NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

January 5, 2017

Group Chairman's Factual Report

SURVIVAL FACTORS

DCA16FA013

A. ACCIDENT

Operator	:	Dynamic International Airways
Airplane	:	Boeing 767-200ER [N251MY]
Location	:	Fort Lauderdale, FL
Date	:	October 29, 2015
Time	:	1233 eastern daylight time (EDT)[1]
NTSB #	:	DCA16FA013

B. SURVIVAL FACTORS GROUP[2]

Chairman	:	Peter Wentz National Transportation Safety Board Washington, DC
Member	:	Kathryn Reneau Federal Aviation Administration Denver, CO
Member	:	Kimberly DeVoe Federal Aviation Administration Seattle, WA
Member	:	Tracy Ton Federal Aviation Administration Los Angeles, CA
Member	:	Bruce Wallace The Boeing Company Seattle, WA
Member	:	Elizabeth Sukie Dynamic International Airways Greensboro, NC
Member	:	Jose Morales United Technologies Aerospace Systems Phoenix, AZ

[1] All times in this report are eastern daylight time, based on a 24-hour clock.
[2] Not all group members were present for all activities.

Member	:	Ryan Davis United Technologies Aerospace Systems Phoenix, AZ
Member	:	Nathan Butters United Technologies Aerospace Systems Phoenix, AZ
Member	:	Guillermo Gonzales United Technologies Aerospace Systems Phoenix, AZ
Member	:	Drew Hartman United Technologies Aerospace Systems Phoenix, AZ

C. SUMMARY

On October 29, 2015, about 1233 eastern daylight time (EDT), a Boeing 767-200ER, N251MY, operating as Dynamic International Airways flight 405, caught fire while taxiing for departure at Fort Lauderdale-Hollywood International Airport (FLL), Fort Lauderdale, Florida. One passenger received serious injuries and the remaining 89 passengers and 11 flight crewmembers received minor injuries or were not injured. The airplane sustained substantial thermal damage from the fire. Flight 405 was a scheduled charter flight en-route to Caracas, Venezuela, operating under the provisions of 14 Code of Federal Regulations Part 121 supplemental. Visual meteorological conditions prevailed at the time of the accident.

D. DETAILS OF THE INVESTIGATION

1.0 Airplane Configuration

The airplane was configured with 18 first class passenger seats (zone A), 200 travel-class passenger seats (71 seats in zone B and 129 seats in zone C), 2 cockpit flight crew seats, 2 cockpit observer seats, and 9 retractable flight attendant (F/A) jumpseats.[3] There were 6 emergency exits, 4 floor-level Type A exits and 2 overwing Type III exits (figure 1).

[3] Passenger seats 9C, 19B, and 23G and flight attendant jumpseat 1RC were inoperative.

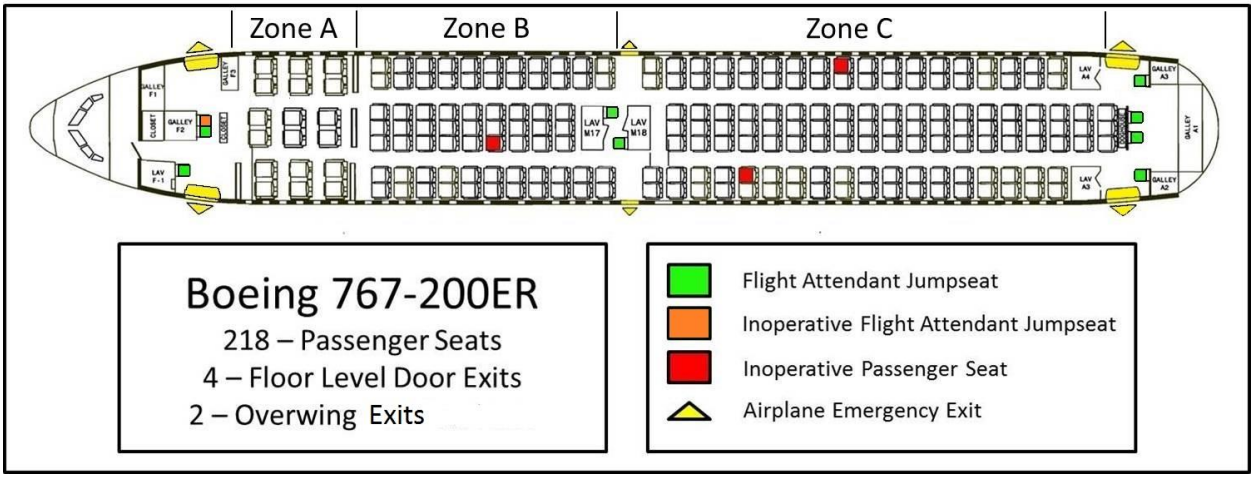


Figure 1 - Cabin configuration for N251MY.

2.0 Floor-Level Exit Doors

All 4 floor-level exits were examined by the survival factors group and found to have no visible damage. The floor level exit doors were operated in the manual mode and functioned normally.

2.1 1L Door

The 1L door was operated in the emergency mode during the evacuation. The slide/raft deployed and inflated fully. The slide/raft was manufactured by BF Goodrich[4] and contained the following information:

- Part number: 101651-303
- Serial number: PA1639
- Date of manufacture: 10-93
- Service bulletin 25-343
- Inspection performed: Overhaul 2/23/15

2.2 1R Door

The 1R door was operated in the emergency mode during the evacuation. The slide/raft fully deployed. The slide/raft was manufactured by BF Goodrich:

- Part number: 101651-303
- Serial number: PA0072
- Date of manufacture: 9-87
- Service bulletin 25-212, 25-213, 25-217, 25-343 and 25-396
- Inspection performed: Overhaul: 6/5/15

[4] BF Goodrich products in this report are currently supported by United Technologies Aerospace Systems (UTAS).

