



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Moab, UT	<b>Accident Number:</b>	LAX08MA277
<b>Date &amp; Time:</b>	08/22/2008, 1750 MDT	<b>Registration:</b>	N601PC
<b>Aircraft:</b>	BEECH A100	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Collision with terr/obj (non-CFIT)	<b>Injuries:</b>	10 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Executive/Corporate		

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## Analysis

The purpose of the accident flight was to transport medical personnel back to their base of operation in Cedar City, Utah. One witness (a rated pilot) at the departure airport reported seeing nine people exit a passenger van with four plastic file boxes and three silver cases. The accident pilot and his nine passengers boarded the twin-engine turboprop airplane. The witness and another witness (also a rated pilot) heard the airplane take off and indicated that the takeoff sounded normal. About 15 minutes later, one of the witnesses observed smoke in the distance that was later determined to be the accident location.

The airplane impacted hilly terrain about 1.2 miles south of the departure airport, left of and less than 100 feet above the elevation of the takeoff runway. The initial impact occurred on steep, upsloping terrain on the opposite side of a gully. The airplane impacted the rising terrain in a slight right-wing low, but significantly nose-high, attitude close to the slope of the terrain.

There were no witnesses to the accident and no recorded data sources to assist investigators in determining what occurred to induce the accident sequence. The entire flight occurred below the floor of air traffic control radar coverage for the area. The airplane was not equipped with flight recorders, nor was it required to be by the Federal Aviation Administration (FAA). On February 9, 2009, the National Transportation Safety Board (NTSB) issued Safety Recommendation A-09-11, which asked the FAA to require all existing turbine-powered, nonexperimental, nonrestricted-category aircraft that are not equipped with a flight data recorder (FDR) and are operating under 14 Code of Federal Regulations (CFR) Parts 91, 121, or 135 to be retrofitted with a crash-resistant flight recorder system. The crash-resistant flight recorder system should record cockpit audio (if a cockpit voice recorder [CVR] is not installed), a view of the cockpit environment to include as much of the outside view as possible, and parametric data per aircraft and system installation, all to be specified in European Organization for Civil Aviation Equipment (EUROCAE) document ED-155, "Minimum Operational Performance Specification for Lightweight Flight Recorder Systems," when the document is finalized and issued. On April 17, 2009, the FAA responded that it established a proof-of-concept study, which provided valuable information on the potential use of a cockpit image recording system on aircraft that require a digital FDR and/or a CVR and for aircraft

that are currently not required to carry any type of data recording equipment and that the United Kingdom Civil Aviation Authority also accomplished a proof-of-concept study. The FAA further stated that a EUROCAE working group has been developing a minimum operational performance specification for lightweight recording systems that can be installed on unequipped aircraft, and the working group intended to publish a document in June 2009 that will provide performance considerations for lightweight aircraft data recording systems, cockpit audio recording systems, aircraft image recording systems, and data link recording systems. The FAA indicated that it will conduct a comprehensive review of the document and consider developing a technical standard order (TSO). In addition, the FAA stated that manufacturers from the general aviation community have been discussing current flight data management technology and developing such systems.

On August 27, 2009, the NTSB responded that it is aware of the FAA's participation in two proof-of-concept studies and that the published findings for those studies have provided valuable information. The NTSB acknowledged the FAA's involvement with the EUROCAE working group and noted that ED-155 was approved and published by EUROCAE in August 2009; however, the FAA must still develop a TSO. Safety Recommendation A-09-11 was classified "Open—Acceptable Response," pending the FAA's issuance of a TSO that includes the specifications of ED-155.

Although the airplane was substantially damaged in the postcrash fire, investigators established flight control continuity with the surviving airframe and components found at the accident scene. All major airplane components were identified in the debris field, indicating that an in-flight structural failure had not occurred. Inspection and disassembly of the engines revealed no evidence of mechanical malfunctions. Propeller signatures were consistent with a high power level being symmetrically delivered by both engines at the time of impact. The ground scars and the 284-foot-long debris field were consistent with a groundspeed slightly above the aerodynamic stall speed of 89 knots and indicate that the airplane was under control at the time of the accident. The investigation did not identify any evidence of poor maintenance or operations.

According to the performance charts in the Beech A100 King Air Pilot's Operating Manual (POM), the maximum allowed takeoff weight of the accident airplane for the environmental conditions on the day of the accident (a hot day and high altitude) was 10,500 pounds. However, calculations determined that the weight of the airplane was 10,842.5 pounds at the time of the accident. While the airplane was 342.5 pounds over the maximum allowed takeoff weight to guarantee single-engine rate of climb capabilities, it was not over the maximum gross takeoff weight of 11,500 pounds. The aircraft performance study found that with both engines and propellers operating, the airplane was capable of taking off, climbing to, and maintaining a safe altitude at its weight of 10,842.5 pounds. Based on the POM, the pilot would have expected an adequate airplane performance margin given the environmental conditions on the day of the accident.

