



National Transportation Safety Board Aviation Incident Final Report

Location:	OPA LOCKA, FL	Incident Number:	MIA00IA128
Date & Time:	04/04/2000, 1724 EDT	Registration:	N175GA
Aircraft:	Dassault DA-20	Aircraft Damage:	Minor
Defining Event:		Injuries:	2 None
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

According to the PIC, when the landing gear selector was positioned to the gear down position in preparation for landing, the landing gear did not extend and cockpit indications confirmed not down. A go around was executed and 'Procedure A' of the 'Emergency Gear Extension' checklist was executed. The result was a down and locked indication of the nose gear and the right main gear, no indication of the left gear being down, both hydraulic system quantities started decreasing, and control pressures felt in the yoke/stick indicated that the flight controls were losing their boost. The PIC elected to declare an emergency with the tower and execute a 2 gear down/1 gear up landing instead of completing the 'Procedure B' and 'Procedure C' portions of the checklist. The aircraft swerved off the left edge of the runway and sustained minor left under-wing skin scraping and a puncture to the left wing droop. Examination of the left wheel well revealed the malfunction causing the double hydraulic system leakage was the failure of two bolts attaching the hydraulic emergency slide valve to the left gear door actuating cylinder. Dassault Falcon Jet Service Bulletin FJF 32-160 dated April 26, 1984, recommends replacement of the 4-mm bolts with 5-mm bolts, to be accomplished, 'when the components are returned for major overhaul or repair, or upon request'. The incident aircraft had not undergone accomplishment of Service Bulletin FJF 32-160.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The failure of the PIC to execute the complete procedure for emergency extension of the landing gear and the subsequent landing with the left main landing gear not locked fully down, resulting in an excursion off the runway and collision with a runway stanchion. A factor in the incident was the fatigue failure of the left MLG door hydraulic emergency slide valve bolts due to non-compliance with a 1984 factory service bulletin that recommended replacement with larger bolts.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION

Phase of Operation: APPROACH

Findings

1. (F) HYDRAULIC SYSTEM,ACTUATOR - LEAK
2. (F) MAINTENANCE,SERVICE BULLETIN/LETTER - NOT COMPLIED WITH - COMPANY MAINTENANCE PERSONNEL
3. (F) INSUFFICIENT STANDARDS/REQUIREMENTS,MANUFACTURER - MANUFACTURER

Occurrence #2: WHEELS UP LANDING

Phase of Operation: LANDING

Findings

4. (C) CHECKLIST - DISCONTINUED - PILOT IN COMMAND
5. LANDING GEAR,MAIN GEAR - UNLOCKED

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT

Phase of Operation: LANDING - ROLL

Findings

6. DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND
7. OBJECT - POLE

Factual Information

On April 4, 2000, about 1724 eastern daylight time, a Dassault Falcon DA-20, N175GA, registered to Grand Aire Express, Inc., operating as a Title 14 CFR Part 91 positioning flight, experienced a failure of the left main landing gear to extend for landing and an excursion off the runway edge during landing rollout at Opa Locka, Florida. Visual meteorological conditions prevailed and an IFR flight plan was filed. The airplane sustained minor damage and the ATP-rated pilot and commercially-rated copilot were not injured. The flight left Louisville, Kentucky, about 2 hours 30 minutes before the accident.

According to the pilot, during the approach to Opa Locka's runway 27R, when the landing gear handle was selected down by the copilot, none of the three landing gears extended. The pilot commanded gear handle up and back down a second time, but again, to no avail. At that point, the pilot executed a go-around, and on his downwind leg, he commanded the reading and execution of, "Procedure A" of the checklist for, "Landing Gear Extension Failure". At the completion of the "Procedure A", the right main and nose gear indicated extended; however, the left main gear indicated not extended, and the pilot lost hydraulic boost to the flight controls while simultaneously observing both hydraulic quantity indications decreasing. The pilot declared an emergency and stated he would be landing as soon as possible.

