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**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

**SURVIVAL FACTORS FACTUAL REPORT
(6 PAGES)**

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WASHINGTON, DC 20594**

SURVIVAL FACTORS GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

I. Accident

Operator(s) : Delta Air Lines, Inc.
Aircraft : McDonnell Douglas (MD-88, N927DC)
Location : Pensacola Regional Airport, Pensacola, Florida
Date : July 6, 1996
Time¹ : 1427 Hours
NTSB No. : DCA-96-MA-068

II. Survival Factors Group

Henry F. Hughes, Chairman
Survival Factors Division
National Transportation Safety Board

Evan **Byrne**, Member
Human Performance Division
National Transportation Safety Board

Lisa A. Keams, Member
Aviation Cabin Safety Inspector
Federal Aviation Administration

John A. Zimmerman, Member
Delta Central Air Safety Committee
Airline Pilots Association

Tem Hanson, Group Photographer
Manager, Photography
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III. Summary

On July 6, 1996, at approximately 1427 hours a Delta Air Lines, Inc. MD-88, experienced a catastrophic engine failure in the number 1 engine during its takeoff

¹ All times herein are based on the 24 hour clock and are eastern daylight savings time.

roll at the Pensacola Regional Airport, Florida. Components of the engine entered the airplane's cabin on the left side resulting in the death of two passengers and the injury of five other passengers. Flight attendants assigned to the aft galley and tailcone jumpseats initiated an emergency evacuation of passengers seated in the aft portion of the airplane. The captain directed the L-1 flight attendant to direct the passengers to remain seated in the forward portion of the airplane. Many of the passengers in the forward half of the airplane remained onboard until a portable airstair was brought to the airplane and they were deplaned without further incident. There were **5** crew members and **137** passengers onboard at the time of the accident.

IV. Details of the Investigation

The Survival Factors Group (**SFG**) was formed on July **7, 1996**. The on-scene investigative effort focused on: airplane interior configuration, emergency evacuation, flight attendant training, medical and pathological aspects, and emergency response.

1. Airplane Interior Configuration

1.1 Cockpit Configuration

The cockpit of the MD-88 was configured in the standard captain **first** officer tandem seating configuration. There was no damage to the cockpit area and the crew seats and other safety appliances were functional. The pilot crew seats were examined and found to be fully operational (see attachment A).

1.2 Cabin Configuration

The airplane's cabin was configured with a **first** class section (rows **1-5**) comprised of double seat units with **4** rows of two seats on the right and 3 rows of 2 seats on the left totaling **14** first class passenger seats. The coach section (rows **9-38**) of the cabin was configured with double seat units on the right and triple seat units on the left. All of the passenger seats and safety belt restraints **were** found to properly function (see attachment A for a list of the passenger seat nomenclature and attachment B for MD-88 cabin seating and equipment location).

1.3 Cabin Interior Damage

Examination of the airplane's interior revealed the primary area of **damage** to have been sustained in and adjacent to row **27**. On the left side cabin wall and overhead bin, pieces from the engine penetrated vertically from the lower left passenger window up **through** the overhead bin and ceiling panel. Inspection of the right side wall, floor, and ceiling indicated approximately **4** or **5** separate areas where the engine fan components pierced the cabin side wall.

Examination of the ceiling panel, crown area and right side of the cabin at row 37 revealed 4 additional exit holes. A triangular piece of the spinner measuring 14" x 16" x 10" was lodged in the ceiling area protruding partially out of the fuselage. Additionally, 2 fan blades were found, one lodged in the right side cabin wall just above the upper right corner of the passenger window and a second fan blade was found on the cabin floor in front of seat 37D. (see attachment C, photographic supplement).

2. Emergency Evacuation

Based on information provided by the crew, passengers, and other witnesses the following occurred

The airplane boarded its passengers at the gate and taxied out to runway 17 without incident. As the MD-88 began its takeoff roll the cabin crew and passengers heard a "loud bang" some seated in the aft cabin described a "concussion or blast" like sensation. Flight attendants seated in the forward aft galley, aft tail cone jump seats attempted to contact the cockpit via the interphone without success.

Immediately, thereafter the flight attendants seated at the aft galley and aft tail cone jump seats initiated the emergency evacuation in the aft cabin area utilizing the tail cone slide down which the husband, wife, and infant seated in row 38 A, B, C, and another passenger evacuated. The G2 flight attendant assigned to the aft galley area assisted through conditions outside the aft galley service door, opened it, and deployed the emergency slide manually. After bending down to pull the slide lanyard and then standing erect, the G2 flight attendant observed fire on the outside forward cowling of the left engine. At that point she redirected passengers forward. The L 2 flight attendant recalled yelling "release seatbelts, get up" and then directed the passengers forward.

Seeing that all of the passengers in the immediate area had moved from the L 2 door, the L 2 flight attendant focused her attention on assisting the flight attendants who were deploying the tail cone exit and attempting to treat the injured passengers at row 37 after which she ran to the cockpit to inform the captain and first officer of what had occurred.

The captain directed the first officer to respond to the back of the cabin to assess the situation and assist the flight attendants who were treating the injured passengers.