The direction of the wreckage dispersal indicates that the airplane's energy path was on a heading of 144 degrees at the time the airplane impacted the terrain. If the pilot had intended to take a direct course to Cedar City, he likely would have made a right turn to a course of 235 degrees after takeoff from runway 21. However, the wreckage and energy path of the airplane were to the left of the runway centerline, indicating that shortly after takeoff, the pilot made a

left turn. Two possible scenarios were considered to account for the wreckage location being significantly south of the direct course to the intended destination. First, the pilot could have been making a left turn back to the airport. The other possibility is that the pilot was flying the airplane south to avoid an area of restricted airspace, R-6413, located 6 miles to the west of Canyonlands Field Airport.

The accident pilot was properly trained, was current, and held the appropriate certificates for the activities in which he was engaged as a commercial pilot for the operator. A review of FAA medical records and interviews with the pilot's spouse revealed no preexisting medical conditions. However, the pilot's autopsy noted severe coronary artery disease, with the near complete occlusion of one coronary artery. Due to the extent of the pilot's thermal injuries, it was not possible to determine if a cardiac event or other debilitating condition had occurred during the brief accident flight. Several witnesses at the departure airport on the day of the accident who saw or interacted with the accident pilot reported that he appeared to be in a good mood, was very willing to engage in conversation, and did not display any indications of physical ailments. In addition, a low level of carboxyhemoglobin was detected in the pilot's blood toxicology sample, which is consistent with the pilot briefly surviving the impact sequence long enough to have been exposed to the products of combustion from the postcrash fire.

The accident airplane was operated under 14 CFR Part 91, Subpart F, and under National Business Aircraft Association (NBAA) exemption 7879B, as approved by the FAA, in accordance with a time-share agreement between Leavitt Group Wings, LLC, and Southwest Skin and Cancer, LLC. The medical personnel who were killed in the accident were employed by Southwest Skin and Cancer, while the pilot was employed by Leavitt Group Wings. According to representatives of Leavitt Group Wings, Southwest Skin and Cancer personnel traveled to satellite clinics monthly to provide care to residents in those areas. NBAA exemption 7879B allowed the airplane to be operated, maintained, and inspected in accordance with 14 CFR Part 91 instead of the more stringent requirements of 14 CFR Part 135 that govern air taxi flights. Title 14 CFR 91.501(b)(6) permits the carriage of company officials, employees, and guests of a company under a time-share agreement in which a person leases an airplane with a flight crew to another person without charge except for the expenses listed in 91.501(d), which include fuel, crew travel expenses, landing fees, and insurance for that flight. According to the FAA, the time-share agreement between Leavitt Group Wings and Southwest Skin and Cancer "appears to comply with the provisions of [14 CFR] 91.501."

Because Leavitt Group Wings operated the airplane entirely under the provisions of 14 CFR Part 91, the FAA's local flight standards district office did not have a surveillance work program (per FAA Order 1800.56J, "National Flight Standards Work Program Guidelines," Appendix A) that included oversight activities related to Leavitt Group Wings, nor was such a program required.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain terrain clearance during takeoff for undetermined reasons.

## Findings

Aircraft	Altitude - Not attained/maintained (Cause)
Environmental issues	Mountainous/hilly terrain - Contributed to outcome

## Factual Information

### HISTORY OF FLIGHT

On August 22, 2008, about 1750 mountain daylight time, a Beech A100 (King Air), N601PC, impacted hilly terrain about 1.2 miles south of the Canyonlands Field Airport (CNY), Moab, Utah, shortly after takeoff. The Leavitt Group Wings, LLC., owned and operated the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certificated commercial pilot and nine passengers were killed. The airplane was substantially damaged during the impact sequence and post crash fire. Visual meteorological conditions prevailed for the cross-country flight that was destined for Cedar City Regional Airport (CDC), Cedar City, Utah. No flight plan had been filed.

According to a representative from the Leavitt Group Wings, LLC., Southwest Skin and Cancer LLC., leased the airplane under a timeshare agreement with the Leavitt Group Wings, LLC. Once a month, Southwest Skin and Cancer medical personnel would travel to the company's satellite clinics and provide care to residents in the area. The trips were normally a day in length, with an early morning departure from Cedar City. Medical personnel would work all day at one of the satellite clinics and then return to Cedar City in the evening.