2.3 2L Door

The 2L door was not operated during the evacuation, the slide/raft was deployed after the accident before relocating the airplane. The slide/raft was manufactured by BF Goodrich:

- Part number: 101651-303
- Serial number: PA0699
- Date of manufacture: 8-90
- Complies with FAA TSO-C69 and appendix 2 of TSO-C69a
- Service bulletin 25-343 & SB 25-396
- Inspection performed: Overhaul 6/4/15

2.4 2R Door

The 2R door was operated in the emergency mode during the evacuation. The slide/raft fully deployed. The slide/raft was manufactured by BF Goodrich:

- Part number: 101651-303
- Serial number: PA2238
- Date of manufacture: 01/97
- Service bulletin 25-343
- Inspection performed: Overhaul 8/10/15

3.0 Overwing Exits (OWE)

The two overwing exits were examined by the survival factors group and found to have no visible damage.

3.1 Overwing Exit Ramp/Slide System

Each overwing exit contained a overwing ramp/slide. The exit is operated by removing the protective cover and pulling inward on the exit handle. Once the handle is pulled an electric signal is sent to a squib switch located above the hatch in the EXIT sign (figure 2). When the squib switch is fired (photograph 1), the overwing compartment containing the ramp/slide is released (photograph 2). Both the compartment door and ramp/slide were designed to fall a predetermined distance at which time the inflation cable is pulled free from an inflation cylinder. A bellcrank connected the inflation cable to the inflation cylinder regulator (figure 3). Once the regulator opens, the stored gas enters the ramp/slide starting the inflation process.

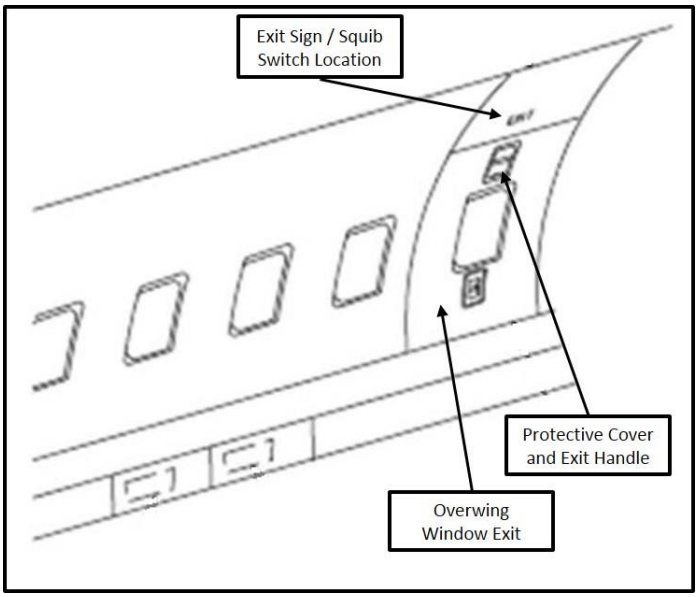
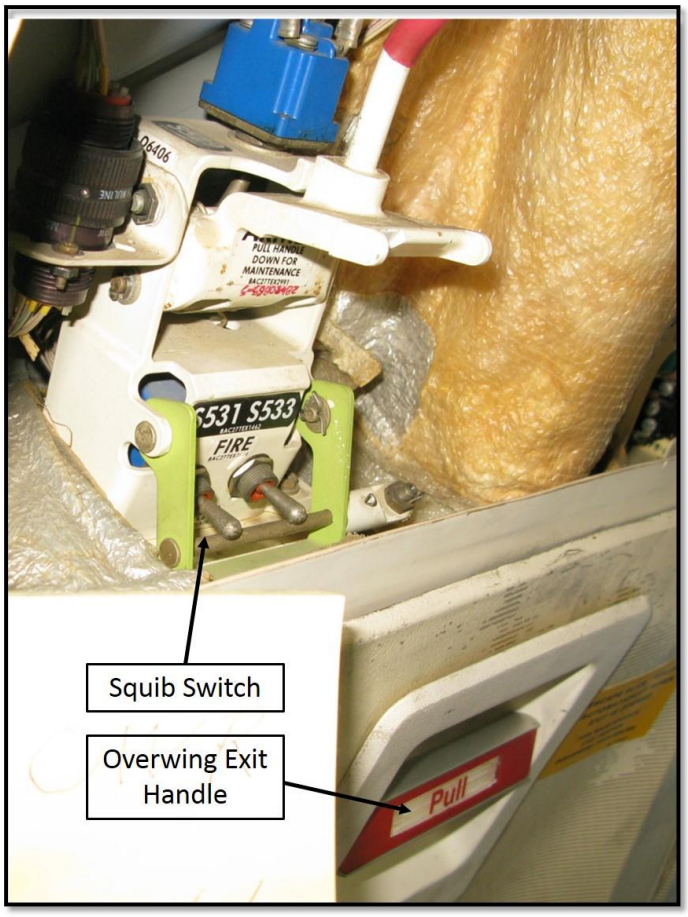
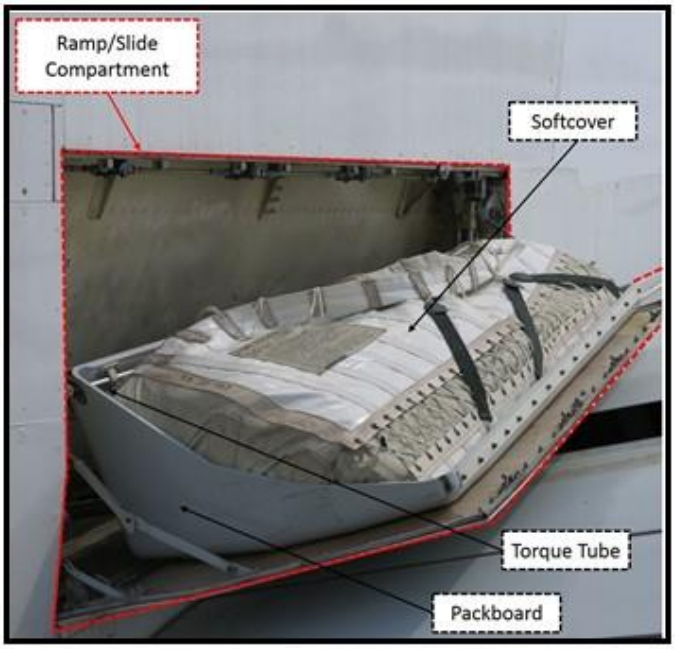


