NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

August 15, 2020

SURVIVAL FACTORS

Survival Factors Group Chairman's Factual Report

DCA19MA143

I. ACCIDENT

Operator	:	Miami Air International
Airplane	:	Boeing 737-800 [N732MA]
Location	:	Jacksonville, FL
Date	:	May 3, 2019
Time	:	2140 eastern daylight time (EDT)

II. SURVIVAL FACTORS GROUP

Group Chairman	:	Emily S. Gibson National Transportation Safety Board Washington, DC
Member	:	Peggy Hurlbert Federal Aviation Administration Orlando, FL
Member	:	Bruce Wallace Boeing Seattle, WA
Member	:	Deborah Wernert Miami Air International Miami, FL
Member	:	Tashana Brown Association of Flight Attendants Pembroke Pines, FL

Member	:	Eric Folland Collins Aerospace Phoenix, AZ
Member	:	Mike Kret Safran AeroSystems Evacuation Wall Township, NJ
Member	:	Paul Lacy Safran AeroSystems Evacuation Wall Township, NJ

III. SUMMARY

On May 3, 2019, at 2142 eastern daylight time, Miami Air flight 293, a Boeing 737-81Q registration N732MA, was landing on runway 10 at Jacksonville Naval Air Station, Jacksonville, Florida, when it departed the end of the runway, contacted a stone embankment, and came to rest in shallow water in St. Johns River. The 2 pilots, 4 flight attendants, 1 mechanic, and 136 passengers were not seriously injured. The airplane was substantially damaged. Flight 293 was a non-scheduled passenger flight from Leeward Point Field, Naval Station Guantanamo Bay, Cuba, operating under the provisions of 14 Code of Federal Regulations Part 121 Supplemental. Instrument meteorological conditions prevailed at the time of the accident, and rain was occurring during the landing.

IV. DETAILS OF THE INVESTIGATION

The Survival Factors group was formed on May 4, 2019. Airplane documentation and interviews with the four flight attendants, airports personnel, and emergency response personnel were conducted. Passenger statements were also obtained.

On June 18, 2019 the group reconvened in Phoenix Arizona at Collins Aerospace facility for a slide examination from airplane N732MA.

On July 9, 2019 the Survival Factors group met in Wall Township, New Jersey at the Safran facility for a raft examination from airplane N732MA.

On August 21 and 22, 2019 the group reconvened with the Maintenance group in Miami, FL at the Miami Air facility for a discussion on how Miami Air conducts maintenance and overhaul of the slides and rafts. The group visited American Southeast Inflatables (ASI), also in Miami FL to discuss their process and procedures in overhauling the slides and rafts.

1.0 Airplane Configuration

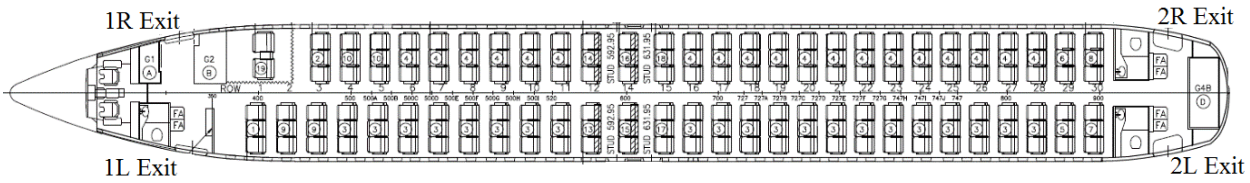


Figure 1*- Diagram of the accident airplane.*

The accident airplane N732MA, Serial No. 30618, was a B-737-81Q. The airplane was equipped with 168 passenger seats with 2 crew rest seats located at row 1 on the right side of the airplane looking forward. There were 3 dual position jumpseats (6 seat locations) one located at door 1L, one located at door 2L, and one located at door 2R. There were 3 seats located in the flight deck: a captain seat, first officer seat, and a jumpseat. The airplane was configured with 4 floor level exits and 4 overwing window exits.

2.0 Cabin Crew Information

2.1 Flight Attendant Training

Position	Initial Training Completion	Last Recurrent Training
Purser 1L	04/25/2002	05/08/2018
1R	12/28/2016	11/05/2018
2L	11/04/2018	N/A
2R	11/01/2018	N/A

2.2 Miami Air Flight Attendant Training Program

Upon hire with Miami Air, flight attendants were required to complete an approved initial training program that qualified candidates as flight attendants. NTSB Survival Factors Group members requested and reviewed Miami Air's flight attendant initial and recurrent training program. The initial course consisted of over 90 hours of training and encompassed a proficiency evaluation. Then, every 12 months, Miami Air flight attendants were required to complete recurrent training. The recurrent course consisted of over 10 hours of training and encompassed a proficiency evaluation.

Included in the initial flight attendant training program were 25 hours of company procedure indoctrination. Subject areas included: the airline operation and policy, aviation laws and regulations, the flight attendant manual system, and duty and rest regulations. The training program also included 5 hours of training on transporting dangerous goods and aviation security. 8 hours of crew resource management training was provided. Over 20 hours were dedicated to general emergency situations including such topic areas as:

- Fires in flight
- Ditching

- Ground evacuations
- Illness injury
- Slide and slide/raft familiarization
- Cabin pressurization and decompression
- Passenger briefings
- Emergency equipment
- Emergency exits

Other initial training modules included 18 hours of flight attendant specific training and 15 hours of aircraft ground training that included:

- Basic aircraft and aviation familiarization
- Aircraft equipment and fixtures
- Aircraft exit
- Aircraft systems

After completion of the initial ground portion of the training program, each flight attendant was required to complete supervised line experience training. After line experience training, the flight attendant received an evaluation on their basic knowledge and abilities required as a flight attendant including their capabilities to conduct flight attendant duties in each phase of flight and overall knowledge of cabin safety.

The Miami Air recurrent flight attendant training program consisted of over 10 hours of training. Recurrent training focused on emergency equipment training and emergency procedures training. Each year, the modules covered the following topics:

- Crewmember security
- Firefighting
- Emergency equipment
- Hazardous material
- Review of raft survival equipment
- Crew resource management scenarios
- Ditching frills
- Aircraft specific
- Aircraft systems
- Aircraft equipment
- Emergency situations
- And other general subjects

2.3 Flight Attendant Manual

Miami Air provided a copy of the flight attendant manual (dated 04-17-2018, revision 005) that was current at the time of the accident. Excerpts from relevant areas of the flight attendant manual are included in attachment 2.

Within the topic of evacuation, it stated no two emergencies are exactly alike and crewmembers muse be prepared to respond to various standard procedures and must utilize common sense in doing so. Having a firm understanding and working knowledge of emergency equipment and procedures would enable one to handle each emergency situation with confidence.

Flight attendant evacuation procedures stated that flight attendants should respond quickly and aggressively and to assess conditions of their exit to determine whether or not the exit is usable or if alternative exits should be used or if they have already been opened. In addition, it stated if an exit is safe, flight attendants should open the exit and ensure the slide was inflating by pulling the red manual inflation handle, or block and redirect passengers if an exit becomes hazardous, use loud and clear commands, and get passengers outside as quick as possible.

The manual stated that if an aircraft experiences an unplanned water evacuation, flight attendants must do the best they can to direct the passengers and if the aircraft was not sinking rapidly, and if time permitted, to launch the rafts. This was accomplished by holding people back, retrieve the rafts from the ceiling, carry them to an exit, secure them to a fixed structure, and have able bodied passengers assist with the launching of the raft. The life raft section of the flight attendant manual provided information on the operation of the life raft.

The manual stated that escape ropes were installed in the window frames and provided information on how to use them. The manual stated in a ditching situation, the escape rope can be used as a hand hold for passengers to walk out on the wing and step into a life raft.

2.4 Flight Attendant Interviews

All four flight attendant interviews were conducted on May 5, 2019. The flight attendant interview summaries are included as attachment 1 of this report.

3.0 Passenger Information

All the 136 passengers onboard the aircraft had some affiliation with the military. The flight was a non-scheduled passenger flight (charter) from Leeward Point Field, Naval Station Guantanamo Bay, Cuba. According to interviews with the terminal director, passengers were classified into two primary groups, those military personnel with confirmed reservations and those traveling space-available that had an attachment to a military service member. The manifest was created using passenger information received from active military identification or passports. There were no lap children onboard the aircraft as the military required a seat for every individual.

4.0 Airplane Documentation

The airplane was located at the end of the runway in relatively shallow water in the St. Johns River. The airplane was intact, and no seats were dislodged.

4.1 Flight Deck Seats

4.1.1 Captain Seat

The seat was undamaged. The shoulder harness retracted, and the armrest was operable. The life vest behind the captain seat was present and stowed. The shoulder belts had no label. The seat was an Ipeco seat. The following information was obtained from the seat and restraints:

Seat Bottom Cushion
Part no. 0A220-o267
Iss. No. 4
Date Jan 2010
TSO no. C72c
Batch No. 1248912-4
TSO. C127a TYPE A-FF
Made in Great Britain

Seatback Cushion
Ipeco Europe
An Ipeco Company
Aviation Way, Southend-On-Sea, England
BL 32 C/O
Part No. 0A220-0265CH
Iss No. 1
Date Oct 2000
Ipeco Batch no. 631230/1-1B
BL Batch no. 30778/10

Lapbelt Insert Tab
Part No 1150011-601-010
Rated 3000 lbs.
Conforms to FAA TSO-C114
Repair by AmSafe only
S/N B31MA1R7-4
O/H10/18

Rotary Buckle
AmSafe Aviation
London UK
Tel +440 208 754 2700

Complete System P/N 118003-425-100
Description ASSY Lapbelt Half
Rotary- P/N150003 608 000 O/H 10/18 RH

Shoulder Harness
No label

4.1.2 First Officer Seat

The seat was undamaged. The shoulder harness retracted, and the armrest was operable. The life vest behind the first officer seat was present and stowed. The shoulder belts had no label. The following information was obtained from the seat and restraints:

Seat Bottom Cushion
Ipeco seat
Part no. 0A220-0267
Iss. No. 4
Date Jan 2015
TSO no. C72c
Batch No. 1676607-4
TSO. C127a TYPE A-FF
Made in Great Britain

Seatback Cushion
Ipeco Europe
An Ipeco Company
Aviation Way, Southend-On-Sea, England
BL 32 C/O
Part No. 0A220-0265CH
Iss No. 1
Date July 2018
Ipeco Batch no. 2057915-1B
BL Batch no. n/a

Lapbelt Insert Tab
Part No 1150011-601-010
Rated 3000 lbs.
Conforms to FAA TSO-C114
Repair by AmSafe only
S/N B31MA1R7-4
O/H10/18

