Aviation Investigation Final Report

Location:	Jackson, Mississippi	**Accident Number:**	MIA08FA114
Date & Time:	June 5, 2008, 07:07 Local	**Registration:**	N3106W
Aircraft:	Beech BE-58	**Aircraft Damage:**	Substantial
Defining Event:	Explosion (non-impact)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

According to the pilot, during the takeoff roll and while traveling at about 50 knots, he heard an "explosion" and could feel a thud in the rudder pedals. He immediately looked up and saw damage on the left wing with black smoke coming out of a hole in the wing. The pilot stopped the airplane, exited and put out the fire with an onboard fire extinguisher. Examination of the airplane found a thermally damaged hose (vent line), which contained a tight hose clamp and crimped end within the clamp. The separated hose was found lying below the siphon break-bent line interconnect. The position of the clamped and crimped end was consistent with the hose being clamped prior to the break-bent line, which would have allowed the partially connected hose to separate from the break-bent line. The separation of the hose from the break-bent line interconnect would have allowed fuel vapor to accumulate within the wing's open cavities. Additionally, the landing light power wire was separated and the exposed end of the wire exhibited melting, and there was evidence of arcing that existed along the base of the structure (lighting hole) and adjacent interior upper wing skin. This arcing was likely the ignition source for the trapped fuel vapor. The outboard leading edge fuel cell was removed during the investigation and checked for leaks. The fuel cell was pressurized and an air leak was found on the aft side of the fuel cap assembly, at the interior fuel placard mounting rivets. The fuel full placard and rivets were found to be loose when moved by hand. The loose mounting rivets would have also been a source of fuel vapor, which would have contributed to the fuel vapors trapped in the wing. The left wing fuel cells were replaced about 13 months prior to the accident and the airplane's most recent 100-hour inspection was performed about 3 months prior to the accident. For 100-hour inspections, the airplane's maintenance manual contained instructions to examine fuel cells, vent lines, and electrical wiring.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An outboard left wing explosion during takeoff due to the improper fuel cell installation and inadequate subsequent inspections by maintenance personnel.

Findings

Aircraft	Scheduled maint checks - Inadequate inspection
Personnel issues	Installation - Maintenance personnel
Aircraft	Fuel storage - Incorrect service/maintenance

Factual Information

History of Flight

Takeoff-rejected takeoff	Explosion (non-impact) (Defining event)

HISTORY OF FLIGHT

On June 5, 2008, at 0707 central daylight time, a Beech BE-58, N3106W, registered to and operated by Jim Hankins Air Service, Inc., experienced an outboard left wing fire during takeoff roll from the Hawkins Field (HKS), Jackson, Mississippi. An instrument flight rules flight plan was filed for the repositioning flight, operated under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed at the time of the accident. The pilot reported no injuries and the airplane was substantially damaged. The flight was originating at the time of the accident.

According to the pilot, after being cleared for takeoff, he turned on the landing lights and strobes. During the takeoff roll, about 50 knots, he glanced to check the engine gauges just before rotation. He then heard an "explosion" and could feel a thud in the rudder pedals (like he had hit a runway centerline light). He immediately looked up and saw damage on the left wing with black smoke coming out of a hole in the wing. He closed the throttles and started to slow the airplane. As the airplane was slowing down, fire was observed coming out of the wing. The pilot stopped the airplane, exited and put out the fire with an onboard fire extinguisher.

PERSONAL INFORMATION

The pilot, age 26, held a commercial pilot certificate, with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane, issued on September 1, 1998. He also held a certified flight instructor certificate, with ratings for airplane single-engine, airplane multiengine, and instrument airplane. His first-class medical certificate was issued on December 22, 2007, with no restrictions.

AIRCRAFT INFORMATION

The six-seat, low-wing, retractable-gear, twin-engine airplane was manufactured in 1973. It was powered by two Teledyne Continental Motors IO-520-C, 285-horsepower engines, and equipped two-bladed Hartzell Model PHC-J3YF-2UF constant-speed propellers.

A review of the airplane's logbooks revealed that the airplane's left wing fuel cells (all three) were replaced on May 2, 2007, and the right wing fuel cells (all three) were replaced on November 20, 2007. The most recent annual inspection was performed on August 30, 2007, at a total time of 9,814.1 hours. The airplanes most recent 100-hour inspection was performed on

February 25, 2008, at 10,013.3 hours.