Figure 2 – Overwing exit.



Photograph 1 – Right side squib switch and exit handle.



Photograph 2 – Ramp/slide compartment in the open position.

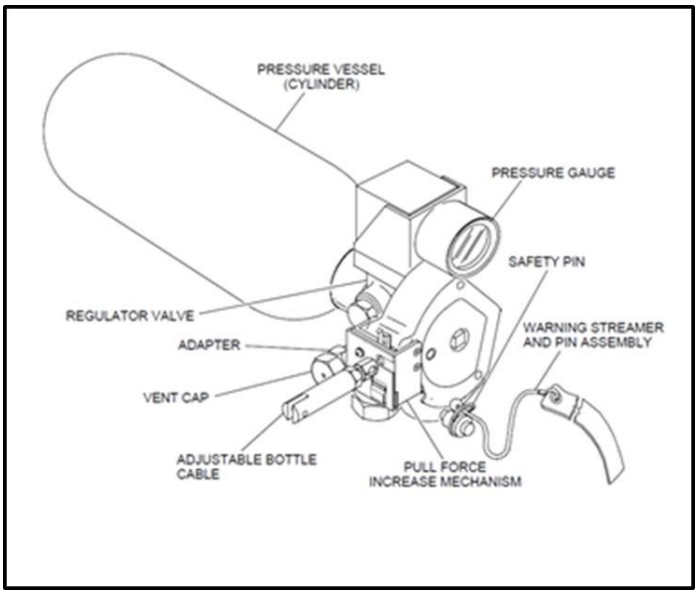


Figure 3 – Reservoir assembly.

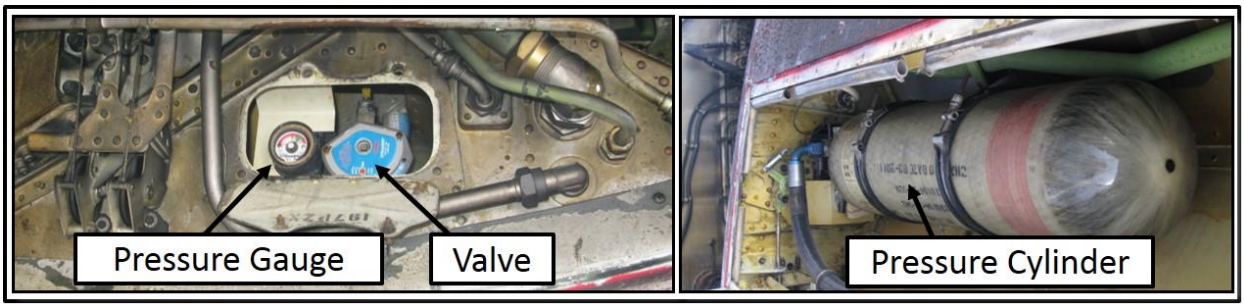
3.2 Left OWE

The left side overwing exit was opened by a passenger during the evacuation. Although the ramp/slide reportedly deployed and inflated properly, no passengers evacuated through the left OWE due to a flight attendant blocking the exit. The bottom portion of the ramp/slide was destroyed by the fire. The ramp/slide compartment door was found open with the top portion of the ramp/slide and packboard attached (photograph 3).

Photograph 3 – Left ramp/slide compartment with top portion of the ramp/slide and packboard.

3.2.1 Left Reservoir Assembly

The ramp/slide's reservoir assembly (consisting of a regulator valve, pressure gauge and pressure cylinder) was found attached in its brackets located below the left wing in the aft wing/body fairing (photograph 4). The regulator valve and pressure gauge can be viewed through the forward side of the wing/body faring bulkhead, while the reservoir assembly is located aft of the bulkhead. No damage was found to the inflation actuation rod, bellcrank, and cylinder firing cable. The ramp/slide cylinder pressure gauge showed zero pressure in the cylinder and the cable trigger was pulled free from the cylinder regulator valve. No anomalies were identified with the overwing escape ramp/slide pack release and deployment mechanisms.



Photograph 4 – Left reservoir assembly.