Rotary Buckle

AmSafe Aviation
London UK
Tel +440 208 754 2700
Complete System P/N 118003-425-100
Description ASSY Lapbelt Half
Rotary- P/N150003 608 000 O/H 10/18 RH

Shoulder Harness
No label

4.1.3 Flight Deck Jumpseat

The jumpseat was undamaged and had been occupied by a Miami Air mechanic. The seatpan folded down. The seatback retracted and lifted into the fittings. There were two shoulder harness with no labels on the straps. The straps fit into the rotary buckle. The seat belts retracted. The seats and restraints were labeled:

Rotary Buckle
Pacific Scientific Co
(code illegible- very scratched up)

Lapbelt
Pacific Scientific
Duarte, CA 91010
P/N 111493-13
NA 1111492-53
FA 2100011-03
Date of MFG 05/09
Rated Strength 2500 lbs.
Conforms to FAA TSO C114

Crotch Strap
Pacific Scientific
Duarte, CA 91010
P/N 111462-09
FA 2100014-03
Date of MFG 05/09
Rated Strength 2500 lbs.
Conforms to FAA TSO C114

4.2 Passenger Seats and Seatbelts

4.2.1 Passenger Seats

The airplane was equipped with 168 seats manufactured by Weber that were designed to comply with TSO-C127A. The seat cushions were also manufactured by Weber. The cushion labels read:

Weber
2000 Weber Drive
Gainesville, TX
Fire blocked Assy

Seat part numbers were labeled as followed:

Row 1 ABC: 853307-401-01A
Row 2 DEF: 873-13036-101 – Double crew rest seat
Row 2 ABC and 3ABC: 853307-417-01A
Row 3 DEF: 853307-402-01A
Row 4 ABC through 11 ABC: 853308-401-01A
Row 4 DEF and 5 DEF: 853308-418-01A
Row 6 DEF through 11DEF: 853308-402-01A
Row 12 ABC: 853308-411-01A
Row 12 DEF: 853308-412-01A
Row 14 ABC: 853308-413-01A
Row 14 DEF: 853308-414-01A
Row 15 ABC: 853308-415-01A
Row 15 DEF: 853308-416-01A
Row 16 ABC through 28 ABC: 853308-401-01A
Row 16 DEF through 28 DEF: 853308-402-01A
Row 29 ABC: 853308-403-01A
Row 29 DEF: 853308-404-01A
Row 30 ABC: 853308-405-01A
Row 30 DEF: 853308-406-01A

4.2.2 Passenger Restraints

The passenger seats were equipped with AmSafe seatbelts. They were labeled:

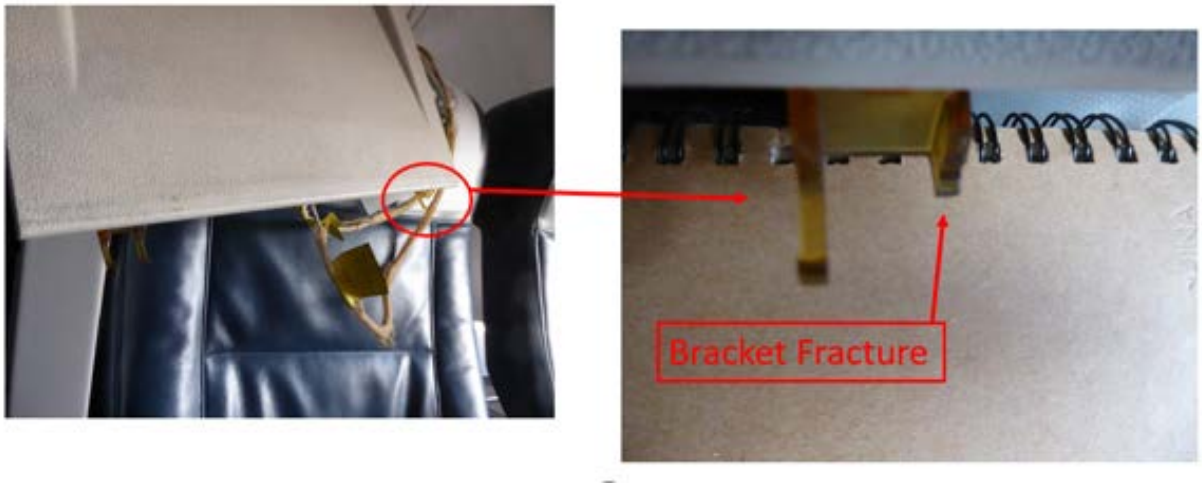
Buckle
AmSafe Belts
P/N 502755-128-2251
M/N 502 751-1
Rated 3000 lbs.
Conforms to TSO C 221f

Insert Tab
P/N 502755-128-2251
M/N 502751-1
Rated 3000 lbs.
Conforms to TSO C221f

4.2.3 Interior Documentation

Prior to the start of interior documentation, emergency response and airport personnel had removed all carry-on luggage from the airplane. This included all luggage from the overhead bins (OHB) and underneath the seats. None of the passenger seats were dislodged or damaged. Row 1DF was designated as the crew rest area. There was a raft line that was connected to the buckle at seat 1C.

A Passenger Service Unit (PSU) video panel was down and hanging by a lanyard at row 9. The inboard latch assembly appeared to be intact however the outboard latch assembly was broken. The PSU video panel was in the area of fuselage crunch damage on the left side of the airplane, about 14 windows back from the front.



Photograph 1- *PSU video panel and fracture of the inboard latch assembly over row 9 ABC.*

The window frame at row 10 was popped out on the upper left corner and the outer glass/plastic portion (the actual window piece) was out of its frame and the outside window seal was hanging down. A wrinkle on the fuselage skin (outside of the airplane) was found about two windows ahead of this window.

At row 19 another PSU video panel was down and hanging by a lanyard. The latch assemblies were broken. Two of the oxygen masks had deployed at row 22.

There were 4 seat cushions missing from the airplane. One seat cushion was found inside a raft.

4.3 Flight Attendant Stations

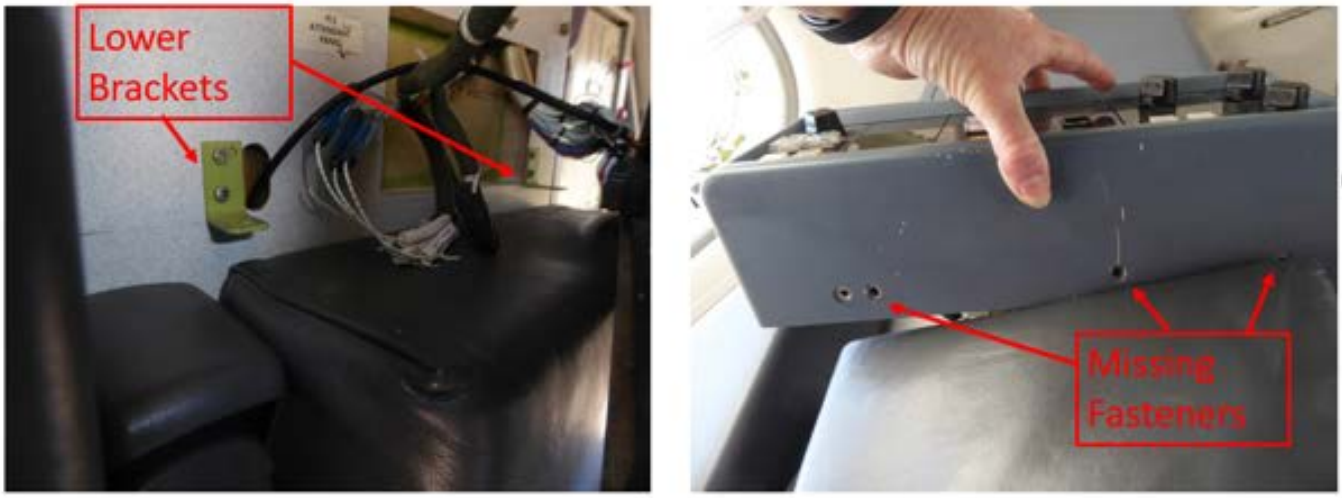
There were three rear-facing dual position jumpseats in the cabin. One located in the forward left side of the cabin and two located adjacent to each other in the aft. Flight attendants in the forward bench seat were seated in locations 1L (outboard) and 1R (inboard); and the inboard seats of each aft double bench seat were designated seat locations for 2L and 2R (outboard seats were unoccupied unless there are 5 flight attendants assigned to flight).

4.3.1 FWD Flight Attendant Station

The forward flight attendant panel (FAP) entry lighting was turned to the off position. The ceiling light was turned to bright. The top end section of the panel was pulled away from the bulkhead about 1 ¾ inch. The panel had released from the top key slot attachment. Two screws that fasten the panel to the lower brackets under the panel were missing. The interphone was present. The emergency equipment cabinet above the FAP held a fire extinguisher. It was labeled:

Serial # E-76584034
Due 8/30/19
Last 8/30/18

Photograph 2- *FAP pulled away from the bulkhead.*



Photograph 3- *FAP removed from the bulkhead*

4.3.2 1L Jumpseat

The 1L jumpseat was the outboard seat of a dual position jumpseat that held the 1L and 1R seat positions. The seat bottom of the 1L jumpseat retracted without resistance. There was no deformation in the frame, however there was some indentation in the cushions. The restraints retracted without resistance. The crew life vest and flashlight were not present under the 1L seating position.

Photograph 4- *1L and 1R jumpseat.*

4.3.3 1L Restraints

The restraint system consisted of an adjustable lapbelt and shoulder harness. The restraint retracted and showed no signs of tear or fraying. The restraints were labeled:

Insert Tab
Pacific Scientific
Duarte, CA 45402
P/N 1117556-100-278
Conforms to TSO C-114
N/A 2100002-100-278
F/A 2100002-01-278
Inspected 11/07 MIA
Rated 2500 lbs.
Repair station
Pacific Scientific, MIA
Date Repair 11/07

1L Buckle End
Pacific Scientific
Duarte, CA 45402
P/N 1117556-200-278
N/A 2100002-200-278
F/A 2100002-01-278
Inspected 11/07 MIA
Rated 2500 lbs.
Conforms to TSO C-114

4.3.4 1R Jumpseat

The 1R jumpseat was the inboard seat of a double jumpseat that held the 1L and 1R seat positions. The seat bottom of the 1R jumpseat retracted without resistance. There was no deformation in the frame, however there was some indentation in the cushions. The restraints retracted without resistance. The crew life vest and flashlight were missing from under the 1R seating position.

