



National Transportation Safety Board Aviation Accident Factual Report

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|--------------------------------|---|-------------------------|-------------|
| Location: | Fort Lauderdale, FL | Accident Number: | MIA07FA005 |
| Date & Time: | 11/01/2006, 0233 EST | Registration: | N232TN |
| Aircraft: | British Aerospace HS 125-700A | Aircraft Damage: | Substantial |
| Defining Event: | | Injuries: | 12 None |
| Flight Conducted Under: | Part 91: General Aviation - Executive/Corporate | | |

HISTORY OF FLIGHT

On November 1, 2006, about 0233 eastern standard time, a British Aerospace HS 125-700A, N232TN, registered to and operated by Juventude Ltd., was landed with the landing gear retracted at the Fort Lauderdale/Hollywood International Airport (KFL), Fort Lauderdale, Florida. Visual meteorological conditions prevailed at the time and an instrument flight rules (IFR) flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 executive/corporate flight from Licenciado Adolfo Lopez Mateos International Airport (MMTO), Toluca, Mexico, to KFL. The airplane was substantially damaged and there were no injuries to the commercial-rated pilot, private-rated co-pilot, or 10 passengers. The flight originated about 2235 central standard time from MMTO.

The pilot-in-command (PIC) who was flying the airplane from the left seat reported that he began his day at 1100 CST, and flew 2 flights in a different airplane; the total flight duration for the 2 flights was approximately 3 hours. He did not rest between the 2 flights, then departed in the accident airplane and proceeded to KFL. The airplane was "flying smooth", and when near KFL, he became distracted in looking for the runway while executing a visual approach to runway 9L. The co-pilot read to himself from a "Flight Safety" checklist, but "not very loud", and there was no challenge response which was "...not typical for them." They "did not follow every item on the checklist", but the flaps were extended to 45 degrees for landing. In preparation for landing, he remembered placing his hand on the landing gear selector handle and moving it half way down, and later reported seeing a green light for the left main landing gear, but saw red lights for the nose and right main landing gears. He elected to continue the approach, and reduced the thrust levers to idle when the flight was approximately 1/4 mile from the runway. He did not hear an audible alarm at that time. The airplane was landed on runway 9L, and he thought he felt the tires rolling then applied the airbrake. He performed an emergency shutdown after the airplane came to rest on the runway, and all occupants exited the airplane. He (PIC) further reported that they did "many things wrong."

The owner of the airplane who was a passenger reported that none of the flightcrew members advised them before landing to prepare for an emergency landing. Additionally, he went into

the cockpit immediately after the airplane came to rest and noticed 2 red lights and a green light; the green light was associated with the left main landing gear. The remaining adult passengers stated they heard sounds during the landing then saw smoke. There was no mention that the flightcrew advised them to prepare for an emergency landing.

According to the cockpit voice recorder (CVR) Factual Report, all inter-cockpit conversations were in Spanish, while conversations with air traffic control were in English. The audio quality of the communications recorded by the cockpit area microphone was reported to be good, which starts with the flight being cleared to descend to 10,000 feet, and ends with one of the flightcrew members advising the KFLC air traffic control tower (ATCT) that they were securing the airplane. No reading of a checklist was heard, and there was no sound associated with extension of the landing gear or landing gear warning horn during the entire recording. The summary transcription indicates that approximately 25 minutes 8 seconds into the CVR recording, a flightcrew member reported the field in sight. At 25 minutes 58 seconds into the CVR recording, the CVR recorded a discussion by the flightcrew about using full flaps for landing. At 27 minutes 57 seconds into the CVR recording, the CVR recorded a mechanical voice stating "five hundred" feet. The CVR then recorded the engine sound decreasing, and at 28 minutes 54 seconds into the CVR recording, a loud grinding sound started. The grinding sound continued for approximately 22 seconds, and stops at 29 minutes 16 seconds into the recording. The CVR then recorded a comment from the PIC asking what had happened to the landing gear. The CVR recorded the response from the co-pilot to be "we never put it down." The tower was then heard asking the flightcrew if they needed assistance, and one of the flightcrew members asked for assistance with moving the airplane off the runway. At 29 minutes 53 seconds into the CVR recording, the CVR recorded a cockpit conversation in which one of the passengers asks about the incident and the captain reported that the landing gear folded when he lowered the nose to the runway, and that the red light is on in the gear handle. At 32 minutes 39 seconds into the recording, the CVR recorded one of the flightcrew members advising the KFLC ATCT that they were going to secure the airplane.