### Witness Information

There were no known witnesses to the accident sequence. Two pilots were at the airport, awaiting the arrival of their passenger. One pilot remained indoors in the lounge area, while the other pilot was outside of the terminal. Both pilots recalled seeing the pilot. The pilot waiting in the lounge spoke briefly to the accident pilot about flying, but did not hear the engines start up or hear the airplane depart. The pilot outside of the terminal heard the engines start up, as well as heard the airplane depart.

Both pilots reported also seeing passengers arrive at the airport. The pilot outside of the terminal was talking on the telephone when he saw a passenger van arrive at the airport. He observed 9 people exit the van with 4 plastic file boxes and 3 silver cases. The pilot did not observe the passengers board the airplane, but was outside when the engines were started. He stated that it was too loud to continue his telephone conversation so he returned to the airport lobby. The witness stated that there were no unusual sounds emanating from the engines. About 15 minutes later, the pilot that had been on the telephone went outside and observed smoke in the distance.

Several people at the airport on the day of the accident reported either seeing or interacting with the accident pilot. They all reported that he was in what appeared to be a good mood, very willing to chat, and did not display any indications of having any physical ailments.

### PERSONNEL INFORMATION

The pilot, age 41, held an Airline Transport Pilot (ATP) certificate with airplane single and multi-engine land ratings. The ATP certificate was issued on July 31, 2008. The pilot also held a flight instructor certificate with ratings for airplane single-engine land and instrument airplane. The pilot had recently received a type rating for the Eclipse EA-500S.

An examination of the pilot's logbook revealed that he had accumulated 1,817.5 hours of flight time as of August 15, 2008. Of that total time, 855.8-hours were in multi-engine airplanes and 698.1 hours were in turboprop airplanes. The pilot had flown 38.4 hours in the preceding 30

days before the accident; 32.8 hours were in the Eclipse EA-500S.

The pilot had completed his Beech C-90/A100 Beech (King Air) initial training on October 21, 2005, and his most recent recurrent training in the King Air was completed on September 30, 2007. Both his initial training and recurrent training were performed at the Recurrent Training Center, Savoy, Illinois.

On June 13, 2008, the pilot completed Eclipse Aviation Upset Recovery Training, which consisted of two flights (1.4 hours) in an L-39C Albatross. From August 2 to August 15, 2008, the pilot accumulated 32.8 hours in the Eclipse 500 while participating in Eclipse Factory Training, which included flying with an Eclipse mentor pilot.

The accident pilot was first hired by Leavitt Group Wings, LLC., on October 10, 2005. On August 31, 2006, he left the company to fly for Sky West Airlines; however, after a few months he was furloughed. On November 6, 2006, he was rehired at Leavitt Group Wings, LLC. The pilot held two positions with the Leavitt Group; he was a corporate pilot with Leavitt Group Wings, LLC., and an information technology (IT) specialist with the Leavitt Group.

#### 72-hour History

According to the pilot's spouse, on August 19, he flew from Cedar City, Utah, to Santa Monica, California, with three other Leavitt Group Wings, LLC, members. While in Santa Monica the pilot worked in his IT capacity at Pridemark-Everest, a Leavitt Group insurance agency, in Santa Ana, California. He returned to Cedar City on the evening of August 20, arriving home between 1900 and 2000, and going to bed at his normal bed time of 2200.

On August 21, he worked a normal day in his IT capacity, and did not fly. According to his wife, his normal routine was to provide a light breakfast for the passengers he was flying, and he therefore spent the evening of August 21 preparing food for the next day's early morning flight. He went to bed between 2200 and 2300. On August 22, the morning of the accident, he left the house by 0615. Around 1630 the pilot called his wife saying that they were getting ready to leave Moab, and that he expected to be home between 1900 and 1930. His wife stated that he appeared to be in a good mood during the conversation, and that he did not mention any physical ailments.

According to the Leavitt Group Wings, LLC. records, while performing maintenance on their cellular phone system, the account belonging to the pilot was identified. The company provided the Safety Board with the last contact their system had with the pilot's cellular phone, which was on August 22, 2008, at 1745:23.

#### Right Front Seat Passenger

The individual occupying the copilot's seat (front right seat) was a 60-year-old medical doctor employed by Southwest Skin Cancer Group. A search of the Federal Aviation Administration (FAA) database did not reveal any records associated with the passenger. Family members reported that he had some interest in aviation but had never been trained to operate an aircraft or other similar aspects of flight.