4.3.5 1R Restraints

The restraint system consisted of an adjustable lapbelt and shoulder harness. The restraint retracted and showed some signs of fraying at the label on the buckle side near the connection point. The restraints were labeled:

1R Insert Tab
Pacific Scientific
Duarte, CA 45402
P/N 1117556-100-278
Conforms to TSO C-114

N/A 2100002-100-278
F/A 2100002-01-278
Inspected 07/13 MIA
Rated 2500 lbs.
Repair station
Pacific Scientific, MIA
Date Repair 07/13

1R Buckle End
Pacific Scientific
Duarte, CA 45402
P/N 1117556-200-278
N/A 2100002-200-278
F/A 2100002-01-278
Inspected 07/13 MIA
Rated 2500 lbs.
Conforms to TSO C-114

4.3.6 AFT Flight Attendant Station

On the aft FAP, the lights were in the off position. There was a cover over the emergency light switch. The interphone was present in the bracket. The lower bracket fasteners (screws) on the aft FAP were installed.

4.3.7 2L Jumpseat

The 2L jumpseat was a double jumpseat. The seat bottom retracted without resistance. There was no deformation in the frame or seat pan. The seatbelts in the outboard jumpseat were buckled and the seatbelts in the inboard were unbuckled and the restraints retracted without resistance. The crew life vests and flashlights were present and stowed under the seating position.

4.3.8 2L Restraints

The restraint system consisted of an adjustable lapbelt and shoulder harness. The restraint retracted and showed no signs of tears or fraying. The restraints were labeled:

2L Insert Tab
Pacific Scientific
Duarte, CA 45402
P/N 1117556-100-278
Conforms to TSO C-114
N/A 2100002-100-278
F/A 2100002-01-278
Inspected 11/07 MIA
Rated 2500 lbs.

Repair station
Pacific Scientific, MIA
Date Repair 11/07

2L Buckle End
Pacific Scientific
Duarte, CA 45402
P/N 1117556-200-278
N/A 2100002-200-278
F/A 2100002-01-278
Inspected 11/07 MIA
Rated 2500 lbs.
Conforms to TSO C-114

4.3.9 2R Jumpseat

The 2R jumpseat was a double jumpseat. The seat bottom retracted without resistance. There was no deformation in the frame or seat pan. The seatbelts in the outboard jumpseat were buckled and the seatbelts in the inboard were unbuckled and the restraints retracted without resistance. The crew life vests and flashlights were present and stowed under the seating position.

4.3.10 2R Restraints

The restraint system consisted of an adjustable lapbelt and shoulder harness. The restraint retracted and showed no signs of tears or fraying. The restraints were labeled:

2R Insert Tab
Pacific Scientific
Duarte, CA 45402
P/N 1117556-100-278
Conforms to TSO C-114
N/A 2100002-100-278
F/A 2100002-01-278
Inspected 07/13 MIA
Rated 2500 lbs.
Repair station
Pacific scientific, MIA
Date Repair 07/13

2R Buckle End
Pacific Scientific
Duarte, CA 45402
P/N 1117556-200-278
N/A 2100002-200-278
F/A 2100002-01-278

Inspected 07/13 MIA
Rated 2500 lbs.
Conforms to TSO C-114

4.4 Airplane Doors and Evacuation Slides

4.4.1 Flight Deck Door

The flight deck door was undamaged.

4.4.2 1L Door and Evacuation Slide

The 1L door was in the fully open position and the door and door frame had no structural damage. The slide was found fully inflated and attached to the airplane. The slide was twisted at the girt shown in photograph 5 and 6. The head end of the slide was partially blocking the exit. The slide was removed by the Survival Factors group and sent to the manufacturer for examination[1]. The red manual inflation handle had been pulled and the girt bar was still intact in floor fittings. The 1L evacuation slide was manufactured by Collins Aerospace and the following was information obtained from the slide's data tag:

For use on model 737-600/-700/-800/-900 Fwd/Aft Doors
Boeing P/N 10-61323-2004
Part Number 5A3307-7
Serial No. BNG2056, Rev D
Date of MFG 9/00
Weight 49.0
Service Bulletins markings were illegible

Photograph 5- *Internal view of the 1L door and slide.*

[1] See attachment 6- Miami Airlines, B737-81Q, Emergency Evacuation in River, FWD RH & LH Door Slide Unsuccessful Deployment, raft field investigation report

Photograph 6- *External views of the 1L door and slide.*

4.4.3 1R Door and Evacuation Slide

The 1R door was in the fully open position and the door and door frame had no structural damage. Upon arrival, the slide was deflated and under water. Photograph 7 taken in the evening of the evacuation by firefighting personnel showed the slide partially inflated and the slide toe end lighting was illuminated. The slide was removed by the Survival Factors group and sent to the manufacturer for examination. The red manual inflation handle was released from the Velcro patch and the girt bar was still in the floor fittings. The 1R evacuation slide was labeled:

For use on model 737-600/-700/-800/-900 Fwd/Aft Doors
Boeing P/N 10-61323-2004
Part Number 5A3307-7
Serial No. BNG2562
Date of MFG 02/2001
Weight 48.0
Service Bulletins

- 25-338
- 25-339
- 25-343
- 25-349
- 25-358
- 25-389
- 25-425

Photograph 7- *1R slide partially inflated and the toe end lighting illuminated.*

Photograph 8- *External views of the 1R door and slide.*

Photograph 9- *Internal views of the 1R door and slide.*

4.4.4 2L Door and Evacuation Slide

The 2L door was closed and the slide was armed with the slide girt bar attached to the airplane floor fittings. The slide gas bottle pressure gauge needle was inside the green band area[2]. The safety strap was across the window. The Survival Factors group disarmed the door. The door was operable, and the door and door frame had no structural damage. The 2L evacuation slide was manufactured by Collins Aerospace and the following was obtained from the data tag:

For use on model 737-600/-700/-800/-900 Fwd/Aft Doors
Boeing P/N 10-61323-2004
Part Number 5A3307-7
Serial No. BNG4305, Rev -
Date of MFG: 08/02
Weight: 47.0 lbs.
Service Bulletins

- 5A3307-25-338
- 5A3307-25-339
- 5A3307-25-343
- 5A3307-25-349
- 5A3307-25-358

[2] The Miami Air Flight Attendant Manual stated if the gauge needle is outside the green zone, the system is unusable.

- 5A3307-25-389
- 5A3307-25-425

The 2L evacuation slide was removed from the door and placed on the ground to be inflated and depressurize the charged cylinder. The slide was removed from its compartment and the safety pin was removed from the slide valise (cover) pocket and installed into the inflation bottle's regulator valve. The slide was unfolded, and restraints were released. The safety pin was removed from the valve and the system was fired by pulling the manual inflation handle. The slide was successfully inflated, and the inflation was recorded by video (attachment 9).

Photograph 10*- Picture of the 2L door.*

4.4.5 2R Door and Evacuation Slide

The 2R door was closed and the slide was armed with the slide girt bar attached to the airplane floor fittings. The slide gas bottle pressure gauge needle was inside the gauge green band area. The safety strap was across the window. The SF group disarmed the door. The door was operable. The door frame and door had no structural damage or deformation. The 2R evacuation slide was labeled:

For use on model 737-600/-700/-800/-900 Fwd/Aft Doors
Boeing P/N 10-61323-2004

Part Number 5A3307-7
Serial No. BNG1781, Rev -
Date of MFG: 08/02
Weight: 47 lbs.
Service Bulletins:

- 25-338
- 25-339
- 25-343
- 25-349
- 25-383
- 25-425

The 2R evacuation slide was removed from door and inflated to depressurize the charged cylinder. Once on the ground the slide was removed from the (clam shell) compartment by pulling on the latch release. The safety pin was removed from the slide valise (cover) pocket and installed into the regulator valve. The slide was removed from the compartment and the valise cover release pin was pulled to allow access to the slide. The slide was unfolded, and restraints released. The safety pin was removed from the valve and the system was fired by pulling the manual inflation handle. The slide successfully deployed, and a video was taken (attachment 10). Approximately 5 minutes after inflation, the slide burst due to seam separation on the left end section of the head end tube. The inflatable portion of the slide was sent to the manufacturer for further examination[3].

Photograph 11- *Picture of the 2R door.*

[3] See attachment 7- Miami Airlines, B737-81Q, Emergency Evacuation in River, FWD RH & LH Door Slide Unsuccessful Deployment, raft field investigation report.

4.4.6 Overwing Window Exits (OWWE)

There were four window exits located in the passenger cabin over the wings, two on each side of the fuselage. Overwing window exits could be opened from the inside or outside using a spring-loaded handle located at the top of the window.

Lifelines

Lifelines were installed in the top forward part of the window frames on the aft window exits. The window had to be open to expose the lifelines. One end of the lifeline attached to the window frame. The remainder was stowed in a tube extending into the cabin ceiling. When the lifeline was pulled from its stowage location, it was attached to a ring (eyelet) on the top surface of the wing. In a ditching situation, the lifeline was used as a hand hold for passengers to walk out on the wing and step into a life raft.

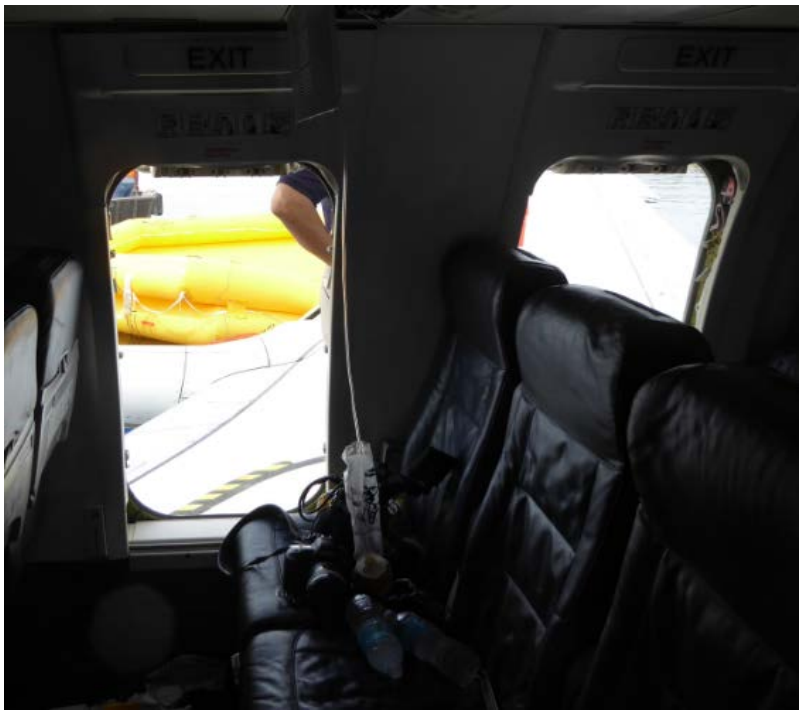
OWWE- Airplane Left

Both left hand OWWE were open and there was no damage to either frame. The door closing strap located at the bottom of the OWWE was out of the compartment. Both doors functioned and the placards were present. The lifeline was stowed in the upper corner of the OWWE at row 15 and not deployed. The lifeline was removed from stowage and was long enough in length to reach the eyelet on the wing.