PERSONNEL INFORMATION

The pilot-in-command (PIC) seated in the left seat was issued a FAA commercial pilot certificate with airplane single and multi-engine land ratings on December 17, 1990. The limitations of the certificate indicates, "issued on basis of and valid only when accompanied by Mexican pilot license number 1929. Not valid for the carriage of persons or property for compensation or hire or for agricultural aircraft operations." The PIC did not have a type rating for the accident airplane make and model, which is contrary to 14 CFR Part 61.31 (a)(2), nor did he have an instrument rating, which is contrary to 14 CFR Part 61.3(e)(1), for operation of an airplane under IFR. There was no record of a U.S. issued medical certificate. The PIC's last flight proficiency check occurred in July 2005, in which he received 10 hours of training in the accident make and model airplane at Tornado Flight School, Mexico City, Mexico. FAA regulation 14 CFR Part 61.58(a)(1) requires a flight proficiency check each 12 calendar months.

The co-pilot seated in the right seat was issued a FAA private pilot certificate with airplane single and multi-engine land ratings on January 5, 2006. The limitations of the certificate indicates, "issued on basis of and valid only when accompanied by Mexico pilot license

number(s) 200302963. All limitations and restrictions on the Mexico pilot license apply." The co-pilot did not have an instrument rating on his private pilot certificate, which is contrary to 14 CFR Part 61.55(a)(2) for operation of an airplane under IFR. He was issued a U.S. first class medical certificate with no restrictions on April 10, 2006.

The co-pilot on the accident flight replaced another pilot who was scheduled to perform the flight but became ill.

Numerous requests were made by NTSB to the Mexican Government regarding Mexican pilot certificate information. The Mexican Government did not respond to the NTSB's requests.

AIRCRAFT INFORMATION

The airplane was manufactured in 1978 by British Aerospace Aircraft Group, as model HS 125-700A, with modification number 258332. It was designated constructors reference number NA 0232, which correlates to serial number 257043. It was certificated in the transport category. The 10 passenger-seat airplane was equipped with retractable landing gears, and an audible landing gear warning which sounds when the flaps are in the landing position (45 degrees), the landing gear selector handle is in the up position, and one or both thrust levers are below the 60 percent rpm position.

There is no direct functional test of the landing gear warning horn system that can be performed by the flightcrew before flight to determine the operational status of the landing gear warning horn; however, the cabin altitude warning system and the landing gear warning system share the same circuitry, including the CA relay and warning horn.

The airplane "Crew Manual" is divided into 3 volumes, with the first being aircraft systems descriptions, the second being operating data, and the third being "Pilot's Checklists." NTSB review of volume 1 revealed the cabin altitude warning horn is operationally tested during the "Before starting engines or APU" section found in the "Air Conditioning - Management in Normal Conditions" section. NTSB review of volume 3 of the Crew Manual revealed the "Pre Departure Check" checklist indicates a section titled "Test Panel" and describes to test each system.

Review of the maintenance records revealed a March 2006 entry which indicates that the 4 club seats, 1 attendant seat, 1 toilet seat, and one 3-place divan were redressed. The toilet seat was not equipped with a seatbelt. At the time of the accident, with respect to passenger seats, the airplane was equipped with 4 club seats, and two 3-place divans, which allowed for 10 passengers. There was no maintenance record entry or weight and balance associated with the cabin passenger seat change.

A handwritten list of 6 discrepancies was stapled to the outer page of the Aircraft Flight Log. None of the listed discrepancies pertained to the landing gear; however, two of the listed discrepancies indicates: "Both fuel indicators are Out/Service" and "Engine Number 1 ITT

indicator [out of service]." The airplane owner reported that he was not personally aware of the discrepancies, and that his dispatcher would know what discrepancies were wrong with the airplane. The owner did state that he "always had maintenance performed in the U.S."