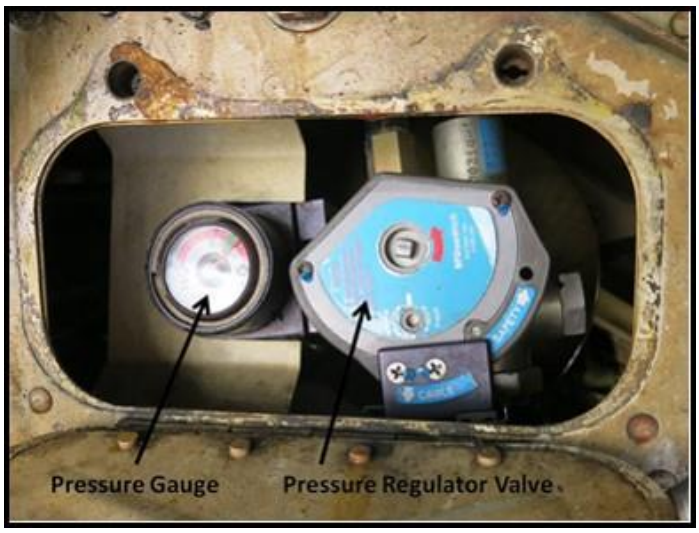
3.3 Right OWE

The right side overwing exit was opened by a passenger during the evacuation, but was not used because the ramp/slide did not deploy or inflate. The ramp/slide compartment door was found open, with the ramp/slide stowed in the packboard and soft cover found in its normal position. The torque tube had rotated and released the soft cover. The ramp/slide was manufactured by BF Goodrich:

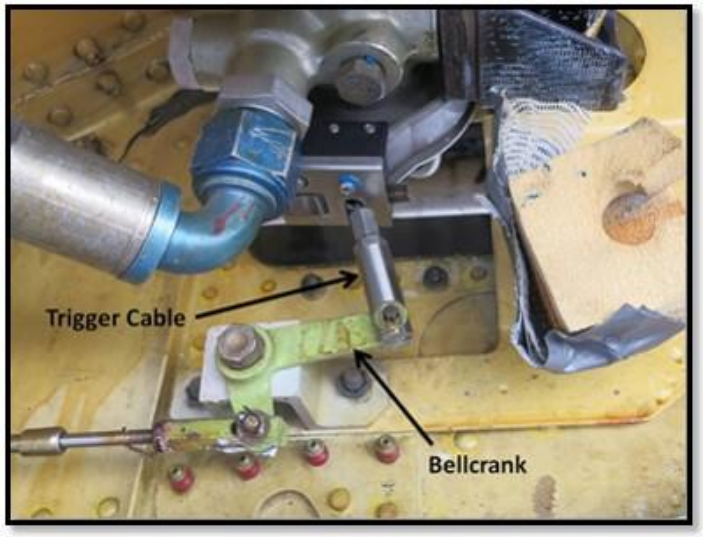
- Part number: 101630-306
- Serial number: PC0271
- Date of manufacture: 6-99
- Complies with FAA TSO-C69 and appendix 2 of TSO-C69a
- Service bulletin 25-343
- Inspection performed: Overhaul 8/19/2015

3.3.1 Right Reservoir assembly

The reservoir assembly was found attached in its brackets located in a compartment below the right wing in the aft wing/body fairing. The inflation cylinder pressure gage indicated the cylinder was fully charged (photograph 5). The firing cable was not pulled from the inflation cylinder regulator valve (photograph 6). The regulator safety pin was found properly stowed within the pin pocket.



Photograph 5 – Pressure gauge and reservoir valve.



Photograph 6 - Reservoir assembly bellcrank and trigger cable.

3.4 Right Reservoir Assembly Valve Documentation and Testing

The right reservoir assembly (figure 3) was visually inspected, weighed and pressure tested for remaining gas in the reservoir at United Technologies Aerospace Systems (UTAS) facility in Phoenix, AZ on November 19, 2015.

Reservoir Assembly:

- Part number: 130104-237
- Serial number: IZ5218

- Date of Manufacture: 02/2004
- Service bulletin 130104-25-328
- Service bulletin 130104-25-342
- Charged date 03-2011
- Reservoir assembly weight – 27.02 pounds (lbs)
- Reservoir pressure – 3080 pounds per square inch gage (psig)

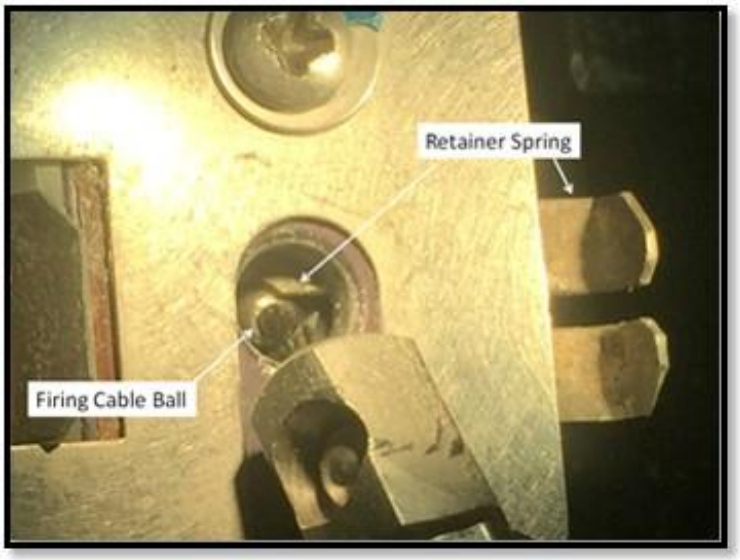
Valve Assembly:

- Part number: 115783-223
- Serial number: N-0943
- Date of manufacture: Illegible

Review of inspection records from Dynamic Intl Airways (attachment 1) indicated that last overhaul date of the right overwing exit reservoir assembly was performed March 15, 2011 with the next overhaul due date in March 2014. Dynamic International Airways was unable to provide documentation to indicate the March 2014 overhaul was accomplished. The cylinder was hydrostatically tested March 2011 and was due to be retested in March 2016.