#### AIRCRAFT INFORMATION

The airplane was a 1975 Beech A100, serial number B-225. The airplane was maintained and inspected in accordance with 14 CFR Part 91.409(f) (3). The operator utilized the Raytheon Aircraft Beech King Air 100 Series Scheduled inspection Program, as per Beech King Air

Maintenance Manual 5-00-00/5-20-00. A review of the airplane's logbooks revealed that the last inspection, a Phase II inspection, had been performed on July 18, 2008. As of that date, the airframe total time was 9,263.3 hours, with 8,674 total cycles, and the Hobbs meter reading of 1,512.4 hours.

The twin-engine airplane was equipped with Walter Engine Incorporated turboprop engines, which were installed on the airframe on May 31, 2005, in accordance with the Walter engines supplemental type certificate (STC) SA02036CH. The engines were maintained in accordance with the Walter Engine Maintenance Manual 0982302. Both engines had the same part number 100-590038-17. The left engine had a serial number of 044022, and the right engine serial number was 051001. Both engines' total time since new was recorded as 879.1 hours at the last phase inspection dated July 18, 2008.

The engine manufacturer has a 300-hour inspection maintenance schedule. On October 9, 2007, at 677.4 hours, the left engine fuel control was repaired. On July 18, 2008, at 879.1 hours, the right engine fuel control was repaired. Additional 300-hour inspections took place on August 30, 2005, at 82.1 hours; June 1, 2006, at 287.6 hours, and March 6, 2007, at 497.1 hours.

The airplane was originally certificated with Pratt and Whitney – Canada PT6A-28 turboprop engines, and Hartzell propeller assemblies model HC-B4TN-3A. The Walter M601E-11A engines and AVIA Letnany propeller assemblies were installed in accordance with STC SA02036CH. The Walter STC package, pertaining to the performance data of the Walter engine and AVIA propeller, submitted to and approved by the FAA, indicated that the airplane performance was 'equal to or better than' the engine and propeller combination that was originally certified for the airplane.

As part of the STC AVIA Letnany zero-time since overhaul propellers were installed on the engines, and were maintained in accordance with the AVIA Propeller Maintenance Manual.

The left propeller, which replaced the propeller originally installed at the time of the STC conversion after the original propeller struck a deer during takeoff, was a model V 510 /90 A/B, serial number 14 068 1156. The total time in service was 3,647.58 hours prior to its zero-time overhaul. The propeller was the only part of the airplane that came into contact with the deer. After installing the new propeller, Honest Air performed the inspection items listed on the Walter Maintenance Manual 300-hour inspection checklist.

The left propeller assembly had a hub gasket resealed on July 18, 2008, and 797.0 hours had been accrued since it had been overhauled.

The right propeller assembly model number was V 510 /90 A/B, serial number 12 068 1105 with a total time in service of 6,000.00 hours prior to its zero-time overhaul.

#### Cockpit Voice Recorder

The airplane was manufactured in 1975 and was not equipped with a cockpit voice recorder, nor was one required for operation under 14 CFR Part 91.609 (Flight Data Recorders and Cockpit Voice Recorders). Part 91.609 (c) (1) states in part that, "no person may operate a U.S. civil registered, multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration, excluding any pilot seats of 10 or more that has been manufactured after October 11, 1991, unless it is equipped with one or more approved flight recorders...."

#### Fueling Information

Fueling records from Redtail Aviation, a fixed based operator (FBO) at Canyonlands Airport, established that the airplane was last fueled on the day of the accident with the addition of 80 gallons of Jet-A fuel.

#### METEOROLOGICAL INFORMATION

A staff meteorologist for the Safety Board prepared a factual report, which is in the docket for this accident.

Canyonlands Field Airport (CNY), Moab, Utah, had an automated surface observation system (ASOS), which was 1.2 nautical miles (nm) south of the accident site. The elevation of the weather observation station was 4,555 feet mean sea level (msl).

The aviation routine weather report (METAR) issued at 1653, reported wind from 220 degrees at 7 knots, with variable wind from 180 degrees to 240 degrees; visibility 10 miles; sky clear; temperature 36 degrees Celsius (96 degrees Fahrenheit - F); dew point minus 04 degrees Celsius (25 degrees F); altimeter 29.94 inches of Mercury (Hg).

The METAR issued at 1753 reported variable wind at 4 knots; visibility 10 miles; sky clear; temperature 36 degrees Celsius; dew point minus 04 degrees Celsius; altimeter 29.93 inches of Mercury.

The National Weather Service radar summary chart for 1619 showed no weather echoes over Utah. At the time of the 1753 observation with a temperature of 96 degrees F, dew point of 25 degrees F, a relative humidity of 8 percent, and a station pressure of 25.31 in Hg, the resulting density altitude was 7,980 feet.