The FAA Master Minimum Equipment List (FAA MMEL) for the accident airplane make and model does not allow dispatching of an airplane with both fuel indicators inoperative, and also does not allow dispatching of the airplane with an inoperative ITT indicator.

METEOROLOGICAL INFORMATION

A surface observation weather report (METAR) taken at the Fort Lauderdale/Hollywood International Airport on the day of the accident at 0153, or approximately 40 minutes before the accident, indicates the wind was from 330 degrees at 4 knots, the visibility was 10 statute miles, scattered clouds existed at 1,800 and 5,000 feet. The temperature and dew point were 25 and 22 degrees Celsius, respectively, and the altimeter setting was 29.93 inches hg.

COMMUNICATIONS

The pilot was last in contact with the Fort Lauderdale/Hollywood International Airport (KFLH) Air Traffic Control Tower. There were no reported communication difficulties.

AIRPORT INFORMATION

The Fort Lauderdale/Hollywood International Airport is equipped with a runway designated 9L/27R, which is a grooved, asphalt runway that is 9,000 feet long and 150 feet wide. The runway was closed immediately following the accident due to damage caused by the on-ground fire and fuel leakage. The damaged portion of the runway was in the process of being repaired when first examined by NTSB at approximately 1847; the runway was re-opened on the day of the accident at approximately 2100 hours.

Examination of runway 9L by NTSB and FAA revealed evidence of runway contact first located at 26 degrees 04.417 minutes North latitude and 080 degrees 09.553 minutes West longitude, or approximately 2,337 feet from the approach end of runway 9L. Skid marks on the runway were continuous from the first touchdown point to the location where the airplane came to rest located at 26 degrees 04.622 minutes North latitude and 080 degrees 09.139 minutes West longitude. The skid mark length based on GPS readings was calculated to be approximately 2,600 feet.

FLIGHT RECORDERS

The airplane was equipped with a Fairchild Weston Systems, Inc., cockpit voice recorder (CVR), model GA100, P/N GA100-0000, S/N 00768. The CVR was retained by NTSB for readout and a summary of the recorded communications was prepared.

WRECKAGE AND IMPACT INFORMATION

According to a maintenance individual who helped recover the airplane, when they arrived on-scene approximately 2.5 hours after the landing, the airplane was resting on the fuselage bottom and the nose landing gear doors were tightly closed and the inboard left and right main landing gear doors were open approximately 1 inch. All landing gears were inside the wheel wells. The landing gear selector handle was in the "down" position, and the emergency hand pump handle was stowed. When electrical power was applied, he confirmed the landing gear indicator lights as reported by the PIC. The airplane was raised from the runway and the landing gears began extending automatically. He pumped the landing gear emergency pump 3 times and the gears went into the down and locked position. The landing gears were then pinned and the airplane was towed to the ramp.

Examination of the airplane by NTSB following recovery revealed the aft portion of both nose landing gear doors exhibited longitudinal scraping; there was no scraping damage to the main landing gear doors. Scraping damage to the bottom of the fuselage was noted from approximately fuselage station (FS) 283.1, to approximately 16 inches aft of FS 374.55. Additionally, scraping damage was noted to "Beam No. 1." Soot was noted in the area of both main landing gears, on the exterior surface of the lower skin of the right wing forward and aft of the main landing gear, and on the outboard gear door of the right main landing gear. Fire damage was noted to the fairings of both main landing gears located forward of the inboard gear doors. The fluid level in the front hydraulic reservoir was within 1 inch from the top of the sight tube, while the fluid level in the rear reservoir was noted to be at the full mark with 3 accumulators. Fresh hydraulic fluid was noted on the exterior skin surface adjacent to the No. 2 engine nacelle. Both wing flaps were symmetrically extended 45 degrees. Examination of the cockpit following recovery revealed the landing gear selector handle was in the down position, and no circuit breakers were tripped or popped. A small sized "crew manual" for the "125 Series 700B" was found in the cockpit, and a large sized "crew manual" for the "Hawker Siddeley H.S. 125 Series 700A FAA Approved Airplane Flight Manual" was found in a cabinet located in the cabin. The "Aircraft Flight Log" book, which was located resting on the center pedestal in the cockpit depicted the accident flight duration as 3 hours.