Preliminary examination of the regulator valve assembly (photograph 7) noted that the hole of the Pull Force Increase Mechanism (PFIM) retainer spring (photograph 8) was not aligned with the hole of the PFIM housing. It was also noted that the retainer spring and firing cable ball were unable to move freely.

Photograph 7 – Regulator valve assembly.

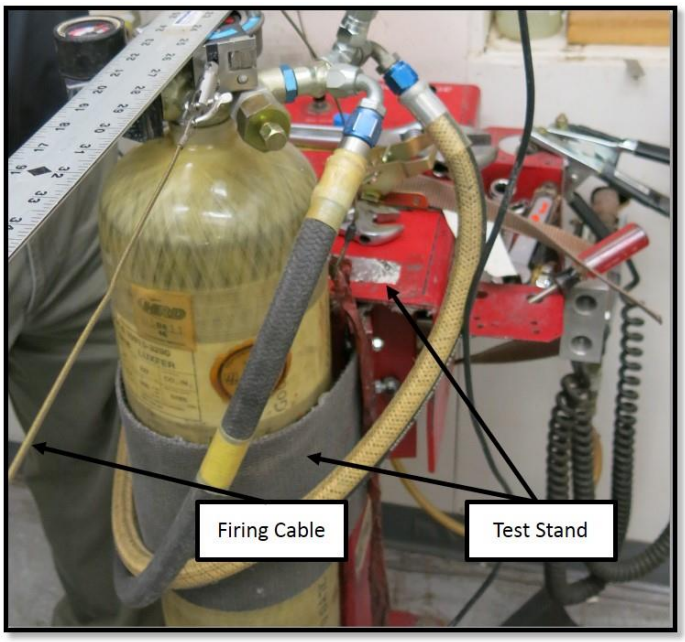


Photograph 8 – Positions of retainer spring and firing cable ball.

The reservoir was placed in a belt vise and the regulator trigger housing cover was removed (photograph 9). Although some minor corrosion was noted on the screws, no anomalies were noted on the trigger mechanism components.

Photograph 9 – Regulator valve with cover plate removed.

The reservoir assembly was mounted vertically in the test stand belt vice and prepared for a firing cable manual pull force test and a regulator output trace (photograph 10).



Photograph 10 – Reservoir assembly mounted in the test stand.

The safety pin was removed and the firing cable was pulled at an equivalent angle to that seen on the aircraft between the bell crank and the PFIM (approximately 15 degrees). It was pulled until the analog pull force gauge read 50 pound-force (lbf), which was 5 lbf above the maximum Goodrich Component Maintenance Manual (CMM) 25-61-24 limit of 45 lbf. At no time during the test did the firing cable actuate the valve.

The safety pin was reinstalled in the valve and the reservoir assembly pressure was discharged from the charge fitting. The weight of the empty reservoir assembly was 17.62 lbs resulting in a gas weight of 9.40 lb which was compliant with CMM 25-61-24. The regulator was removed from the cylinder.

The empty cylinder was inspected for foreign object debris (FOD) with no findings noted. The valve was examined from the bottom which gave partial visibility to the ball and ball seat with no anomalies noted. The regulator valve was then installed on a low volume cylinder (photograph 11) as a holding fixture to complete further bench tests.

Photograph 11 – Regulator valve installed on low volume cylinder.

The pressure gauge was removed to allow better visibility of the ball and ball seat. The alignment of the PFIM retainer spring hole was confirmed to be out of alignment with the hole of the PFIM housing (photograph 8). Subsequently, the PFIM safety was removed to allow for further examination. The retainer spring was moved from the "ENGAGED" to "DISENGAGED" position to allow the firing cable ball to pass through freely (photograph 12). This allowed for actuation of the valve trigger mechanism without interference by the PFIM. The result of this test was a pull force of 25 lbf.

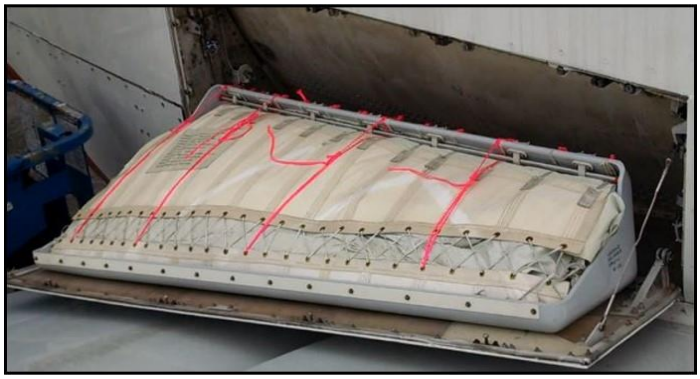
Photograph 12 - PFIM "ENGAGED" / "DISENGAGED" indication.

The PFIM was disassembled and removed from the valve body allowing access to the retainer spring. Examination of the retainer spring noted surface corrosion and deformation around the small "ENGAGED" hole (photographs 13). Witness marks were also noted around the "ENGAGED" hole.

Photograph 13 – Top and side view of the retainer spring.

