She indicated that she was tired and nodding off to sleep at the time of the accident. She only remembered a loud bang, then woke up and there were two people trying to get her out of her seat. She indicated that her jacket was stuck and she was held in her seat by it. The people pulled on her and she was in pain, and could not describe exactly where. Someone then cut the jacket free and she was removed. Her head was hurting badly, her right ear was badly scraped. (Interviews with first responders confirmed that a woman in the front of the bus needed to have her jacket cut away to free her from the seat.) She indicated that the woman next to her was about 50 years old. The woman who sells tickets was sitting alone in the opposite front seat.

A 61 year old female (occupant D) was interviewed at Jacobi Medical Center. She was seated across seat numbers 21-22 and across the aisle from her was another female approximately 50 years of age.

A 71 year old female (occupant E) was interviewed at Jacobi Medical Center. She stated she was seated in seat number 35 (actually determined to be seat 34) which is and aisle seat on the

[31] See Survival Factors Attachment 4: Statements to State Police Redacted.

right side. Next to her in the window seat was another female approximately 30 years of age. She sustained a partial right foot amputation and a neck injury.

A 55 year old male (occupant F) was interviewed by New York State Police. His statement indicated that he was sitting on the driver's side of the bus, fourth seat from the back, and was alone in the seat. He was sleeping at the time and was awoken when the bus was crashing. He helped two women out of the bus.

A 47 year old male (occupant G) was interviewed by New York State Police. His statement indicated that he was sitting in the right rear of the bus, aisle seat in the second to last row. He was sleeping and was woken up twice by the right tires of the bus riding on the rumble strips. He fell asleep again at the time of the crash and was woken up when the bus turned on its side and hit the pole.

A 62 year old male (occupant H) was interviewed by New York State Police. His statement indicated that he sat in seat number 53 on the right side of the bus and that most people were seated on the right side of the bus. He fell asleep after getting on the bus and woke up to a loud crashing noise with steel and glass breaking and saw a metal pole coming toward him. The bus was already on its side. The bus stopped with the pole being one row in front of him. He heard people moaning and saw people without arms and legs. One of the passengers helped him get out from the roof exit of the bus. He was in shock and waited for the emergency services to arrive. He told the firemen that his head hurt and was taken to the hospital with eight other people. While waiting for the firemen to come he heard the bus driver asking the other people who got out to help those that were still trapped.

A 43 year old female (occupant I) was interviewed by a NY State Police investigator at St. Barnabas Hospital. She indicated that she was sitting on the passenger side towards the back, on the aisle side of the seat with a man sitting next to her. She awoke was asleep at the time of the crash and awoke to people falling on top of her.

The doctor of a 70 year old male (occupant J) was interviewed regarding his injuries. The man was pronounced deceased at St. Barnabas Hospital 7:15am March 15, 2011. He suffered extensive blunt force injuries including focal extensive facial trauma, a punctate bleed on the brain, liver and spleen damage, bilateral pulmonary contusions, bilateral rib and bilateral hip fractures. He did not have penetrating injuries.

2. FDNY First Responder Interviews

Interviews were conducted with FDNY first responders.[32] A summary of the information pertinent to the survival factors investigation is provided below.

Firefighters from rescue units were interviewed at the Special Operations Command Station in the Bronx, New York. They were the first unit to arrive on-scene except for the NYPD ESU unit. They saw victims walking and climbing out of the bus. Most of the victims were on the ground between the roof and the body of the bus, with some stirring. They helped a girl out

[32] See Survival Factors Attachment 9: First Responder Interviews Redacted.

through the top of bus (driver's side). Victims were located towards rear of bus between the pole and the roof, with victims wrapped around the pole. They saw limbs sticking out from under bus roof and side. They worked on extending rear roof hatch opening. They did not see anyone beyond the sign in the rear of the bus. They were concerned about electrical power from the street sign. Victims were able to evacuate and were guided towards the front of the bus to exit at the windshield.

There was access through the windshield and about 4 people were taken out through the rear roof opening; some deceased and some alive. They heard a woman complain about her back and a Hispanic male asking about his shoes. They cut seatbacks near the expanded roof hatch opening to open space at the pole, and saw at least three people were stuck at the pole. They saw a man with amputated arms located forward of the pole and saw a heavy set man and a woman dragged and wrapped around pole.