The airplane was then placed on jacks for further evaluation of the landing gear. An electrically operated pump was installed onto the right engine to supply hydraulic pressure in order to operate the landing gear, and an external power supply was connected to supply electrical power to the airplane. The aircraft's battery was turned on and green down and locked lights for the nose and both main landing gears were illuminated; all landing gears were down and locked at that time. The auxiliary pump supplied hydraulic pressure to the airplane's hydraulic system at 3,000 psi and no hydraulic leakage was noted. The landing gear was then retracted using the normal system, and all landing gears retracted and all landing gear doors closed satisfactory. With electrical power applied to the airplane, the landing gear retracted, and both thrust levers at flight idle, no gear warning horn was heard. The landing gear selector was then placed in the down position and all gears went into the down and locked position and the gear doors closed with no discrepancies noted. The gear selector was then placed in the gear-up position and all landing gears retracted and the gear doors closed with no discrepancies noted. The landing gears were then extended using the emergency hand pump and all gears went into

the down and locked position. The warning horn utilized in the landing gear audible warning system was then powered by an external power source and the horn was determined to be functional. Trouble shooting of the circuit for the inoperative landing gear audible warning system revealed a separated wire at a relay identified as "CA", which is located behind panel "F22", which is behind the co-pilot's seat. The separated electrical wire was identified as "CA8." The separated electrical wire was then positioned at the appropriate position on the relay and with the thrust levers at flight idle, the landing gear retracted, and the flap selector placed to the 45 degree position, the warning horn operated satisfactory. During testing, the main and nose gear standby indicators correctly indicated the position of each respective landing gear. In addition each landing gear annunciator light above the landing gear selector handle correctly indicated each respective landing gear position during the functional testing of the landing gear. The "CA" relay was retained for further examination.

Examination of the "CA" relay was performed at the NTSB Materials Laboratory located in Washington, D.C. The result of the examination revealed one terminal was fractured. A wire labeled "68CA8" remained attached to the fractured end of the terminal. Another wire was fractured where it intersected the solder bead on the fractured terminal, and several strands of the "68CA8" wire were fractured near the terminal. Examination of the terminal fracture surface revealed a "...mix of smooth features and elongated dimples consistent with overstress shear fracture." No evidence of preexisting fracture such as fatigue was noted. One of the other terminals on the relay was fractured in the laboratory and both fracture surfaces were similar.

TESTS AND RESEARCH

Operational testing of the landing gear, flaps, and landing gear warning horn is performed during an inspection identified as "C12", which is required to be performed every 1,200 hours. The procedure requires the airplane to be on jacks, ground electrical power applied to the airplane, and an external source providing hydraulic pressure to the airplane's hydraulic system. The "F22" panel area is inspected during an F6 inspection, which is performed every 24 months. The "CA" relay is located behind the "F22" panel.

A review of the airplane maintenance records revealed the last "C12" and "F6" inspections occurred on March 10, 2006. The airplane total time and landings at the time of the last C12 and F6 inspections were 10,127.9, and 6,341, respectively. At the time of the accident, the airplane had accumulated 60.0 hours and 43 landings since the last "C12" and "F6" inspections. Further review of the maintenance records revealed no entry indicating removal, repair, or replacement of the "CA" relay, or wiring to or at the "CA" relay.

As previously reported by the pilot-in-command, prior to landing he noticed a green light indicating the left main was down and locked, but noticed red lights for the nose and right main landing gears. This was later confirmed by one of the passenger's after the airplane came to rest, and also by the mechanic who helped recover the airplane. NTSB review of the small sized crew manual found in the cockpit revealed the emergency procedures for "Landing Gear Three Greens Not Indicated" indicates the circuit breakers for the warning horn, and ground proximity warning system (GPWS) if installed are to be pulled. If all gears do not indicate

locked down by the standby indicators, then the emergency hand pump is utilized in an attempt to lower the landing gear(s). The captain did not attempt to extend the landing gear using the emergency hand pump. According to the system description found in the airplane flight manual, "With the aircraft on the ground a selector lever out-of-position indication is given by three green annunciators and three red annunciators being illuminated."