3.5 Right Reservoir assembly & Ramp/Slide Documentation and Testing

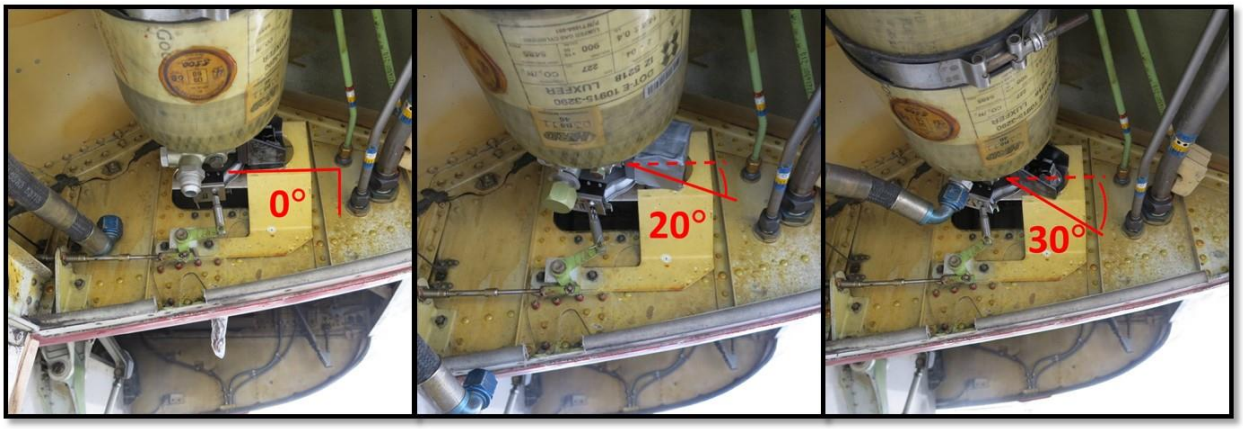
The survival factors group meet at Fort Lauderdale Intl Airport (FLL) on February 23, 2016 to investigate the functionality of the accident airplane's actuation mechanism and the capability of the accident airplane's reservoir assembly to activate under different regulator configurations. An exemplar ramp/slide (photograph 14) provided by UTAS was installed on the overwing ramp/slide compartment door location on the right hand side of the accident airplane.



Photograph 14 – Exemplar ramp/slide.

The reservoir valve was tested in four positions, starting with a baseline of zero degrees. The reservoir valve was then turned to the right for the remaining tests until it reached the worst case scenario of 30 degrees. (photograph 15):

- 0 degrees
- 18 degrees
- 20 degrees
- 30 degrees



Photograph 15 – Reservoir valve test positions.

Additionally, three different valves were used during the testing of the pull force increase mechanism (PFIM). The first valve was taken from the right side of the accident airplane. The second valve was taken from the left side of the accident airplane, and a third valve was an exemplar provided by UTAS. The retainer springs were used from the right side valve on the accident airplane[5], the left side valve on the accident airplane[6], and a valve provided by UTAS[7]. The forth spring was taken from new inventory[8]. Each test was conducted by manually operating the compartment door before releasing it to free fall to an open position.

Table 1 contains eleven test configurations and test results that were performed on the right hand side ramp/slide evacuation system. All eleven test configurations successfully actuated the reservoir assembly valve.

[5] The retainer spring from the right side valve is designated in Table 1 as N251MY Right Hand.
[6] The retainer spring from the left side valve is designated in Table 1 as N251MY Left Hand.
[7] The retainer spring provided by UTAS is designated in Table 1 as UTAS Provided Valve.
[8] The retainer spring taken from new inventory is designated in Table 1 as New from Production.

Test #	Regulator Assembly	Retainer Spring	Regulator Rotation Angle (Degrees)	Other Configuration Change	Reservoir Assembly Actuated? Yes / No	Comments
1	N251MY Right Hand	N251MY Right Hand	0	None	Yes	Normal Actuation
2	N251MY Right Hand	N251MY Right Hand	30	None	Yes	Normal Actuation
3	N251MY Right Hand	New from Production	30	None	Yes	Normal Actuation
4	UTAS Provided Valve	UTAS Provided Valve	20	None	Yes	Normal Actuation
5	UTAS Provided Valve	N251MY Right Hand	20	None	Yes	Actuation hesitation
6	UTAS Provided Valve	N251MY Right Hand	20	None	Yes	Actuation hesitation
7	UTAS Provided Valve	N251MY Right Hand	20	None	Yes	Actuation with less hesitation
8	UTAS Provided Valve	N251MY Right Hand	18	Slide Was Dropped Faster	Yes	Actuation hesitation
9	N251MY Left Hand	N251MY Left Hand	20	None	Yes	Normal Actuation
10	N251MY Left Hand	N251MY Left Hand	20	Firing Cable from N251MY Right Hand	Yes	Normal Actuation
11	N251MY Left Hand	N251MY Right Hand	20	Firing Cable from N251MY Right Hand	Yes	Normal Actuation

Table 1 – Actuation test results.

To determine the pull force exerted on the valve actuation cable by the bellcrank, the load was measured using a handheld load cell during the full range of motion of the overwing ramp/slide compartment door opening. Table 2 contains the bellcrank force test results.

Test #	Test Description	Maximum Peak Force (Lbf)
1	Dropped slide from closed position	211
2	Dropped slide from closed position	217
3	Dropped slide from point prior to hitting soft cover release latch	110
4	Dropped slide from point prior to hitting soft cover release latch	114

Table 2 – Bellcrank force test results.