The flight attendant assigned to the G1 jump seat stated that about 10 to 15 seconds into the takeoff she heard "a loud bang". She attempted to contact the cockpit utilizing the interphone, which she utilized previously that same day, however it was inoperative. An examination of the interphone by Safety Board

investigators indicated the interphone system was functional however, it was rendered inoperable when the pilots turned off the airplanes electrical systems in their attempt to minimize an electrical fire hazard. The L-1 flight attendant went to the cockpit where the captain advised her not to evacuate the passengers. At that time she complied and using a megaphone directed the passengers not to evacuate as she ran toward the aft section of the cabin.

The L-1 flight attendant described seeing "a hole in the aircraft and lots of blood". At that point the L-1 attendant ran forward to the cockpit and advised the captain that "we had an emergency situation and possibly 2 dead. The L-1 flight attendant then went back to Row 37 and assisted the male passenger seated in the right side aisle seat until another passenger who was a physician began treating the unconscious passenger who had sustained a severe head injury.

While the L-1 flight attendant and the physician aided the unconscious passenger the first officer coordinated the removal of the tail cone slide and the deployment of the air stairs for use by the emergency medical service (EMS) and fire fighters.

After being received by EMS and the airport firefighters in an estimated 2-4 minutes after the onset of the accident, the L-1 flight attendant went forward, observing that the passengers forward of about row 20 were calm. The flight attendants estimated that 20 to 30 minutes later some portable airstairs arrived and the remaining passengers deplaned. Neither the L-1 or R-1 doors or emergency slides were deployed. All four overwing emergency exit rows (Row 26 and 27) were used as was the tail cone ext. The L-2 emergency slide was deployed but due to fire on the outside of the left engine, it was not utilized.

3. Flight Attendant Training

All three of the on duty and one off duty * flight attendants were qualified on the MD-88 and had completed initial training which included a course of instruction in emergency evacuation procedures. In addition all but Flight Attendant Peart who had graduated from initial training in July of 1996, had completed the required annual recurrent training which included refresher emergency procedures and evacuation training.

Flight Attendant Training Information

<u>Flight Attendant</u>	<u>Date of Employment</u>	<u>Initial Training</u>	<u>Recurrent Training</u>
Anne M. Kelly	4/6/83	4/11/83	6/14/96
Kimberly Rhodes	2/23/94	2/27/94	3/6/96
Terri Savage	2/27/91	3/28/91	2/11/96

Additional information ~~will~~ be provided regarding Delta Airlines flight attendant emergency procedures and evacuation training.

3.1 Delta Air Lines Emergency Evacuation Policy

Under current Delta Airlines policy a flight attendant may initiate an emergency evacuation if one of the following conditions exist: fire, major damage to the aircraft, or serious personal injury.

The emergency evacuation can only be initiated after the airplane has stopped. F/A's are required to notify the cockpit immediately via the interphone or in person.

In this accident the flight attendants assigned to the aft galley and tailcone jumpseat positions initiated the evacuation of passengers after the airplane had come to a stop based on their observations of the severe damage to the cabin area, serious injury of three passengers, and fire on the onboard side of the left engine cowling.

The captain's assessment of the overall emergency situation led him to direct the first officer to halt the evacuation of passengers from the front of the airplane and await the arrival of the portable airstairs. Neither the L-1 or R-1 doors were opened or the emergency slides deployed in preparation for an emergency evacuation however.

4. Medical and Pathological

4.1 Injury Table

	<u>Cockpit Crew</u>	<u>Cabin Crew</u>	<u>Passengers</u>	<u>Other</u>	<u>Total</u>
<u>Fatal</u>	0	0	2	0	2
<u>Serious</u>	0	0	2	0	2
<u>Minor</u>	0	0	3	0	3
<u>None</u>	2	3	137	0	142

Note: An off-duty pilot and flight attendant ~~were~~ onboard as passengers both assisted in the evacuation and in assisting passengers however, they are not included as crew members.

Additional medical and pathological information has been requested and will be supplemented as an attachment to this report as it becomes available.

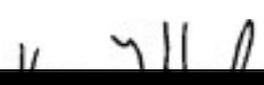
5. Emergency Response

At 1427 the Pensacola Regional Airport's **FAA** tower control alerted the Pensacola Fire Departments communications Center of an MD-88 with "number one (left) engine distorted". The airports fire station was directed to respond and arrived onscene at 1429 and stationed the first arriving foam truck facing the tail section and both engines the second and third crash trucks to arrive about the same time positioned themselves forward of and facing the front of the airplane on the left and right sides.

Firefighters stated that upon arrival several passengers had exited the airplane by way of the tailcone emergency slide and all four overwing emergency exit windows. Initially, several passengers were standing on the wings and the first officer was seen to have called for the passengers to return to the cabin. Some complied others slid off the trailing section of the wings where the fire fighters provided assistance.

Two fire fighters made their way into the airplane by way of the **L-2** door and began to provide medical aid to the most seriously injured passengers. During *this* time the first officer responded to the tailbone area and with the assistance to fire fighters on the ground was able to disconnect the tailcone emergency slide and lower the airstairs for use by emergency medical service personnel (EMS) to evacuate the injured.

A triage area was established along the side of Runway 17-35 on the left side of the airplane and a landing zone for the "lifeflight" helicopter was designated. At about 1442 the most seriously injured passenger, who had been seated in row 37, was transported to Sacred Heart Hospital's trauma unit. All of the remaining passengers were either treated by EMS and transported to Sacred Heart Hospital or to the main terminal on a bus which had been requested by the fire department.


Se [Redacted] Investigator
Senior Accident Investigator