



National Transportation Safety Board Aviation Accident Final Report

Location:	Seattle, WA	Accident Number:	SEA03LA018
Date & Time:	12/16/2002, 1907 PST	Registration:	N55RF
Aircraft:	Hawker Siddeley DH-125	Aircraft Damage:	Substantial
Defining Event:		Injuries:	3 None

Flight Conducted Under: Part 91: General Aviation - Business

Analysis

The Co-Pilot was the flying pilot with the Captain giving directions throughout the approach phase. The Captain stated that he extended the flaps and the landing gear. When the aircraft touched down, the landing gear was not extended. The Co-Pilot reported that she did look down at the landing gear lever and at "three green lights" on the approach. The CVR was read out which indicated that the Co-Pilot directed the Captain to call inbound. The Captain acknowledged this and stated "fifteen flaps." The Co-Pilot then stated "fifteen flaps, before landing." The Captain did not respond to the Co-Pilot but instead made a radio transmission. The Captain shortly thereafter, stated that he was extending the flaps to 25 degrees. The Captain made another radio transmission to the tower when the Co-Pilot stated "final, sync, ignitions." The Captain responded "ignitions on." Full flaps were then extended. The Captain gave the Co-Pilot continued directions while on the approach for heading, speed and altitude. At approximately 300 feet, the Captain stated, "yaw damper's off, air valves are off, ready to land." The Captain reported that it was obvious that touchdown was on the flaps and keel. The Captain stated that he raised the flaps, shutdown the engines, and confirmed that the landing gear handle was down. During the gear swing test the landing gear cycled several times with no difficulties. All red and green lights illuminated at the proper positions. During the test, it was found that the gear not extended horn did not function with the gear retracted, the flaps fully extended and the power levers at idle. Later a bad set of contacts to the relay was found. When the relay was jumped, the horn sounded. Inspection of the damage to the aircraft revealed that the outer rims of both outer tires displayed scrape marks around the circumference of the rim. The outer surface of the gear door fairings were scraped and the flap hinge fairings was ground down.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The landing gear down and locked was not verified prior to landing. The checklist was not followed, and an inoperative landing gear warning horn were factors.

Findings

Occurrence #1: WHEELS UP LANDING

Phase of Operation: LANDING

Findings

1. (F) LANDING GEAR, GEAR WARNING SYSTEM - NOT OPERATING
2. (C) GEAR DOWN AND LOCKED - NOT VERIFIED - PILOT IN COMMAND
3. (F) CHECKLIST - NOT FOLLOWED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On December 16, 2002, at 1907 Pacific standard time, a Hawker Siddeley DH-125, N55RF, registered to and operated by National Aircraft Leasing as a 14 CFR Part 91 business flight, landed gear up at Boeing Field, Seattle, Washington. Instrument meteorological conditions prevailed at the time and an instrument flight rules flight plan was in effect. The aircraft was substantially damaged and the airline transport pilot, commercial pilot and passenger were not injured. The flight originated in Sacramento, California, about one hour and 30 minutes prior to the accident.

The flight crew reported that the Co-pilot seated in the right seat was the flying pilot for the duration of the flight. The initial phase of the approach utilized the autopilot in the GPS (Global Positioning System) mode. At 2,200 feet in altitude hold, the mode was switched to the ILS (Instrument Landing System) approach for runway 13R.

During an interview and subsequent written statement, the Captain reported that during the approach he selected the flaps to 15 degrees and extended the landing gear. Flaps were then extended to 25 degrees when the descent began. The Co-Pilot noted a "flapping or thumping noise" and the autopilot was disengaged and the flaps were extended to 45 degrees. The Captain reported that the engine sync was turned off and the ignitions turned on. A wind check was made at two miles out and the final checklist was completed with the yaw dampers off and the air valves shut. The Captain reported that the approach was stabilized and the touchdown was smooth. The Captain stated that it was obvious that touchdown was on the flaps and keel. The Captain raised the flaps, shutdown the engines, and confirmed that the landing gear handle was down. No audible warnings or warning lights were noted.

The Co-Pilot reported that while preparing for landing on 13R, the Captain asked her if she wanted 15 degrees of flaps and gear down. The Co-Pilot stated that she did. When the autopilot was disengaged, a loud "thumping" sound was heard and she called it to the Captain's attention. The Captain stated that everything was normal and to continue flying. The Captain called out and extended the flaps to 25 degrees, with the noise continuing. The Co-Pilot mentioned that "something did not feel right," and the Captain told her to continue. The Co-Pilot glanced at the instruments and noticed that the landing gear was down and locked and she saw three green lights. On short final, 45 degrees of flaps were extended and the landing continued. No warning horns were noted. The Co-Pilot noted a "very long flare" and told the captain that something was wrong. At this time, the crew heard and felt the scraping sound and they knew that the main landing gear was not down. After the aircraft came to rest, the Co-Pilot noted that the landing gear lever was down and in the locked position.