Immediately following the accident, the flightcrew removed the airplane's checklist. NTSB review of a copy of the checklist revealed it was a training checklist from Flight Safety International. One of the items on the before landing checklist pertaining to the landing gear indicates "Down, 3 Green." The training checklist also has a section titled "Close In", which indicates that the landing gear is required to be "rechecked."

NTSB review of Service Difficulty Reports (SDR's) for the make and model airplane that cover the period, "Prior to 1995", and "1995 to Present", revealed no entry related to the fractured terminal of the "CA" relay.

The submitted NTSB "Pilot/Operator Aircraft Accident/Incident Report" indicates the "No" block was checked for the question was there mechanical malfunction or failure.

ADDITIONAL INFORMATION

The airplane minus the retained cockpit voice recorder was released to the owner of the airplane on March 1, 2007. Additional items consisting of the maintenance records, and "CA" relay were later retained by the NTSB. The cockpit voice recorder and maintenance records were released to John H. Lewis, of South Aviation, on August 29, 2007. The "CA" relay was released to John Taylor, also of South Aviation, on October 12, 2007.

Pilot Information

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| Certificate: | Commercial | Age: | 47, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | |
| Instrument Rating(s): | None | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | No |
| Medical Certification: | Unknown | Last FAA Medical Exam: | |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | 07/01/2005 |
| Flight Time: | 10112 hours (Total, all aircraft), 1730 hours (Total, this make and model), 10112 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft) | | |

Co-Pilot Information

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| Certificate: | Private | Age: | 22, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Right |
| Other Aircraft Rating(s): | None | Restraint Used: | |
| Instrument Rating(s): | | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | No |
| Medical Certification: | Class 1 Without Waivers/Limitations | Last FAA Medical Exam: | 04/01/2006 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | |
| Flight Time: | | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|--------------------------------------|---------------------------------------|--------------------|
| Aircraft Make: | British Aerospace | Registration: | N232TN |
| Model/Series: | HS 125-700A | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Transport | Serial Number: | 257043 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 12 |
| Date/Type of Last Inspection: | 03/01/2006, Continuous Airworthiness | Certified Max Gross Wt.: | 25500 lbs |
| Time Since Last Inspection: | 60 Hours | Engines: | 2 Turbo Fan |
| Airframe Total Time: | 10187.9 Hours at time of accident | Engine Manufacturer: | Garrett-AiResearch |
| ELT: | Installed, not activated | Engine Model/Series: | TFE 731-3 |
| Registered Owner: | Juventude Ltd. | Rated Power: | 3700 lbs |
| Operator: | Juventude Ltd. | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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|----------------------------------|----------------------------------|---|---------------|
| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Night |
| Observation Facility, Elevation: | KFLL, 9 ft msl | Distance from Accident Site: | |
| Observation Time: | 0153 EST | Direction from Accident Site: | |
| Lowest Cloud Condition: | Scattered / 1800 ft agl | Visibility | 10 Miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | 4 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 330° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.93 inches Hg | Temperature/Dew Point: | 25° C / 22° C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Toluca (MMTO) | Type of Flight Plan Filed: | IFR |
| Destination: | Fort Lauderdale, FL (KFLL) | Type of Clearance: | IFR |
| Departure Time: | 2235 CST | Type of Airspace: | |

Airport Information

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|----------------------|---------------------------------------|---------------------------|-----------|
| Airport: | Fort Lauderdale/Hollywood Intl (KFLL) | Runway Surface Type: | Asphalt |
| Airport Elevation: | 9 ft | Runway Surface Condition: | Dry |
| Runway Used: | 9L | IFR Approach: | None |
| Runway Length/Width: | 9000 ft / 150 ft | VFR Approach/Landing: | Full Stop |

Wreckage and Impact Information

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|---------------------|---------|----------------------|-----------------------|
| Crew Injuries: | 2 None | Aircraft Damage: | Substantial |
| Passenger Injuries: | 10 None | Aircraft Fire: | On-Ground |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 12 None | Latitude, Longitude: | 26.076944, -80.152222 |

Administrative Information

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|-----------------------------------|--|
| Investigator In Charge (IIC): | Timothy W Monville |
| Additional Participating Persons: | Steven J Petrossian; FAA Flight Standards District Office; Fort Lauderdale, FL |
| 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/ . |