OWWE- Airplane Right

Both right side OWWE were open and there was no damage to either doors or door frames and the door operated when opened. The lifeline was present and stowed in the upper corner at row 15. The lifeline was removed from stowage and there was some difficulty pulling it from the location. They were long enough in length to reach eyelet on the wing.

Photograph 13- *External view of the overwing window exits – left side.*



Photograph 14- *Internal view of the overwing window exits.*

OWWE Instructional Placards

Photograph 15- *Picture showing steps to open the overwing window exit on the seatback tray table.*

4.5 Galley

The airplane was equipped with three galley consoles, referred to as G1, G2, and G3. There were two galley consoles in the forward part of the airplane cabin and one in the aft of the airplane. The galley contained ovens, waste containers (trash cart), coffee makers, storage/servicing carts, and stowage bins. The galleys were equipped with an electrical power and water system. Light controls were also located on the galley electric panel.

4.5.1 Forward Galley- G1

Oxygen masks had deployed in the forward galley. All the bins were stowed, locked, and latched securing them to into the airplane structure. The galley storage/servicing cart closest to the aisle was locked with one latch in the down position securing the cart into the airplane structure. The center storage/servicing cart was locked and latched into the airplane structure, and the trash cart was open. The coffee pots were stowed and locked.

4.5.2 Forward Galley- G2

The right-side oven was not latched with the brackets securing it into the airplane structure. The left side oven was latched into the airplane structure and secured using the latches. All of the storage/servicing cart doors and brakes were locked; however, the trash cart was open (not locked) and not latched using the restraints into the airplane structure. Galley storage/servicing cart 1 was not latched into the airplane structure via the upper latch restraints, but the side latch restraints

were secured, Galley storage/servicing cart 2 had one upper latch restraint secured and one still in the upward unsecured position of the into the airplane structure. Galley storage/servicing cart 3 was latched into the airplane structure and partially secured, however this was the latch restraint that the raft lanyard had been connected. The raft lanyard was connected to a side galley latch of the airplane structure and to the seatbelt fitting at seat 1C. The lanyard was pulled apart and it was undetermined if it had been ripped or cut from the raft.

Photograph 16- *Raft lanyard connected to the galley cart latch in the G1 galley.*

Photograph 17- *Raft lanyard that was connected to a galley storage/servicing cart latch in the G1 galley and to one of the rafts.*

Photograph 18- *Raft lanyard that was connected to connected to a seatbelt fitting at seat 1C.*

4.5.3 Aft Galley- G3

All lower serving/trash carts were stowed, secured via latch restraints, and locked into place. There was a double coffee maker; one pot was stowed and secure, the other coffee maker was missing the coffee pot and not locked. There were three ovens. Oven 1 was latched at the top but missing the bottom latch, oven 2 was latched at the top but the bottom latch was not secured and oven 3 was latched at the top but the bottom latch was not secured. All the galley bins were locked and stowed. There was a mirror installed near the ceiling of the galley, between two of the bins that allowed the flight attendants to view the aisle while sitting in the jumpseat.

Photograph 19- *Mirror that was in aft galley that allowed for a visual of the airplane cabin while sitting in the aft jumpseat.*

4.6 Lavatories

There were 3 lavatories. The forward lavatory had a large bag of trash stowed inside. The oxygen mask was deployed. The aft lavatory on the left side of the airplane also had the oxygen masks deployed. The aft lavatory on the right side of the airplane did not have the oxygen mask deployed. None of the lavatories were damaged.

4.7 Emergency Equipment

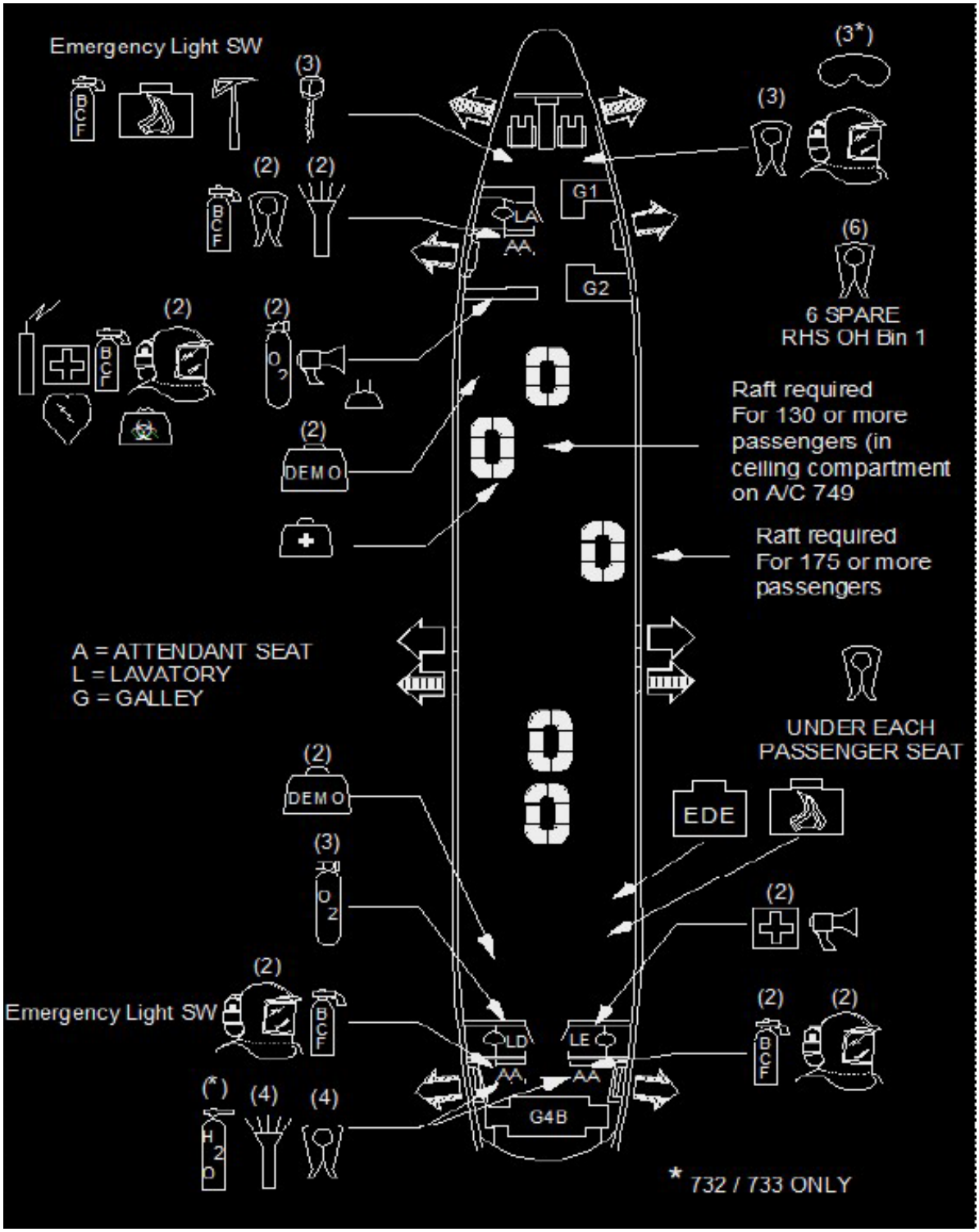


Figure 2*- Diagram of the Emergency Equipment.*

4.7.1 Forward Emergency Equipment

Emergency equipment was stowed in the forward emergency equipment compartment.

Portable Emergency Locator Transmitter (ELT)

The ELT was secured in the bracket. The performance test was completed on January 26, 2016. The next date of test was due on January 26, 2021. It was labeled:

P/N 021C-3428
MFR 07217
DMF 022001
SER 021C-3428
PNR 1151324-1 Series #
Identification Code ADCC06886B0C0401

Oxygen Bottles

There were two oxygen bottles stowed in the compartment. They were labeled:

2000psi
AVOX part 5500-C1A-BF23A
S/N 36994cz
Mfg. date 01/1967
Date of last inspection 01/18
Date due 05/22

2000psi
S/N ST 739061
Mfg. date 10/2005
Date of last inspection 09/illegible
Date due 09/illegible

Portable Breathing Equipment (PBE)

There were 2 PBE's in the compartment. These were listed as crew PBE. The first PBE had a March 2016 date listed as a date of last inspection with a due date of a new inspection March 2026. The serial number listed was 004-08006M. The second PBE was inspected on July 2015 with a due date of July 2025 listed on the label. The serial number was 004-05546M.

Megaphone

The megaphone was missing from its stowage location in the compartment.

First Aid Kit

The first aid kit was present and secured in its bracket.

Water Extinguisher

The water extinguisher was secured in its bracket. It was labeled, PN92480.

4.7.2 Mid-Cabin Emergency Equipment

Fixed Emergency Locator Transmitter (ELT)-

The cover to the ELT was present, however the ELT was missing from the overhead compartment as it had activated and had been removed by first responders to deactivate it. Photograph 20 shows the placards on the device:

Photograph 20- *Labels obtained from the Fixed ELT.*

The Air Force Rescue Coordination Center (RCC) provided information obtained from the ELT. The ELT detection was at 9:43pm (0143z) at the location- Latitude 30 deg 14.3'N, Longitude 81 deg, 48.2'W.

Overhead Bin Row 1DF

A pouch with 11 additional life vests inside. They were manufactured and labeled:

Switlik Parachute Co, Inc.
Trenton, NJ USA
Life preserver model AV-35 9b

FAA-TSO C 13d
Adult/Child
Part no. S-51250-6300

Overhead Bin Row 1ABC

An automated external defibrillator (AED) was stowed in the overhead bin, along with safety demonstration kits and a first aid kit.

Overhead Bin Row 4 ABC

A medical kit with a date of last inspection listed as May 1, 2018 and a due date of October 31, 2019 was labeled on the kit. The serial number was 2047.

Life Raft Stowage

The airplane cabin was configured to stow 4 life rafts. Two life rafts were stowed in the forward ceiling compartment and overhead bin compartment at row 3 and 4, and two life rafts in the mid-cabin ceiling compartment at rows 17/18 and rows 19/20.[4]

4.7.3 Aft Equipment

Water Extinguisher

The water extinguisher was secured in its bracket. It was labeled with P/N 392430 and S/N EAL957 as an Air Pro, LLC in Miami, FL. The date of last inspection was July 2015 with a due date of July 2020.

Halon Extinguisher

The halon extinguisher was secured in its bracket. It was labeled with S/N W-702204. The date of last inspection was September 2015 with a due date of September 2020.