METEOROLOGICAL INFORMATION

The 0735 surface weather observation at HKS was: winds 170 degrees at 10 knots, visibility 6 statute miles with haze, ceiling was overcast at 1300 feet, temperature 26 degrees Celsius, dewpoint temperature 22 degrees Celsius, and an altimeter setting of 29.95 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Examination of the airplane found that about 37 inches of the outboard left wing and wing tip remained attached, but exhibited compression buckling and fire damage. The upper wing skin panel, located inboard of the wing tip, was bent upward, which sheared four rivets on four ribs. The flexible hose stand-off, which connected the siphon break check valve to the outboard leading edge cell, was observed without an attached rubber hose or clamp (vent line). All other flexible hoses and hose clamps were secure and attached. A thermally damaged hose (vent line) was observed, which contained a tight hose clamp and crimped end within the clamp. The separated hose was found lying below the siphon break-bent line interconnect. The landing light remained attached by the outboard side of the mounting bracket. The landing light ground and power leads exhibited sooting, and the protective plastic coating was destroyed by fire, leaving the wires exposed. The ground wire remained connected and intact. The landing light power wire was separated and the exposed end of the wire exhibited melting, and there was evidence of arcing that existed along the base of the structure (lighting hole) and adjacent interior upper wing skin.

The left strobe light remained intact and attached to the cannon plug. It exhibited thermal damage and the shield was partially melted. The outboard leading edge fuel cell was removed to facilitate a leak check. The fuel cell was pressurized with a regulated air source and checked for external leaks. An air leak was found on the aft side of the fuel cap assembly, at the interior fuel placard mounting rivets. Upon further examination, the fuel full placard and rivets were found to be loose when moved by hand. No visible fuel leaks or staining was observed around the vents or sump drains of the airplane. The fuel pump or fuel strainer did not exhibit any leaks or staining.

ADDITIONAL INFORMATION

Review of the Hawker Beechcraft Corporation, Baron 55 and 58 Maintenance Manual, Table 601, 100-Hour Inspection, D Wings and Carry Through Structure, item 6, revealed "Fuel Cells and Vents - Inspect fuel cells and vent lines as indicated in 28-10-00, 201..." Further review of the maintenance manual, item 8, revealed "Electrical Wiring and Equipment - Inspect for chafing, damage, security and attachment."

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	26,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	December 22, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 28, 2008
Flight Time:	2525 hours (Total, all aircraft), 900 hours (Total, this make and model), 2387 hours (Pilot In Command, all aircraft), 65 hours (Last 90 days, all aircraft), 32 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3106W
Model/Series:	BE-58	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	TH-408
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	February 25, 2008 100 hour	**Certified Max Gross Wt.:**	5400 lbs
Time Since Last Inspection:	64.2 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	10013.3 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	C91 installed, not activated	**Engine Model/Series:**	IO-520-C
Registered Owner:	Jim Hankins Air Service, Inc.	**Rated Power:**	285 Horsepower
Operator:	Jim Hankins Air Service, Inc.	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	EWKA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dawn
Observation Facility, Elevation:	HKS,341 ft msl	**Distance from Accident Site:**	
Observation Time:	07:35 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	6 miles
Lowest Ceiling:	Overcast / 1300 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	26°C / 22°C
Precipitation and Obscuration:	Light - None - Haze		
Departure Point:	Jackson, MS (HKS)	**Type of Flight Plan Filed:**	IFR
Destination:	Pennsicola, FL (PNS)	**Type of Clearance:**	IFR
Departure Time:	07:07 Local	**Type of Airspace:**	

Airport Information

Airport:	Hawkins Field HKS	**Runway Surface Type:**	Asphalt
Airport Elevation:	341 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	5387 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 None	**Latitude, Longitude:**	32.333889,-90.220001

Administrative Information

Investigator In Charge (IIC):	Wilson, Ralph
Additional Participating Persons:	Jacob Corbett; FAA/FSDO; Jackson, MS Eric Thomas; Hawker Beechcraft Corporation; Wichita, KS
Original Publish Date:	June 11, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68180