

NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Western Pacific Region
Seattle, WA 98188

January 10, 2010

AIRWORTHINESS GROUP CHAIRMAN'S REPORT

CEN09MA142

ADDENDUM 1

A. ACCIDENT

Operator: Empire Airlines, Inc.
Location: Lubbock, TX
Date: January 27, 2009
Time: 0437 central standard time
Aircraft: N902FX, ATR-42-320

B. AIRWORTHINESS GROUP

Chairman: Kristi Dunks
National Transportation Safety Board
Seattle, WA

Member: Daniel Baker
National Transportation Safety Board
Denver, CO

Member: Daniel J. Vengen
Federal Aviation Administration
Lubbock, TX

Member: Guilhem Nicolas
BEA
Le Bourget Cedex, France

Member: Vincent Ecalle
BEA
Le Bourget Cedex, France

Member: Tom Strom
Empire Airlines, Director of Maintenance
Hayden, ID

Member: John Melnick
ATR, Director of Technical Support
Dulles, VA

Member: Didier Cailhol
ATR
Blagnac Cedex, France

Member: Marion Choudet
ATR
Blagnac Cedex, France

Member: Christian Freixinos
ATR
Blagnac Cedex, France

Member: Hugo Whitten
FedEx
Memphis, TN

Member: Carl W. Mason
Pratt and Whitney Canada
Little Elm, Texas

C. SUMMARY

On January 27, 2009, at approximately 0437 central standard time (CST), N902FX, an Aerospatiale Alenia ATR-42-320, operating as Empire flight 8284, sustained substantial damage when it collided with terrain short of the runway while executing the Instrument Landing System (ILS) RWY 17R approach at Lubbock Preston Smith International Airport (LBB), Lubbock, Texas. The airplane was registered to Federal Express Corporation, Memphis, Tennessee, and operated by Empire Airlines, Hayden, Idaho. The airline transport pilot rated captain was seriously injured and the commercial rated first officer sustained minor injuries. An instrument flight rules flight plan was filed for the flight that departed Fort Worth Alliance Airport (AFW), Fort Worth, Texas, at approximately 0312 CST. Instrument meteorological conditions prevailed for the supplemental cargo flight operated under 14 Code of Federal Regulations Part 121.

The purpose of this addendum is to document information that was gathered after the completion of the Airworthiness Factual report.

D. ADDENDUM

Section 3. Structural Documentation

2.11 Flap Position Fairing

The flap position fairing on the left wing was documented. The left wing markings were sooted. The right wing fairing was consumed in the post-impact fire. The cockpit switch to activate the wing lights was in the “ON” position.



Photo 1. Flap Position Fairing

2.12 Examination of Flap Rollers and Flaps

The flap rollers and flap control surfaces were documented for evidence of mechanical malfunction or control interference. Due to damage sustained during the accident, limited examination of the right wing components was possible. Examination revealed no deformation or markings. There was no evidence to indicate that the flap rollers or flap control surfaces resulted in a mechanical blockage of the flap movement.

Section 4. Systems

1.1.1.1 Aircraft Cockpit Asymmetry Indication

The Federal Aviation Administration (FAA) was asked to compile a list of aircraft certified with a cockpit asymmetry indication, flap malfunction indication, or no specific flap malfunction indication. The ATR 42-200,-300, -320 and Cessna 500,550,553, 560, 560XL were certified without a specific cockpit flap malfunction indicator dedicated to an asymmetry condition. The results are shown in Table 1.

Table 1. Certification with Flap Malfunction Indicator

Aircraft Make/Model	Flap Asymmetry	Generic Flap Warning	No Flap Warning Light
Airbus A300	X		
A300-600	X		
A310	X		
A330/340	X		
B717, 727, 737, 747, 757, 767, 777	X		
ATR 42-200,-300, -320			X (asymmetry detection system prevents flap asymmetry from exceeding 8-10 degrees)
ATR 42-400, -500	X		
ATR 72-101, -102, -201, -202, -212, and -212A	X		
BAe 146		X	
BAe ATP		X	
BAe J41	X		
Bombardier Regional Jets		X	
Bombardier DHC-8 series		X	
Cessna 500,550,553, 560, 560XL			X (worst case scenario yields full asymmetry of the outboard flap)
Cessna 650		X	
Cessna 680		X	
Cessna 750		X	
DC-9-81/82/87, MD-88	X		
Dornier 328-100/300	X		
EMB-135/145		X	
EMB-170		X	
EMB-190		X	
F10	X		
F7X	X		
F900	X		
F900EX	X		
Fokker F27, F28, 100/70	X		
Gulfstream G150, 200	X		
Gulfstream GIV		X (originally a flap position indicator was used, a later production change introduced a caution light for generic flap failures)	
Gulfstream GV	X		
Hawker Beech 4000		X	
Hawker Beech MU 300-10, 400, 400A	X		
IAI 1125 Astra, Astra SPX, G100	X		
Learjet 31, 55, 60		X	X (has interconnect that prevents asymmetric flap deployment)
Learjet 45		X	
MD-11	X		
MD-90	X		
Saab 340		X	

1.3.2 ATR Flap Asymmetry and Icing Conditions

During the investigation, ATR was asked if icing conditions could have resulted in a flap asymmetry by delaying the extension of the flaps.

According to ATR, in all types of icing conditions, runback icing does not exceed 15 to 20 percent wing chord on the upper surface and 30 to 40 percent chord on the lower surface. These limits are upstream of the flap assembly.

Additionally, liquid water accumulation within the slot designed between the wing and the flap has the potential to freeze at negative temperatures. Although water may enter this gap during rainy conditions, ATR indicated that continuous air circulation and gap thickness prevent water from staying trapped. ATR further noted that ATR models having a similar wing/flap design have accrued 17,567,000 flight cycles with no reports of flap asymmetry or jamming due to flight in icing conditions.

ATR also noted that occasionally, de-icing fluid residues may rehydrate during rainy conditions and then freeze into a gel-like residue at a negative outside temperature. Although operators have reported this residue to ATR, no other detrimental effects have been reported. The accident airplane was not serviced with de-icing fluid prior to departure.¹

¹ Normal record keeping requirements do not require the recording of aircraft deicing. However, it is likely that the aircraft was deiced on prior flights.