Reference to the "Operating Handbook, Abnormal and Emergency" that was on board N175GA and used by the crew during the failure of the landing gear to extend revealed that there is a "Procedure B" and a "Procedure C" to be executed, in sequence as necessary, to insure extension of all three landing gear prior to landing.

The aircraft sustained superficial under-wing skin scraping of the left wing. A puncture in the left wing leading edge droop resulted from collision with a runway stanchion, but no structural member was damaged. Speed tape was applied to the wing droop perforation by a company mechanic, a ferry permit was issued by the FAA, and the airplane was flown to the airline's headquarters in Louisville. According to the airline's Director of Maintenance, the failed component was the attaching hardware for the hydraulic emergency slide valve, P/N A2-23769, mounted to the left main landing gear door-actuating cylinder. The emergency slide valve's function is to allow continued hydraulic operation of the landing gear door with the operable hydraulic system in the event of a single hydraulic system failure. The emergency slide valve is common to both of the aircraft's hydraulic systems; therefore, a leak caused by failure of the mounting hardware results in a double hydraulic system failure.

On April 26, 1984, the product support division of Dassault Falcon Jet promulgated Service Bulletin FJF 32-160 recommending that the attachment hardware for the emergency slide valve to be increased in size, (4-mm bolt diameter to 5-mm). The compliance wording states, "when the component is returned for major overhaul or repair, or upon request." Maintenance records revealed that the incident aircraft had not had the SB complied with. A copy of SB FJF 32-160 is included as an attachment to this report.

The left MLG door actuator, PN A23729-0, SN 095, was examined for failure analysis at a repair station/subsidiary of Dassault Falcon Jet Corporation with NTSB oversight. The attached data plate revealed a pre-modification part number and measurement of the emergency slide valve attachment bolt diameters confirmed that SB FJF 32-160 had not been complied with. Both bolt shanks revealed minor cadmium plating decay and stress corrosion.

Both bolt shanks revealed fatigue failure and total fracture at the location where the first thread, (closest to the bolt head) was machined. The repair station engineering report is an attachment to this report.

The FAA Data Section of Aviation Flight Standards, AFS-620, researched their database for Falcon 20 landing gear door actuator service difficulty reports from 1974 to the present and found no other cases of hydraulic failures due to emergency slide valve attachment hardware failure.

Pilot Information

Certificate:	Airline Transport; Commercial	Age:	31, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	11/16/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	6000 hours (Total, all aircraft), 3000 hours (Total, this make and model), 4500 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Dassault	Registration:	N175GA
Model/Series:	DA-20 DA-20	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	45
Landing Gear Type:	Retractable - Tricycle	Seats:	3
Date/Type of Last Inspection:	02/27/2000, AAIP	Certified Max Gross Wt.:	28660 lbs
Time Since Last Inspection:	72 Hours	Engines:	2 Turbo Jet
Airframe Total Time:	16552 Hours	Engine Manufacturer:	GE
ELT:		Engine Model/Series:	CF-700-202
Registered Owner:	GRAND AIRE EXPRESS, INC.	Rated Power:	4500 lbs
Operator:	GRAND AIRE EXPRESS, INC.	Operating Certificate(s) Held:	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	OPF, 10 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	1750 EDT	Direction from Accident Site:	90°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	12 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	260°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	31 °C / 20 °C
Precipitation and Obscuration:			
Departure Point:	LOUISVILLE, KY (SDF)	Type of Flight Plan Filed:	IFR
Destination:	OPA LOCKA, FL (OPF)	Type of Clearance:	IFR
Departure Time:	1454 EDT	Type of Airspace:	Class G

Airport Information

Airport:	OPA LOCKA (OPF)	Runway Surface Type:	Asphalt
Airport Elevation:	9 ft	Runway Surface Condition:	Dry
Runway Used:	27R	IFR Approach:	None
Runway Length/Width:	8002 ft / 150 ft	VFR Approach/Landing:	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Minor
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	ALAN C STONE	Report Date:	04/06/2001
Additional Participating Persons:	DAN CASTRO; MIAMI, FL WALT WILSON; MIAMI, FL		
Publish Date:			
Investigation Docket:	NTSB accident and incident docket serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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