DAMAGE TO AIRCRAFT

The fire damage was localized to the area of the underbelly keel and just aft of the left main landing gear and traveled up and along the left side of the fuselage, inboard of the left engine. The fuselage skin was melted and torn away. The belly keel was also compromised. The inside of the left engine cowling displayed heat distress.

The flap hinge fairings that extend below the flaps were ground down. The flaps did not appear to be damaged.

The left and right main landing gear door fairings, with semi-circular cut outs that exposed the outer tires when retracted, displayed scrape marks noted to the outer side of both doors in the area where the material rises. There was no damage noted to the leading edge or ends of the doors. Both left and right side outer tire rims displayed scrape marks along the circumference of the rim.

PERSONNEL INFORMATION

At the time of the accident, the Captain held airline transport pilot and flight instructor certificates for single and multi-engine aircraft with an instrument rating. The Captain reported a total flight time of 13,497 hours in all aircraft and 1,713 hours in the make and model aircraft involved in the accident.

The Captain held a Class II medical certificate dated January 2, 2002. No waivers or limitations were reported.

The Co-Pilot held commercial, flight instructor and flight engineer certificates for single engine land and sea, and multi-engine land aircraft with an instrument rating. The Co-Pilot reported a total flight time of 2,400 hours in all aircraft and 200 hours in the make and model aircraft involved in the accident.

The Co-Pilot held a Class II medical certificate dated February 5, 2002. No waivers or limitations were reported.

FLIGHT RECORDERS

The Fairchild model GA-100 cockpit voice recorder (CVR), s/n 01093 was removed from the aircraft and transported to the National Transportation Safety Board, Audio Laboratory, Washington, D.C. on December 23, 2002. The CVR was examined by the Transportation Safety Specialist who noted that the unit showed no evidence of structural damage, and the interior sustained no apparent heat or impact damage. The Dukane underwater locator beacon (ULB) was tested and found to operate satisfactorily.

The Cockpit Voice Recorder committee convened on January 9, 2003 and a transcript of the cockpit conversations was prepared of the final 12:34 minutes of the 32:12 minute recording.

The transcript began at 1855:55 with the Captain reporting that they were four minutes to the NOLLA turn point. The Co-Pilot was the flying pilot and was responding to the Captain's directions to maintain course alignment and establishment to the glide slope. The communications/directions from the Captain continued for course headings, speed and altitude adjustments.

At 1900:51, the Co-Pilot made a comment, "What's that noise? Do you hear that?" The Captain responded "Yep. I don't know. Something. I think it's a gyro noise."

At 1900:56, Seattle Approach contacted the flight indicating that they were five miles from NOLLA. A direction to turn right to a heading of 050 degrees was given and to maintain 2,200 feet until established on the localizer. The flight was cleared for the ILS (Instrument Landing System) for runway 13 right. The Captain responded to the controllers directions.

The communications between the Captain and the Co-Pilot continued with the Captain directing the Co-Pilot to continue utilizing the auto-pilot for the approach.

It was noted by the Captain at 1902:46, that the frequency for the approach was not correct.

At 1903:10, the Co-Pilot noted that they were at NOLLA, and directed the Captain to call inbound. The Captain acknowledged the Co-Pilot and then selected "fifteen flaps." The Co-Pilot responded "fifteen flaps, before landing. We doing this auto-pilot?"

The Captain did not respond to the Co-Pilot, but instead made a radio transmission to Approach Control reporting that they were at NOLLA. The approach controller directed the flight to contact tower (Boeing Tower) on 120.6.

The Co-Pilot then stated that they were left of course, then corrected to say they were right of course, and questioned, "I need to go left?" The Captain responded that "it's gonna, engage here in a minute." The Captain then indicated that he was extending the flaps to twenty-five, and directed the Co-Pilot to "pull the power a little."

At 1903:36, the Captain contacted Boeing Tower and reported that they were just passed NOLLA. The controller responded that they were cleared to land, gave the wind conditions as wind from 160 degrees at 8 knots, and identified traffic.