Portable Breathing Equipment (PBE)

There were 4 PBE's in the aft section of the airplane. These were listed as crew PBE. The first PBE (serial number 004-08057M) had a March 2016 date listed as a date of last inspection with a due date of a new inspection March 2026. The second PBE (serial number was 004-08007M) was inspected on March 2016 with a due date of March 2026. The third PBE (serial number 004-05539M) was last inspected on May 2017 and due on May 2019. The fourth PBE (serial number 004-08264M) was last inspected on March 2016 with a due date of March 2026.

4.8 Miscellaneous Equipment

An onboard wheelchair and the safety demonstration kits were located in the overhead bins at row 30 ABC. Three oxygen bottles were also secured in their brackets at the aft bulkhead. A copy of the flight attendant manual was in the overhead bin at row 28. Video equipment was

[4] All 4 rafts had been retrieved during the evacuation and were not located in their stowage compartments.

installed at row 29 in the overhead bin. Two first aid kits and a megaphone were present and stowed at the aft bulkhead. In both sides of row 23 and 24 there were bags of pillows and blankets.

4.9 Passenger Safety Information Card

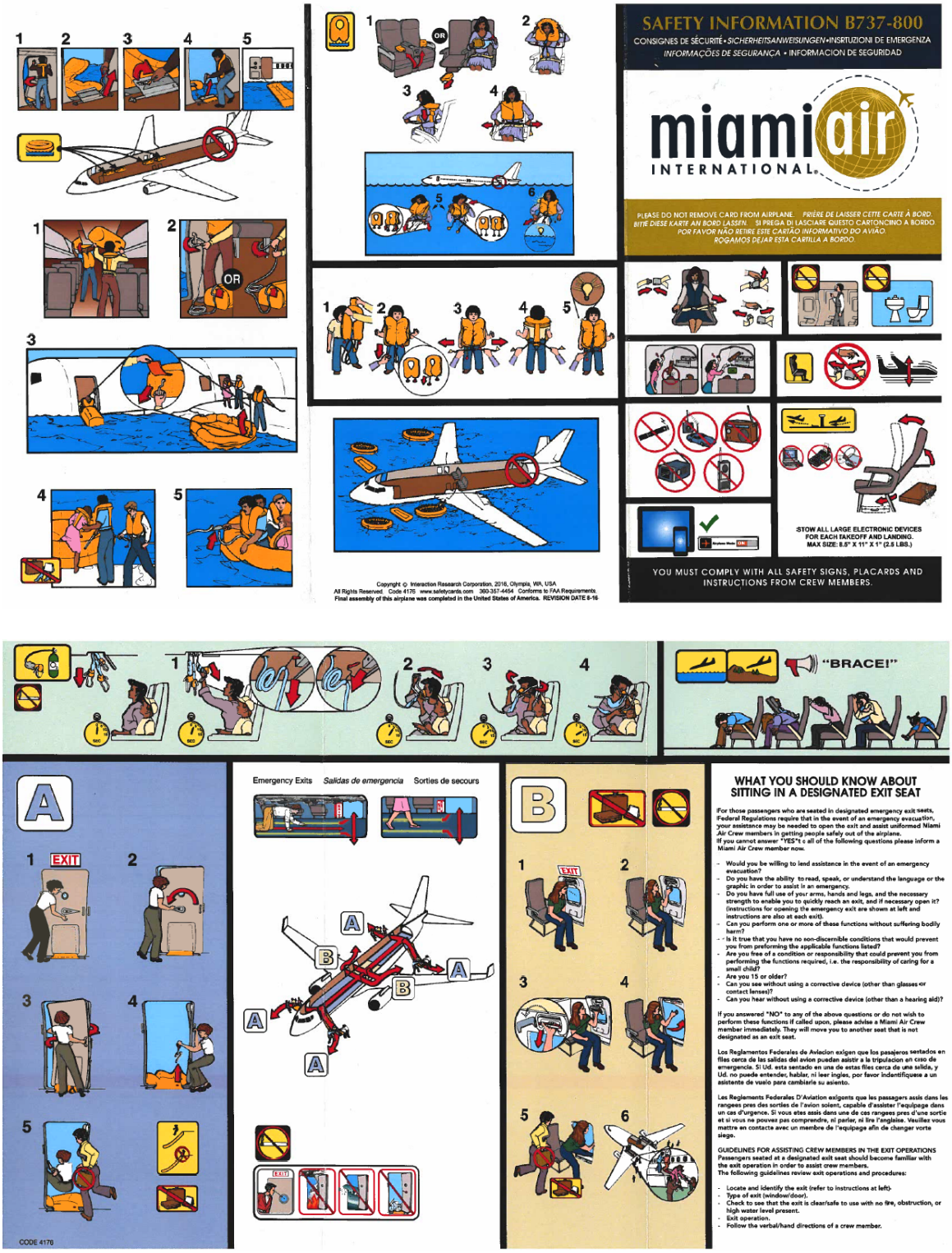


***Figure 3**- Passenger Safety Information Card.*

4.10 Life Vests

Life vests were found in the airplane, in life rafts, at the accident site near the rock wall and at the end of the runway. Some life vests were found at hangar 117 where passengers were taken after the accident for accountability and triage. There were 98 life vests recovered, some were stenciled with the names Korean Air, EL AL, and Delta. The life vests that were recovered were all manufactured and labeled:

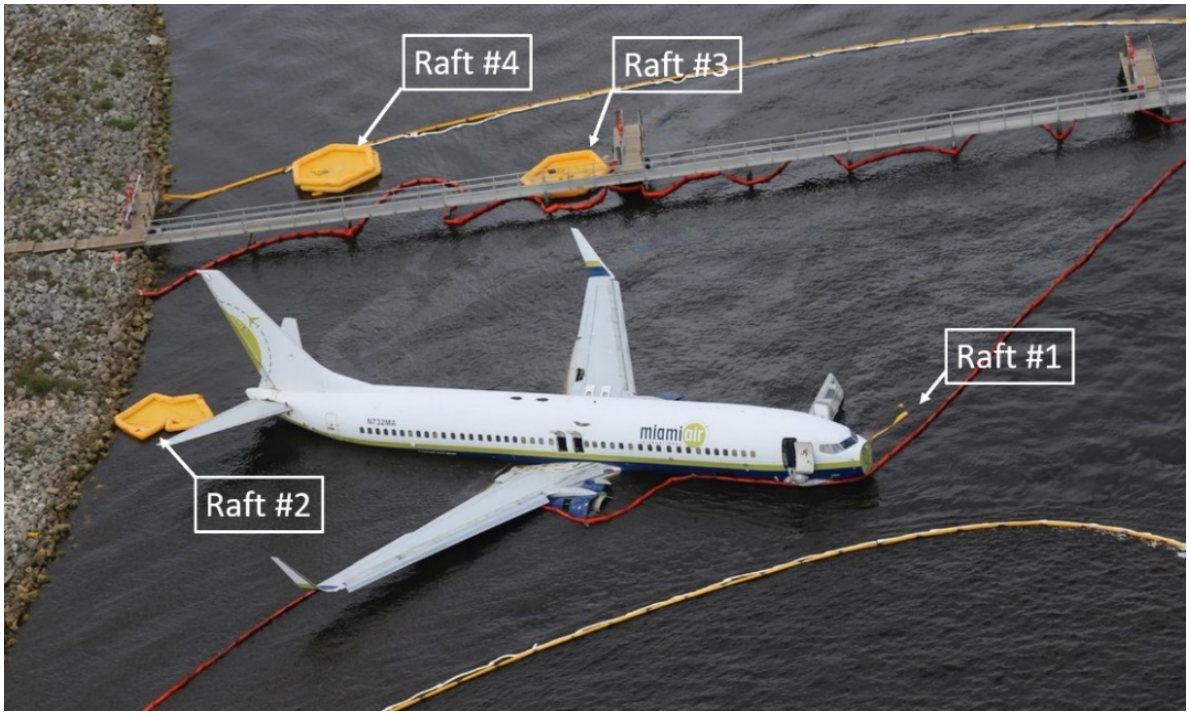
Switlik Parachute Co, Inc.
Trenton, NJ USA
Life preserver model AV-35 9b
FAA-TSO C 13d
Adult/Child
Part no. S-51250-6300

The life vests were dual chamber life vests. Life vests were stowed in a white plastic bag sealed with a tab that said “PULL, TIRE, TIRER”. Two red straps were fitted around the white pouch with another red strap across those with a red tab that was labeled “LIFEVEST PULL” (see photograph 21). Life vests were stowed on the airplane in a leather pouch under the seat with a Velcro flap.

Photograph 21- *Picture showing life vest stowage.*

4.11 Life Rafts

All four inflatable life rafts were found outside the airplane. The life rafts were manufactured by Safran AeroSystems in Belmar, NJ.



Photograph 22*- Picture showing life raft number and location at accident site.*

4.11.1 Life Raft #1

Life raft #1 was a 46-person life raft and according to flight attendant interviews was launched from door 1R. It was found underwater to the left of door 1L upon arriving on- scene. A 6-inch tear was noted in one chamber near one of the locator lights on the raft. The mooring line was found on the airplane attached to a galley cart and a seat belt at seat 1C. The mooring line had been separated from the life raft. The life raft maintenance release record was missing from the cover pouch. The life raft was sent to the manufacturer for further inspection.[5] The raft was labeled:

Air Cruisers Company
Belmar, NJ U.S.A
P/N: 62738-103
S/N: 5625A
FAA TSO-C12c
LBA unit No. 40.320/21
Date of /Fabric Mfg: February 2003
Date of raft mfr. April 2003
46 Person Raft

[5] See section 9 of this report and attachment 7 - Miami Air Life Raft Deployment Failure Investigation Report.

The cover of the raft was labeled:

Air Cruisers Company
Belmar, NJ U.S.A
46 Person Life Raft
Life Raft System P/N D23940-117
Container P/N D23995-101
System Weight: 101.1 lbs.
S/N 5625A
Date of Manufacture Apr - 2003
FAA TSO C12c
LBA Unit No. 40.320/21
Rated Capacity 46 Persons
Overload Capacity 69 Persons

A maintenance service card labeled "ASI" was attached to the cover of the raft. The information on the card read:

ASI - American Southeast Inflatables & Oxygen, INC.
FAA CRS #YISR800L - EASA CRS # 145.5088
2891 N.W. 75th Street, Miami, Florida 33147
PH: (305) 693-8474/693-8475
FAX: (305) 693-8476
e-mail: asirafts@AOL.com
www.asirafts.com
Customer: Miami Air International, INC.
Description 46 Person Life Raft w/Survival Kit
Part No.: D23940-117 (Mfg by Air Cruisers)
Work Performed: Overhauled
Work Order number 1R1320
Inspection Date: June 27, 2018

4.11.2 Life Raft #2

Life raft #2 was a 56-person life raft and, according to flight attendant and firefighter interviews, was the second raft deployed off the right wing. The life raft was found aft of airplane tail floating against sea wall. The raft had three tears in one chamber and additional tears were in the second chamber. The life raft maintenance release record and serviceable card was found on the cover. The life raft was labeled:

Air Cruisers Company
Belmar, NJ U.S.A
Life raft P/N 64313-101
S/N L5176
Date of Manufacture 08/00

FAA TSO C70a
Normal Capacity 56 Persons
Overload Capacity 84 Persons

4.11.3 Life Raft #3

Life raft #3 was a 46-person raft and initial photographs show it fully inflated at the time of the accident.