They saw a woman pop-up from the top of the bus and waving for help and helped her out by taking a ladder down to her. They saw a Hispanic man that appeared to be in shock, stuck in his seat on the driver's side of the bus. They cut out 3 seatbacks near the pole to un-pile the group of people between the pole and the roof/luggage racks.

Firefighters were interviewed at the Engine 90 and Ladder 41 Station, Bronx New York. They took the bus driver from the MERV (Mobile Emergency Response Vehicle)[33] bus on a stretcher to an ambulance. The bus driver was complaining about pain to his upper chest. Staged in front of the bus were about 12 people out in grass. One person was thought to be unaccounted for, so was sent to walk around the area and look for others along the parkway, but no one was found.

Firefighters were interviewed at Ladder 50 station, Bronx New York. They went in through the front and saw about 6 to 10 people piled up with at least half deceased. They moved the victims about 15 feet away from bus and put the deceased in one spot and the living in another. They saw others lying on the ground between the bus and the roof and started a brigade, handing people out in stokes baskets through the front. They called for extraction equipment, but then didn't need it.

Firefighters were interviewed at Ladder 61 station, Bronx, New York. Commanders instructed others to secure the bus and battery, and to secure the sign electricity. The Firefighters were told to stabilize the bus and called for extraction equipment. They saw 2 victims in the front near the windshield, one deceased, and the other a seriously injured woman trapped by her coat. Another deceased was in the stairwell near the loading door. They freed the trapped woman by cutting off her coat and pulling her out. Firefighters put the 2 deceased on and backboard and removed them from the windshield area. A firefighter put up a ladder midway along the bus under-carriage. The front of the bus was accessible by walking in through the front. Firefighter took the previously trapped woman to an ambulance. Firefighter removed 2 victims from the rear and saw a double amputee near the sign stanchion.

One firefighter noted that as soon as you entered the bus, there were a lot of bodies on top of each other. He felt that people were sleeping on the bus and didn't have seatbelts on. He thought

[33] MERV is a full-size bus used for triage and also serves as a holding area prior to transport.

the impact threw them to the front of the bus. He said there were a lot of "self defense" wounds, i.e., arm and hand injuries. He estimated that there were 8 to 9 deceased in the front of the bus. He didn't leave the bus until all the people and body parts were out, which took well over an hour. It was light outside when he finished.

Firefighters were interviewed at the Engine 97 Station, Bronx, New York. They set up foam line and others from the engine unit helped out the EMS.

Firefighters were interviewed at the Engine 97 Station, Bronx, New York. They heard that this was a Mass Casualty, so the Captain told them to grab all the EMS supplies they could. When they arrived they saw two people climbing out of the top (through the windows on the driver side). They formed a brigade line to pass the people out of bus through the front. They pulled out a set of seats that were already loose and threw out the broken seatbacks. They used airbags to lift the bus in order to remove the people stuck under the roof portion of the bus. They had to stop and reposition airbags due to people moaning, which indicated that the lifting was putting pressure on their limbs or torso. At least two victims were stuck under the bus. When asked to describe which portion of the bus the victims were under, both thought they were under the roof/top portion of the bus.

Firefighters were interviewed at the Engine 79 Station, Bronx, New York. Ladder 32 arrived at 6:20 am and was not involved in removal of victims. Engine 79 was one of the last units on scene. They generally saw victims with blunt force trauma and facial injuries.

The Division Chief (second Incident Commander) was interviewed at Bronx Command Office, Bronx New York. He stated that the first 911 call came in at 5:37 am. Upon arriving at scene at 6:01 am he relieved Incident Command from Battalion Chief. He found out there were 31 passengers plus driver. He assigned the Battalion Chief to handle operations, instructed another Chief to take over as rescue supervisor and a Captain to supervise EMS.

The Battalion Chief (first Incident Commander) was interviewed at Battalion 20, Bronx New York. He assumed Incident Command upon arrival at 5:47 am. He initially saw bus overturned and people milling around towards the front of the bus. The Chief’s driver located the bus driver and talked to him in order to determine how many people were on board. He did a walk around and saw one fatal near front of bus and several limbs sticking outside side of bus. When Ladder 50 arrived he instructed them to handle this as a building collapse and remove all the victims in order encountered. He instructed Ladder 50 to get airbags and lift up the bus in order to remove people trapped under bus. He instructed firefighters to widen the rear roof hatch area to help with removal of victims. After Firefighters placed air bags in front he saw roof wobble and told them to stop and stabilize it first. He did not issue the Mass Casualty code 1060 since he felt they had enough responding units. He treated the scene like a building collapse with a “surface evacuation”, where you can not clearly determine dead and alive, so you pull out everyone starting with those at the surface and work your way in.