At 1904:02, the Co-Pilot stated, "final, sync, ignitions?" The Captain responded "ignition's on." Communications continued between the Captain and Co-Pilot about the use of the auto-pilot. The Captain continued to direct the Co-Pilot on course heading, altitude and airspeed to remain aligned on the localizer and glide slope over the next two minutes.

At 1906:04, the Captain stated "yaw damper's off, air valves are off, ready to land."

The Captain continued directing the Co-Pilot for the final approach phase.

At 1906:42, the cockpit area microphone picked up the sounds of scraping and rumbling.

At 1907:01, the Captain stated "gear didn't come down."

At 1907:25, the area microphone picked up the statement, "The gear didn't come down. We put it down but it didn't lock I guess. We didn't see anything." Following comments stated, "We sure as hell got three reds now, but..." followed by "We had no warning and no warning horn..."

TESTS AND RESEARCH

On December 18, 2002, investigators from the National Transportation Safety Board and the Federal Aviation Administration inspected the landing gear system. The aircraft was placed on jacks. Power was applied and the landing gear was cycled several times. All three landing gear extended and retracted with no anomalies noted. All three of the red and green gear indicator lights illuminated with the landing gear in the appropriate positions. The landing gear was retracted, the flaps were extended to 45 degrees and the power levers (left/right) were placed in the idle position. It was found that the gear not extended warning horn did not sound.

The landing gear warning system was inspected by maintenance personnel from Galvin Flying Service, Maintenance Department. During the troubleshooting processes, the mechanic found a bad set of contacts to the relay. Once the relay was jumped, the warning horn was confirmed.

Maintenance records indicated that the last time the warning horn was functionally checked was in 1999. The next scheduled functional test for this system was due December 20, 2002. There is no push-to-test for this system.

ADDITIONAL DATA/INFORMATION

The checklist used in the aircraft was provided for review. The checklist for "Final" stated:

1. Engine Sync Off
2. Ignition On
3. Gear Down, 3 lights on
4. Brake Pressure Checked
5. Flaps As required
6. Yaw Damp Off
7. Air Valves Closed

The aircraft was released to the owner's representative on December 19, 2002. The cockpit voice recorder was retained by the National Transportation Safety Board for readout. The recorder was returned to the Director of Maintenance, Galvin Flying Service, on January 7, 2003.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	Age:	68, 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):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	01/02/2002
Occupational Pilot:		Last Flight Review or Equivalent:	03/14/2002
Flight Time:	13497 hours (Total, all aircraft), 1713 hours (Total, this make and model), 10622 hours (Pilot In Command, all aircraft), 76 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Age:
Airplane Rating(s):	Seat Occupied:
Other Aircraft Rating(s):	Restraint Used:
Instrument Rating(s):	Second Pilot Present: Yes
Instructor Rating(s):	Toxicology Performed:
Medical Certification:	Last FAA Medical Exam:
Occupational Pilot:	Last Flight Review or Equivalent:
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	Hawker Siddeley	Registration:	N55RF
Model/Series:	DH-125	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	25020
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	12/12/2002, Continuous Airworthiness	Certified Max Gross Wt.:	21700 lbs
Time Since Last Inspection:	12 Hours	Engines:	2 Turbo Fan
Airframe Total Time:	14162 Hours	Engine Manufacturer:	Allied Signal
ELT:	Installed, not activated	Engine Model/Series:	TFE-731-3R-1H
Registered Owner:	National Aircraft Leasing	Rated Power:	3700 lbs
Operator:	National Aircraft Leasing	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	BFI, 18 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	1853 PST	Direction from Accident Site:	
Lowest Cloud Condition:	Scattered / 3300 ft agl	Visibility	10 Miles
Lowest Ceiling:	Broken / 9000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	170°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.44 inches Hg	Temperature/Dew Point:	8° C / 3° C
Precipitation and Obscuration:			
Departure Point:	Sacramento, CA (MHR)	Type of Flight Plan Filed:	IFR
Destination:	Seattle, WA (BFI)	Type of Clearance:	IFR
Departure Time:	1730 PST	Type of Airspace:	Class D

Airport Information

Airport:	Boeing Fld/King Co Intl (BFI)	Runway Surface Type:	Asphalt
Airport Elevation:	18 ft	Runway Surface Condition:	Wet
Runway Used:	13R	IFR Approach:	ILS
Runway Length/Width:	10001 ft / 200 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	47.516667, -122.303333

Administrative Information

Investigator In Charge (IIC):	Debra J Eckrote	Report Date:	07/23/2003
Additional Participating Persons:	Patrick M Paden; FAA-FSDO; Renton, WA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets 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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