4.0 Cabin Crew Procedures

4.1 Pre-flight

The cabin crew consisted of 9 F/As, each F/A position is designated by a letter (A thru I) representing their cabin position, crew responsibilities and jumpseat location. The Crew boarded the B-767-200 and completed the preflight checklist (attachment 2) prior to passenger boarding. The 1R jumpseat had been labelled inoperative and was missing the seat pan and seatback cushion (photograph 16). In normal operations the C F/A would occupy this jumpseat during taxi, take-off, and landing. With the 1R jumpseat inoperative, the C F/A choose to sit in the last row of the main cabin in seat 34C.

Photograph 16 – Inoperative 1R jumpseat.

1.2 Evacuation

The events leading up to the evacuation started with passengers witnessing the left engine start on fire. According to flight attendant interviews, (attachment 3) passengers immediately moved from the left side of the airplane to right side of the airplane while it was still taxing. Passengers were requesting the crew to open the doors and evacuate. A summary of each flight attendant's actions during the evacuation follows.

The A F/A was seated at the 1L jumpseat prior to take-off when he heard a loud noise and saw a light in the mid cabin followed by passengers rushing the 1L door. The A F/A used the interphone to notify the cockpit and other F/A's of an emergency. After assessing the 1L door the A F/A operated the door in the emergency mode and evacuated around 20-30 passengers then exited through the 1L door.

The B F/A was seated at the 2R jumpseat when she heard the emergency chimes. Before the B F/A could get out of her jumpseat and assess the door, the C F/A had come from the main cabin and operated the 2R door. The B F/A went into the cabin to get passengers moving. After the cabin was clear she exited the 2R door.

The C F/A was seated in seat 34E during taxi due to an inoperative jumpseat when he heard a boom and saw passengers crossing the cabin from the left to the right side of the

airplane. He moved from 34E to the 2R door and operated the door in the emergency mode. The C F/A stated the slide/raft looked "funny" and did not inflate quickly. He pulled the manual inflation handle, but one side of the slide/raft appeared to inflate before the other side. Passengers were crowding around the door and a few passengers evacuated out the door. After the cabin was clear he exited the 1R door.

The D F/A was seated at the 2L jumpseat when she heard an explosion and saw a bright yellow light on the left side of the airplane. Passengers were yelling "fire". Her first reaction was to fight the fire, but when F/A C opened the 2R door she stayed in the galley and commanded passengers to evacuate. The D F/A stated she did not assess the 2L door or operate it because all the passengers had moved from the left side of the airplane to the right side. After all passengers had evacuated she checked the cabin, and exited the 2R door.

The E F/A was seated at the left overwing exit jumpseat when she felt the airplane jolt. She thought the airplane had hit something but then could hear passengers yelling "fire". A passenger not seated in the OWE was trying to operate the exit, they had cracked the exit but had not removed it from the window frame. The E F/A stated that she stopped the passenger and tried to replace the window but could not get it closed. She blocked the exit and redirected passengers to other exits. After the cabin was clear she exited the 2R door.

The F F/A was seated at the right OWE jumpseat when she heard an explosion. She could hear passengers yelling "fire" and had 5 or 6 passengers crowd around her jumpseat. The passenger not seated in the exit row operated the OWE but did not evacuate through the window because the ramp/slide had not deployed. The F F/A then redirected passengers to other exits.

The G F/A was seated at the 2RC jumpseat when she heard a loud sound and saw flames out the 2L door window. She watched the C F/A operate the 2R door and start his evacuation commands. She directed passengers to exit and after the cabin was clear exited the airplane.

The H FA was seated at the 1LC jumpseat when she heard a loud sound and saw passengers coming toward her. The C F/A had taken a seat in the aft of the main cabin, so the C F/A stated she assessed and operated the 1R door. After passenger had evacuated she exited the airplane.

The I F/A was seated at the 2LC jumpseat when she heard a loud sound and saw flames and black smoke out the 2L door window. She watched the C F/A operate the 2R door and start his evacuation commands English. She started commanding passengers to evacuate speaking Spanish. After the cabin was clear she exited the airplane.

5.0 Flight Attendant Training

5.1 Flight Attendant Training Facility

Members of the survival factors group met at the Pan Am International Flight Academy (PAIFA) located at 5000 NW 36th street in Miami, FL on February 25, 2016. The PAIFA consists of the 3 training facilities, the main training facility, a simulator training facility and an egress training slide facility. Dynamic Intl Airways contracts with PAIFA to use the facility for flight attendant initial new hire and flight attendant recurrent training. The actual training is conducted by Dynamic Intl Airways employees.

The PAIFA main facility classroom accommodated 20 students and the Pan Am West facility classroom accommodated 40 students. The survival factors group reviewed emergency training equipment that was installed onboard Dynamic Intl Airways aircraft and used for initial new hire and recurrent training. The equipment consisted of:

- Fire extinguisher – Halon
- Fire extinguisher – Water
- Protective breathing equipment
- Emergency medical kit
- First aid kit
- Megaphone
- Portable oxygen bottle
- Emergency locator transmitter
- Automated external defibrillator

The live fire training room (photograph 17) was located in the main training facility. A 5 lb carbon dioxide B-C fire extinguisher was used for live fire training for initial new hire and recurrent training.

Photograph 17 – Fire training pit and extinguisher.

The water survival training room (photograph 18) was located in the main training facility. Dry ditching drills were conducted in the survival training room and wet ditching drills were conducted in the pool for initial new hire and recurrent training.

Photograph 18 – Water survival training room.