Photograph 23- *Life raft #3 inflated at the time of accident.*

The life raft was labeled:

Air Cruisers Company
Belmar, NJ U.S.A
Life raft P/N 62738-103, Rev N
S/N 5500A
LBA unit No. 40.320/21
Date of Fabric Manufacture October 2000
Date of Raft Manufacture April 2001
FAA TSO C12c
Normal Capacity 46 Persons

The cover of the raft was labeled:

46 Person Life Raft
Life Raft System P/N D23940-117
Container P/N D23995-101
System Weight: 103.0 lb.
S/N 5500A
Date of Manufacture 4/01
FAA TSO C12c
LBA Unit No. 40.320/21

Rated Capacity 46 Persons
Overload Capacity 69 Persons

A maintenance service card labeled "ASI" was attached to the cover of the raft. The information on the card read:

ASI (American Southeast Inflatables & Oxygen, INC.
FAA CRS #YISR800L - EASA CRS # 145.5088
2891 N.W. 75th Street, Miami, Florida 33147
PH: (305) 693-8474/693-8475
FAX: (305) 693-8476
e-mail: asirafts@AOL.com
www.asirafts.com
Customer: Miami Air International, INC.
Description 46 Person Life Raft w/Survival Kit
Part No.: D23940-117 (Mfg by Air Cruisers)
Work Performed: Overhauled
Work Order number 1R1316
Inspection Date: June 28, 2018

4.11.4 Life Raft #4

Life raft #4 was a 46-person raft and initial photographs show it fully inflated at the time of the accident.

Photograph 24- *Life raft #4 inflated at the time of accident.*

The life raft was labeled:

46 Person Life Raft
Life Raft System P/N D23940-117
Container P/N D23995-101
System Weight: 102.0 lbs.
S/N 5651A
Date of Manufacture Jan - 2004
FAA TSO C12c
LBA Unit No. 40.320/21
MOD per S.B. Liferaft 35-25-46
Rated Capacity 46 Persons
Overload Capacity 69 Persons

A maintenance service card labeled "ASI" was attached to the cover of the raft. The information on the card read:

ASI (American Southeast Inflatables & Oxygen, INC.
FAA CRS #YISR800L - EASA CRS # 145.5088
2891 N.W. 75th Street, Miami, Florida 33147
PH: (305) 693-8474/693-8475
FAX: (305) 693-8476
e-mail: asirafts@AOL.com
www.asirafts.com
Customer: Miami Air International, INC.
Description 46 Person Life Raft w/Survival Kit
Part No.: D23940-117 (Mfg by Air Cruisers)
Work Performed: Overhauled
Work Order number 1R1377
Inspection Date: September 7, 2018

5.0 Airport Information and Documentation

Jacksonville Naval Air Station (Towers Field) was located about 4 miles south of Jacksonville, Florida, with an estimated field elevation of 22.5 feet msl. The air station was owned by the United States Navy. It was not considered to be a part 139 airport and was not inspected by the FAA.

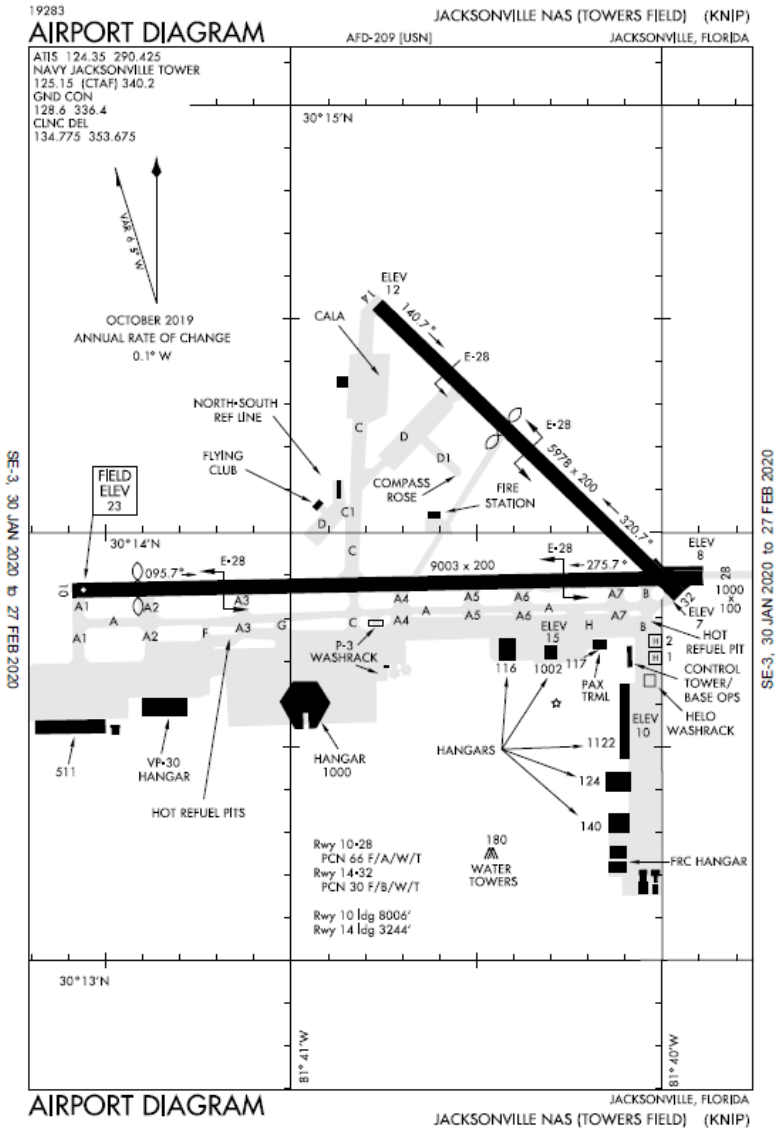


Figure 4*- Airport Diagram.*

5.1 Runway Information

The accident occurred on runway 10/28 which was a non-grooved asphalt surface 9003 feet long by 200 feet wide.[6] The published landing distance available for runway 10, the accident runway, was 8006 feet due to a 997-foot displaced threshold.[7]

Runway 10 was equipped with high intensity runway edge lights, centerline lights, and runway end identifier lights. It had a 2,400-foot, high intensity approach lighting system with

[6]The airport also had runway 14/32 which was 5978x200 feet. Landing distance available for runway 14 was 3244 feet.

[7] 9003 feet was available for runway 28.

centerline sequenced flashers (ALSF-1).[8] A 4-light precision approach path indicator with a 3.00-degree glide path angle was located on the left side of the runway. An E-28 raised cable arresting gear system was located 1,190 feet from approach end of the runway.[9]

5.2 Naval Air Station Pre-Mishap Plan

According to the airfield specialist, the Department of the Navy, Naval Air Station Jacksonville Instruction 3750.5I[10], provided procedures for aircraft fire fighting (ARFF), rescue, and salvage operations. The purpose of the pre-mishap plan was to provide guidance for aviation related incidents and accidents.

Navy Air Station Jacksonville had no assigned station aircraft, eliminating the requirement for a comprehensive aviation pre-mishap plan. In the event of an aviation accident the commanding officer (CO) would have overall authority and responsibility for compliance and the executive officer (XO) would assume this role if the CO was not available or assist the CO as required. The pre-mishap plan stated the fire department should maintain all crash-fire equipment in proper alert condition and liaison with local authorities to ensure maximum cooperation during off-station aviation mishaps. The plan further stated, emergency services should provide and maintain adequate equipment, provisions, and qualified personnel to meet the requirements of the pre-mishap plan. Water rescue procedures were not listed in the Pre-Mishap plan.

5.2.1 Equipment

The plan stated that because of the nature of emergencies involving aircraft, crash/fire equipment should be portable and self-sustaining in the field. And to be effective, certain crash/fire equipment should be capable of full operation within seconds after a mishap. Primary consideration in any aircraft mishap should always be the saving of human lives. Vehicle or equipment dispatched to the scene of a mishap should be limited to the requirements of each circumstance. The following were authorized aircraft fire fighting, rescue, and supportive equipment:

- Aircraft fire fighting and rescue trucks
- Public works cranes with appropriate slings
- Auxiliary crash fire and rescue vehicles
- Structural fire equipment
- Ambulance
- Portable lighting equipment
- Security vehicles
- Salvage equipment
- Command and duty vehicles

[8] It also had an optical landing system and wave off lights which were not applicable to this event.
[9] Its location was just past the far end of the aiming point markings on the runway which left about 7813 feet of runway remaining after the cable. It was marked by a series of 8 yellow 10-foot-diameter circles painted across the runway.
[10] See attachment 3 for the naval air station plan.

- Field communications van
- City, county, and state police/fire vehicles
- Other Support equipment provided by to the military services

Water rescue vehicles were not listed in the Pre-Mishap plan.

6.0 Accident Summary

The accident occurred on the second day of a three-day trip for the flight attendants. The day started in Jacksonville Naval Air Station (NIP) at 0730. The pilot had briefed there was expected weather out of and into NIP. They were delayed approximately 4 hours to leaving NIP, due to air conditioning, and were on ground once at Guantanamo Bay Naval Base (GTMO) for about an hour. According to interviews, there was no turbulence arriving into GTMO. The flight attendants described the boarding process as "typical" and nothing out of the ordinary. The safety information was provided to the passengers by a safety video briefing prior to departure.

The flight time was about 2 hours 30 minutes and the flight attendants conducted two services, a meal and beverage service. The captain had told the flight attendants to prepare the cabin for landing early. Closer to NIP there was some turbulence. Approximately twenty minutes before the "arrival check" the captain made an announcement to discontinue the service and for passengers and the flight attendants to be seated. The seat belt sign was turned on. The flight attendants completed their "pre-landing compliance checks: and sat in their jumpseats conducting a silent review. The flight attendants saw lightning during the approach.

The purser, who was seated in the forward jumpseat, stated she could "feel wind" on descent and then felt the airplane touchdown; it was smooth landing going down runway. The purser grabbed the interphone and waited to make the landing PA. The forward flight attendants felt the airplane drift to the right and felt some bumps. Within a few seconds they felt vibrations and heavy aircraft movement to the left and then to the right again. They were bouncing up and down, then felt two "crashes." The first one was very hard and one of the ovens flew out of its stowage compartment. The second, more things flew out of the galley compartments. The oxygen masks dropped in the G2 galley.