Firefighters were interviewed at the Engine 89 Station, Bronx New York. They arrived at 6:10 am and told to stretch out a foam line.

Firefighters were interviewed at Ladder 37 Station, Bronx New York. They arrived 20 minutes into the incident. The majority of bodies were removed when they arrived except 2 deceased near back of the bus near the pole. They conducted a secondary search after everyone was removed. They inspected the bus and checked for any remaining bio material.

Firefighter (the driver for Battalion Chief and first Incident Commander) was interviewed at the Squad 61, Bronx, New York. He responded to scene near the MERV and walked over to a tow truck driver who was already at the scene. He inquired as to what happened and was told by the tow driver to talk to the bus driver. He located the driver and asked how many passengers were on board, the driver indicated 31. He asked the driver if he was injured, and the driver replied that he was slightly injured, but there were people in the bus that were injured worse and needed help. He observed the driver to have a laceration on the left side of his forehead and he was covered in dirt. He stepped into the gap that was at the front of the bus and looked inside. It was dark outside when he arrived at the scene, and he did not have a flashlight with him. He stated that the interior of the bus was very dark, and he noted 4 to 6 people on the ground near the front portion of the bus. He stated he did not know the status of the passengers, but they appeared entrapted and in grave condition. He advised the incident commander that there were 31 people on the bus, and "everyone was trapped." He notified the dispatcher of the circumstances of the accident, and requested additional units respond to the scene. He did a "360" walk around the bus. He originally thought that the windshield fell out, however upon his second look, he noticed the pole had torn through it. He noticed that that diesel fuel was leaking from the bus, but he advised that this did not pose a serious hazard at the time due to diesel fuel being a less flammable fuel. He saw that EMS had triaged the driver as “walking wounded” and informed the EMS that the driver needed to be "up-triaged" due to his potential injuries due to the driver complaining of chest pain. He assisted in the rescue operations (moving equipment, being part of the assembly line that was evacuating the victims and debris from the bus), but he did not enter the bus during his time at the scene.

3. New York Police Department Interviews

New York City Police officers were interviewed by telephone on April 4th, 2011. They indicated that the call came in around 5:30 am and arrived in about 5 minutes. When they arrived, there was already an engine company and a ladder company on scene. They pointed their headlights onto the bus. The first officer on scene requested a ladder and entered the bus. The bus was wide open from the pole coming through windshield, and had basically cut it in half. There were 4 ESU (emergency service unit) officers in the bus. They saw multiple bodies, most in the rear and some in the front as well as some people walking around dazed. The fire department was near the rear of the bus with "jacking bags" (airbags to help lift the vehicle) helping people who were trapped under the rear third of the bus. They wanted to cut the roof and peel it back on both sides to allow access, but stopped because the top corners of the bus were difficult to cut. The luggage area and inside skin ("double roof") impeded the cutting operation. They were also worried about sparks.

The bodies under the bus were under the roof portion. Since the pole came through, thought they were thrown from the windows. They thought that maybe pole pushed people under the roof portion of the bus. They helped remove people as they were passed out. They pulled out

everyone dead or alive. After removing people, they checked for more bodies. It seemed that everything was intact until it hit the pole, as they did not see bodies outside the final resting area of the bus. The first 5 people he came across were deceased and located near the front. They were in the interior of the bus. They were thrown into the walkway of the bus and the right side of the bus. They used scoop stretchers, backboards, anything they could find to carry a person. There were people on the left about 3 to 4 seats back. One Asian woman was still "strapped in" with a "seatbelt" (later identified as her jacket). She had leg pain so they carried her out. They came across 2 more deceased and another live person, a man with both arms amputated. The grabbed him by the belt and passed him out to the triage staff. No jacking bags were used in the front portion of the bus. Somewhere around the middle of the bus, after taking out more victims, he realized that most of the people in the rear had already been removed by those working from outside the bus. The fire department removed the AC unit from the rear of the bus and used this area to remove bodies.

//**END of REPORT**////////////////////////////////////