The Boeing 767 door trainer was located in the Pan Am West facility. The floor level exit was a Type A exit door (photograph 19), the overwing exit (photograph 20) was a Type III exit used for initial new hire and recurrent training.

Photograph 19 – Boeing 767 door trainer Type A exit.

Photograph 20 – Boeing 767 training Type III overwing exit.

The dual lane egress training slide (photograph 21) was located at the Pan Am building #100. The egress training slide was used for initial new hire and recurrent training.

Photograph 21 – Dual lane egress training slide.

5.2 Flight Attendant Training Curriculum

Dynamic Intl Airways trains each flight attendant by providing them an initial new hire training course that covers 15 topics. Additionally, each flight attendant receives hands on training on a B-767 Type A door trainer and Type III overwing exit. These trainers are used for initial new hire and recurrent training. The survival factors group was provided the flight attendant training curriculum which includes:

1. Training Expectations
2. Company History
3. Agency Overview – FAA
4. 24 Hour Clock
5. General Policy and Procedures
6. Comply – F/A Manuals
7. Aircraft and Aviation Orientation
8. Aircraft Ground 767-200
9. Duties and Responsibilities
10. Fatigue Risk Management
11. Rest and Duty
12. Portable Oxygen Concentrators
13. Disability Awareness Part 382
14. International Procedures
15. Drug and Alcohol

5.2.1 Evacuation Criteria

The FAM chapter 10, page 10-4-1 (attachment 4) evacuation criteria is divided into three parts. 1) Necessity of Evacuation, 2) Best way to Evacuate and 3) Who will Decide. This guidance is provided to flight attendants for decision making in planned or unplanned emergency evacuations.

5.2.2 Inoperative Jumpseat Policy

Flight attendants are trained for inoperative jumpseats that may arise during pre-flight operations or inflight operations. If a flight attendant discovers an inoperative jumpseat during either of these phases of flight they should follow the procedures found in the flight attendant manual (FAM) on page 10-1-4 (attachment 5).

5.2.2.1 Inoperative Jumpseat Training

The F/A training curriculum labeled “General Policy and Procedures” stated that each F/A must be seated on his/her designated flight attendant seat with seat belt and shoulder harness fastened for all taxi, takeoff and landing operations. If a flight attendant seat was broken, the flight would progress under the provisions of the Minimum Equipment List (MEL), the F/A was instructed to sit in the aisle passenger seat with the closest proximity to the inoperative jumpseat.

5.2.3 Flight Attendant Seating and Duty Chart

The FAM chapter 4, page 4-14-9 (attachment 6) shows the jumpseat location and responsibilities for F/A minimum crew A through E. Page 4-14-10 shows the jumpseat location for the remaining F/A crew F through I, but does not designate any responsibilities for those F/A's.

6.0 Evacuation Timeline

Table 3 is a timeline of the evacuation and ARFF response developed by using 4 airport security camera videos provided by Broward County Aviation Department (BCAD) at Ft. Lauderdale Intentional Airport.

Local Time	Elapsed Time		ARFF Elapsed Time
		Aircraft taxiing	
12:33:00pm	00:00	Fire ignites left engine	
	00:08	Aircraft stops taxiing	
	00:09	R2 door opens and slide/raft starts to inflate	
	00:14	R2 slide/raft inflated at a 45° angle to the right	
	00:19	1st passenger evacuates R2	
	00:25	Passenger falls forward on tarmac	
	00:33	L1 Door inflating (cannot see door open, but do see slide inflating)	
	00:34	R1 door opening	
	00:43	1st passenger evacuates R1	
	00:49	BCAD vehicle arrives on-scene	
	00:51	Right engine stops blowing R2 slide/raft	
	00:57	Right cockpit window opens	
	01:02	BCAD Safety official arrives on-scene	
	01:06	BCAD Safety official repositions R2 slide/raft to 90°	
	01:10	ARFF Crash (#9) vehicle departs fire station	00:00
	01:15	Escape rope - right cockpit window	
	01:17	Female crew member evacuates R1 door	
	01:23	ARFF Engine depart fire station	00:13
	01:26	Last passenger evacuates R2 door	
	01:28	ARFF Crash vehicle and Incident command ARFF vehicle depart fire station	00:18
	01:39	ARFF Engine depart fire station	00:28
	01:43	Male crew member evacuates R1	
	01:47	EMS depart fire station	00:37
	01:48	Female crew member evacuates R2	
	01:54	Male cockpit crew member evacuates R1	
	01:57	Male cockpit crew member evacuates R1	
	02:09	ARFF Crash (#9) vehicle arrives on-scene	00:59
	02:25	ARFF Engine arrives on-scene	01:24
	02:31	ARFF Crash vehicle #3 starts to apply water from the aft of the aircraft	01:30
	02:32	ARFF Crash vehicle #9 starts to apply water from the front of the aircraft	01:31
	02:36	Incident command ARFF vehicle arrives on-scene	01:35
	03:01	EMS arrives on-scene	02:00
12:37:11	04:11	Fire extingushed	03:11

Table 3 - Evacuation and ARFF response timeline.

E. LIST OF ATTACHMENTS

Attachment 1: Dynamic Ramp/slide Maintenance Records
Attachment 2: Flight Attendant Manual - Pre-flight Checklist
Attachment 3: Flight Attendant Interviews
Attachment 4: Flight Attendant Manual - Evacuation Criteria
Attachment 5: Flight Attendant Manual - Inoperative Jumpseat Procedure
Attachment 6: Flight Attendant Manual - Seating and Duty Chart