The cabin went dark and there was no communication. The emergency lights came on. When the airplane came to a stop, the passengers were in a panic and some were trying to get their luggage. One man had a backpack and would not give it up because he said he had insulin. A flight attendant told everyone to stay in their seats and remain calm.

They heard the pilots trying to come out of the flight deck. They removed the debris from in front of the flight deck door. The captain was the first out and said to open the doors to evacuate.

It was pitch black outside. The purser opened the 1L door and stated the slide inflated and then twisted. The captain looked out of the door and said, "that's water." They could see rock and, according to the interviews, they both were surprised to see water. The purser could not detach the slide from the airplane so blocked the exit and moved to open the 1R door. Another flight attendant was holding passengers back while the 1R door was opened. The slide inflated then began to deflate. The purser, captain, and mechanic (that had been sitting on the flight deck) tried to launch the raft from that door, but it also deflated. The captain went into water and tried to access the

cargo bay in an attempt to rescue some pets; that's when they realized they could stand in the water. The purser grabbed the megaphone to redirect passengers to overwing exits. Purser and the mechanic brought the ceiling compartment raft to the 1R door and launched it.

The flight attendants began yelling, "grab your life vest, put it on." When passengers went to put on their life vests, they had difficulties putting on the life vest. According to the flight attendant interviews, some passengers were in shock and disbelief at what was happening. The flight attendants told passengers to leave everything and put on their life vest.

One of the flight attendants asked two able body passengers (ABPs) to assist with rafts located in the ceiling compartments. They were told to bring it to the overwing window exit.

In the aft part of the cabin, it was very dark until the emergency lights came on. The flight attendants did not know they were in water until they got out of their jumpseat to check on passengers, and realized they were standing in water and someone yelled "we are in water." The flight attendants were unsure if they were in the ocean or a river. They knew they needed to start an evacuation. They began yelling commands to passengers to get their life vests from under their seats, put them on, but not to inflate them. One flight attendant grabbed a passenger life vest for them self and began to help passengers with their life vest.

The flight attendants blocked the aft exits because that is "what is taught in training for water evacuations." They tried to help passengers with their life vests, and many did not know how to put them on or how to take them out of the under-seat pocket. They helped passengers put on life vests as they moved toward the overwing window exits.

One flight attendant climbed up on a passenger seat and shouted to the Captain standing at the front of the airplane cabin asking if they should evacuate. Passengers responded "yes, they said to evacuate." Once the flight attendants got to the overwing window exit, they saw land and people on the pier and others walking by a stone wall. They enlisted the help from an ABP to assist with the life raft.

Two rafts were retrieved from the mid-cabin ceiling compartment located just aft of the overwing window exits. Passengers had opened the overwing window exits and some passengers were on the wing. Once the flight attendants got to the window exits, they were able to get the rafts outside. They hooked the raft line to the aircraft and inflated the raft. The flight attendants stated it was hard to pull to inflate the raft. The flight attendant deployed the life raft off the trailing edge of the left wing and another flight attendant deployed the life raft off the trailing edge of the right wing. By then all passengers were on the wings. Once the raft on the left wing was full, the flight attendant unhooked the line and threw it to a man who she saw throw it to rescuers who were in the water. The flight attendant estimated about 60 passengers in one of the life rafts.

Someone had brought a second raft to one side of the wing. The flight attendant recalled the wind, rain and thunder and stated it was difficult to launch this one. Once the raft was deployed and inflated, as passengers started to board the raft, someone jumped in and the flight attendant heard a "pop" and saw bubbles. The flight attendant told the passengers to hurry and paddle to the shore. Two men jumped into the water and pushed the raft to shore.

A rescue boat arrived and took about six remaining passengers to the shore. All crew members did a walkthrough of the cabin to ensure no one was left behind. One of the aft flight

attendants was the last off. He conducted a cabin check with the captain and the mechanic. They evacuated out of the overwing exit on right side onto a rescue boat.

7.0 Emergency Response

7.1 Emergency Response Equipment

Apparatus Type[11]	Number of response apparatus	Number of personnel that accompanied the apparatus
Engine	8	26
Marine Boat Unit	2	8
Ladder Truck	3	12
Rescue Truck	16	32
Specialty Vehicle	4	4
Administrative Vehicle	9	9
Field Chief Vehicle	9	9
TOTAL	**51**	**100**

7.2 Emergency Response Summary

According to firefighter interviews, one reported there were issues with the ring of the crash phone. They were in a temporary shelter due to construction of a new facility and the crash phone was placed in another room. Typically, two crash bells had been a notification however, they received one long tone from the tower. The phone rang around 2145 and the tower net message came over the PA and announced, “civilian airplane in river.”

Weather was a downpour and the visibility down the runway was not very good. It was raining and lightning. They arrived at the site within minutes of notification. None of the firefighters realized how large the airplane was until they saw the tail and passengers on the left wing. The crash and structural crews were instructed to hold back because of ground stability. When the assistant chief got to the site, the passengers were already on both sides of the wing. Jacksonville Fire Rescue Department (JFRD) was called to send their boats to aid in rescue efforts.

At this time, no rafts had been deployed and you could see lights inside the cockpit area. Minutes later the flight attendants inflated the rafts. A ladder was put in the water from the ILS pier. One of the firefighters had created a makeshift line using a firehose to get to the passengers. They installed the hose to the ILS pier ladder and then to the wing tip. According to interviews, firefighters took off gear and jumped into the water to hold the raft from drifting. The assistant chief told them to get out as he did not know how deep water was and there was fuel in the water. He was concerned for their safety.

The rain had dwindled significantly. Once the flight attendants deployed a raft on the left side, a firefighter pushed it to a wing for “women and children first.” The firefighters pushed the

[11] Emergency Response vehicles were from both the Naval Air Station Jacksonville Fire Rescue and the Jacksonville Fire Rescue Department (JFRD). The marine vehicles and personnel were the JFRD.

raft over to the ILS pier. It was hard to get the raft to stop once at the pier loaded with passengers because of the current. As the raft slipped under the pier, another firefighter jumped into the water to hold the raft. Firefighters had stated the life vests were a hindrance in allowing passengers to climb the ladder onto the pier. They proceeded to cut the life vest off passengers.

Two firefighters pushed the raft back for another load of passengers. The raft made two trips until there was no one remaining on the left wing. One passenger could not get out of the raft due to a preexisting leg injury. Firefighters used a black tarp from the medical truck and the passenger was tied to the tarp and pulled onto the pier.

One of the firefighters moved to the right side of the airplane where they had begun to shuttle a raft between the airplane wing and the rock wall. Passengers were trying to paddle to the rocks. A firefighter waded out to assist. The water was up to his chest. The firefighter helped unload the raft and pushed it to the left as a second raft came in so he could assist people off. There were children on both rafts and the rafts were full. An infant was given to a firefighter and he assisted the mother out of the raft. Firefighters had to "cut off the life vests to allow people to see the rocks and to see where they were going." Passengers were having difficulty stepping from the raft to the rock. Another firefighter stepped into the water and helped pull the raft to the rocks. Once the raft was unloaded, they sent it back. The first raft had mostly women with children.

The fire chief of the air station (NAS Jax) received a call from the tower at 2156 that "we have a plane in water". He responded to the incident from his home within 11 minutes of his notification. He relieved his assistant chief who was already at the scene and was established as the incident commander. By the time the fire chief arrived, some passengers were still in the rafts and headed toward the rock wall and some had been rescued from the airplane and were standing on shore. The chief asked for a manifest as he wanted to verify passenger accountability. When the assistant chief received notification that an airplane had slid off the runway, the tower was unable to provide an airplane or passenger count information. One of the firefighters spoke with the pilot about the manifest. The manifest was retrieved from the cockpit during a secondary search of the airplane after everyone had been taken off.

JFRD units responded to a "marine incident" and was advised there was a Boeing 737 in the water. According to interviews, the JFRD chief did not know what resources NAS Jax Fire Department already had on scene, so he requested "full assignment. A marine boat, M-38, arrived and retrieved the pilots and flight attendants from the right side of the airplane. All other passengers had already been taken off the aircraft using the life rafts. Another marine boat, M-39, arrived and took the chief to perform a primary search of the airplane cabin. M-38 returned to the right side positioned the vessel near the door of the airplane to conduct a secondary search of the cabin and search the cockpit area for a manifest. The manifest was obtained and taken to command.

A triage staging area was established near the waterfront. Rescue trucks had arrived and established a treatment and transport area inside the hangar. Two buses that belonged to the base helped transport passengers from the accident site to the hangar. According to the terminal director, on night of accident, two terminal employees had obtained a copy of manifest and provided it to the terminal director who took responsibility to confirm passenger count at the hangar, The process to identify passengers was complicated because buses were continuously

arriving at the hanger with new passengers. The NAS Jax Hospital advised that they had assembled 50 medical personnel to attend to any injured passengers or passengers that wanted to be checked out. Entire families were kept together and sent to the hospital to be evaluated even if they were not injured. All the passengers were coded as green at the triage center and said to have sustained no injuries. US customs and border protection arrived at the hanger and assisted in locating foreign nationals who were on the flight and provided assistance to clear passengers.

When the number of passengers and crewmembers in the treatment area coincided with the manifest the incident was announced as under control. The chief released all units, including the marine units, but later requested they return to recover the cabin baggage. The scope of service does not allow for NAS Jax to have any water rescue vessels. NAS Jax had to rely on JFRD for any water rescue.

8.0 Evacuation Slide Examinations

Survival Factors group members met on June 18, 2019 at the Collins Aerospace facility in Phoenix Arizona for slide examinations from aircraft N732MA. See Attachment 6. The door 1R slide (BNG2562) was pulled from box, rolled up and tied with the mooring line.

On the top side, at the head end, the mooring line was tied. The red manual inflation handle was stowed. The primary restraint was present (4A3613-230 / 230 lbs.) and sheared (released). The secondary restraint was not attached to the slide surface restraint patch. The secondary restraint (4A3613-210 / 210lbs.) was found connected to the anchor point of the lower restraint patch. It was not connected at the anchor point inside the restraint pad on the topside of the sliding surface. It was not sheared. The white girt release handle was stowed. The safety tie was intact. The aspirator was labeled:

P/N 5A 3265-2 Revision G
N-2939
MFG 8-00

The inflation system firing cable was properly routed through the grommets and the safety pin from the valise was out. The geometric restraints seemed to work as designed. It was pulled from the pin. There was no indication these were routed incorrectly. There was a 59-inch tear, not on a seam, that was located along the geo restraint patch. There was some fraying around the geo restraint patch on the right-side main tube. The tear was 8 inches before the patch at the bulkhead and unable to tell where the tear initiated. The retentive material of the geo patch was bonded. There was a wrinkle (air pocket) in the patch, with some fraying around. On the left side of the geo restraint the patch area had no sign of air pockets. There was a small hole with abrasions about ¼ inch in length, located at the right tube between the head end and the bulkhead, about 22 inches from the bulkhead.

On the bottom side, the head end truss strap attachment was fully debonded (separated from the slide) on the opposite side of the tear. The head end truss strap attachment was partially debonded (separated from the slide) on the same side of the tear. The truss straps outboard pulled away approximately 2 inches. The girt release cable was found in the truss straps, in the Velcro

retainer that should have been housing truss straps and not per instruction. The light battery test lead cord was routed though the Velcro retainer and not per instruction. The last overhaul was performed by American SouthEast Inflatables on 1/16/19. The PRV TEST opened at 3.18 psig (test max at 3.2) and closed at 2.73 psig (test above 2.7). It was labeled:

Pressure Relief Valve (PRV)
P/N 4A3641-25 Rev M
S/N N9002
MFCT Goodrich

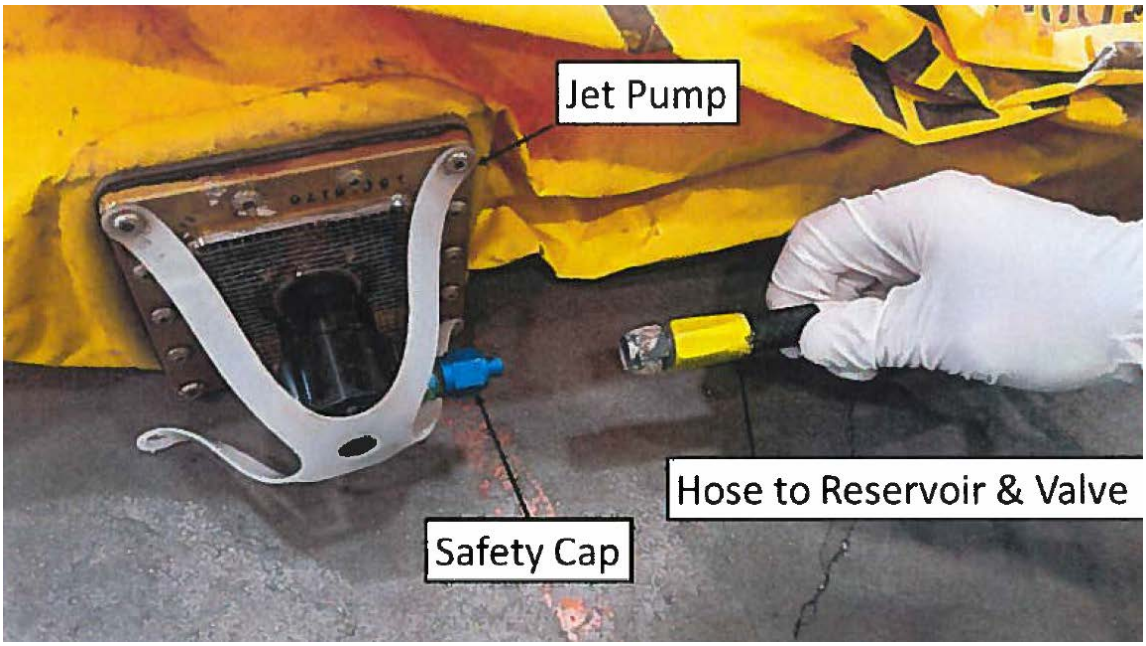
The door 1L slide (BNG2056) was taken out of box, rolled up and tied with mooring line. The girt twisted and heavily wrinkled. No firing cable was present. It was last overhauled on June 13, 2018 by American SouthEast Inflatables. Multiple repair patches were present. There was no evidence of the required heat reflective paint. The primary and secondary restraints were present and sheared. The primary restraint was labeled 230 lbs. and the secondary restraints 210 lbs.

The Door 2R slide (BNG1781) had severe debonding of the attachment patches, including the lifeline patch, mooring line patch, twist correction wedge, and the friction panel. The seam separated at the top left side of the head end tube. It was approximately 12 inches. There was some lifting on the slide surface bonding to the inflatable. The silver heat reflective paint was flaking. The last overhaul was January 16, 2019 by American SouthEast Inflatables. The last overhaul should include an overpressure test of at 4.8 psig held for 5 minutes to verify the structural integrity of the inflatable assembly. The PRV TEST revealed it opened at 3.15 psig and closed at 2.8 psig. It was labeled:

Inflatable Part Number 5A3305-101
Serial No. BNG1781, Rev 8
Inflatable Date of MFG: 06/00

9.0 Life Raft Examination

Survival Factor group members met on July 9, 2019 in Wall Township, New Jersey at the Safran AeroSystems facility for a raft examination from airplane N732MA. See Attachment 7 for the full investigative report. The raft was pulled from the box, rolled up, and inside a plastic bag. The raft was a reversible design. Both bottles were at 0 psi. Both inflation hoses were connected to the bottle and routed properly. The tubes were not connected to the jet pump. The jet pump connectors for the inflation hoses were safety capped.



Photograph 25- *The jet pump connectors for the inflation hoses that were safety capped.*

Some tape was wrapped toward the end of the hose connector. The bottles were taken out of the sleeve for inspection. The ball valve was in the activated open position. One of the hose connectors was rusty. The P/N and MFG on the hose was unreadable. There was a 14 ½ inch jagged tear in the life raft at the knife stencil. Some peel away coating was noted from the area adjacent to the tear was present. The raft fabric was still in the folded creased condition. The short folds were still evident.

Photograph 26- *The fold creases in the raft.*

The mooring line was frayed and one of the locator light wire conductors was frayed. There was a 6" tear near the locator light. Patches were present in various places but seemed to be intact and secured to the life raft.

10.0 Miami Air Maintenance and Overhaul

Survival Factors and Maintenance group members met on August 21, 2019 in Miami, FL at the Miami Air facility for a discussion on how Miami Air conducts maintenance and overhaul of the slides and rafts.

Miami Air had removed American SouthEast Inflatables from their approved vendor status. They had contracted with a new vendor, Aviation Inflatables, and took four rafts and two slides to the new vendor for inspection. All the rafts and slides were successfully deployed at Aviation Inflatables. Miami Air also stated that they were implementing a new audit process for all vendors.

Miami Air also quarantined two slides and six rafts due to expire for the group to examine. The group randomly chose two slides and two rafts. Of the rafts and slides that were examined and inflated in the Miami Air Hangar, no anomalies were found, and the systems successfully deployed and inflated. See the Maintenance Group Chairman's Factual Report for more information.

11.0 American Southeast Inflatables (ASI)

On August 22, 2019 Survival Factors and Maintenance group members visited American Southeast Inflatables (ASI). The group met with the president and chief inspector to discuss the process and procedures in overhauling slides and rafts[12].

The president of ASI expressed his concern over aging flotation equipment and indicated he had previous discussions with his Principle Maintenance Inspector (PMI) over the 15-year limitation requirements and the impact of storage issues when equipment leaves the facility. He stated if a unit passes any proof pressure test; it can experience storage or handling issues which would cause failure during a subsequent leak test.

Photograph documentation was provided to the president of the 1L slide patches and the absence of the radiant reflective paint. He stated they were not his patches and it is their procedure to photograph the units as they leave the facility. Photograph documentation was also provided on the 1R slide showing the secondary restraint not attached and he agreed that was a packing issue. When asked about the procedures for packing, he stated to obtain manuals from the vendors were difficult and he obtained from a 3rd party source. He was not aware that Miami Air had full access to manufacturer CMMs, nor did Miami Air offer the CMMs to ASI.

[12] See the Maintenance Group Chairman's Factual Report for more information.

The president indicated there had been a reduction in his workforce. Previously, two slide and raft packers were employed at ASI, but currently he only had one. He employed a part time person to assist in the evenings.

When asked about the safety caps on the raft, he stated the packer should have seen that the safety caps as they would be on top of unit and seen as the package was laced. He stated the employee that packed that specific raft was no longer an employee with ASI and did not have a response when asked about any other raft that employee may have overhauled. A list was provided of all the rafts with that part number for a 24-month period.

An explanation about life vest that was observed on scene was provided and he stated that the life vest back panel should have been rolled up and tucked inside the collar and buttoned into place, however what was observed on scene was the panels were loose and not packed correctly.

The maintenance shop was observed including the general packing areas, system storage and the inflation system assembly/charging station. The overall presentation appeared clean, with no debris noted in the carpeted packing areas. The carpeted areas had been replaced approximately four months prior to the visit. The shop had several "open" bay doors and accordingly there were no environmental controls in the shop area (it was open to the outside environment). The shop manager noted the difficulty they have had over the years with repairing inflatables constructed from polyurethane coated fabrics using polyurethane based adhesives. This difficulty was likely due to the "open" shop environment. The adhesives utilized were solvent based, and when applied to the fabric, experience a drop in temperature due to the evaporation process. In high humidity environments, this could lead to condensation on the cement application area. For this reason, manufacturers of inflatable safety equipment recommend specific environmental conditions for performing inflatable repairs.

12.0 Medical and Pathological Information

12.1 Injury Table

Type of injury	Flight Crew	Flight Attendants	Passengers	Total
Fatal	0	0	0	0
Serious	0	0	0	0
Minor	1	0	0	1
None	2	4	136	142
Total	3	4	136	143

12.2 Transport Information

All passengers were transported by JFRD units except for the 17 passengers who were taken to the Navy Jacksonville Hospital via bus with naval corpsmen assisting in the transport. All passengers were coded "green" using the triage system. Families were kept together to be

evaluated. 41 passengers were transported for evaluation in total. One minor injury was reported and one passenger (infant) remained overnight for observation.

Number of Passengers Transported	Destination
17	Navy Jacksonville ER
4	Orange Park Medical Canter
4	Memorial Hospital
3	Park West ER
3	St. Vincent's Riverside Hospital
7	Baptist Downtown Medical Center
3	UF Health Shands

Emily Gibson
Survival Factors Investigator

Attachments

Attachment 1- Flight Attendant Interview Summaries
Attachment 2- Flight Attendant Manual Excerpts
Attachment 3- Airport Pre-Mishap Plan
Attachment 4- Record of Conversation - Terminal Director
Attachment 5- Airfield Specialist Interview Summary
Attachment 6- Miami Airlines, B737-81Q, Emergency Evacuation in River, FWD RH & LH Door Slide Unsuccessful Deployment
Attachment 7- Miami Air Life Raft Deployment Failure Investigation Report
Attachment 8- Emergency Response Interview Summary
Attachment 9- 2L evacuation slide video
Attachment 10- 2R evacuation slide video
Attachment 11- Emergency Response Vehicle and Personnel