According to the upper air data information, there were no strong directional or speed shears identified below 18,000 feet that would suggest any significant turbulence, other than thermally related.

Geostationary Operations Environmental Satellite number 12 (GOES-12) data showed clear skies over the Moab area surrounding the time of the accident.

#### AIDS TO NAVIGATION

The FAA reported that in the area of the accident site, the radar floor was about 5,400 feet mean sea level (msl), with a radar ceiling for the geographical area of about 60,000 feet.

The National Transportation Safety Board investigator-in-charge (IIC) reviewed recorded radar data for the area. There were no radar returns noted in the airport vicinity at the time of the accident.

#### COMMUNICATIONS

The airport was unattended at the time of the accident and had no one monitoring the common traffic advisory frequency (CTAF). At the time of the accident, the accident pilot was also not in contact with either a Terminal Radar Approach Control (TRACON) or Air Route Traffic Control Center (ARTCC) Center.

#### AERODROME INFORMATION

The Airport/ Facility Directory, Southwest U. S., indicated that runway 21 at Canyonlands Field was 7,100 feet long and 75 feet wide, at an elevation of 4,557 feet. The runway surface was constructed of asphalt. It also showed that the airport was non-towered.

## WRECKAGE AND IMPACT INFORMATION

The airplane impacted on the upslope side of hilly terrain in a right wing low, nose-high attitude about 1.2 miles southeast of the airport. The site elevation was approximately 4,632 feet mean sea level (msl).

The measured debris path was approximately 284 feet in length on a magnetic heading of 144 degrees. The first identified point of contact (FIPC) with terrain was from the right wing, with a propeller blade from the right engine propeller assembly located in the debris field near the initial impact point.

About 44 feet from the FIPC centerline were two ground impressions that were about 15 feet apart. The debris path continued upslope and along a flat ridge of a hill before cresting over the hill and coming to rest upright about 100 feet below the flat ridge, on the down-slope side along a magnetic heading of 210 degrees. Investigators estimated the terrain angle to be about 35 to 45 degrees. The airplane was mostly consumed by the post-impact fire (reference Hawker Beechcraft report that is in the docket for this accident).

Remains of the left and right wings, the fuselage, the horizontal stabilizer, elevators, the vertical stabilizer, and the rudder were located in the main wreckage. The left wing and engine were located to the right, and forward of the fuselage. The left propeller assembly had separated from the shaft flange and was adjacent to the left engine.

The right engine and propeller assembly remained attached to each other, but had separated from the right wing center section. The right engine/propeller assembly was located to the left of the fuselage. The right wing was located underneath the main wreckage.

Both engines' propeller blades exhibited leading edge gouging, chord-wise scratching, and S-bending.

## MEDICAL AND PATHOLOGICAL INFORMATION

The State of Utah, Department of Health - Office of the Medical Examiner, completed an autopsy on the pilot on August 24, 2008. The autopsy listed the cause of death as blunt force and conflagration injuries as a result of an airplane crash. The medical examiner noted that there was no definitive soot identified in the upper airway. It was further noted that the right coronary artery had a large eccentrically located yellow atheromatous plaque and a pinpoint lumen producing greater than 90-percent occlusion of the vascular lumen. The left anterior descending coronary artery was also found to be 60- to 70-percent occluded.

The FAA Forensic Toxicology Research Team, Oklahoma City, Oklahoma, performed toxicological testing of specimens from the pilot. Analysis of the specimens contained no findings for carbon monoxide, cyanide, or volatiles. The report contained the following findings for tested drugs; ephedrine detected in the liver, naproxen detected in the liver, and pseudoephedrine detected in the liver.

The pilot's spouse was interviewed by Safety Board investigators as part of the 72-hour background check and to obtain medical information. She reported that there was no known family history of heart disease and up until a month prior to the accident, the pilot had played racquetball at least three times a week without any unusual symptoms. The spouse also reported that the pilot had ceased his exercise regime due to intensive airplane training that he

was receiving. She also reported that he occasionally used a pseudoephedrine for allergies, but was unaware of any other use of medications or nutritional supplements. A review of FAA medical records by Safety Board investigators indicated that the pilot was a non-smoker.

## FIRE

According to the Grand County Sheriff's Department, a 911 call was received by dispatch reporting a brush fire. When first responders arrived on scene they confirmed a downed airplane and fire. Park Rangers from the Bureau of Land Management (BLM) also responded to the accident site, and were able to extinguish the fire.

## TESTS AND RESEARCH

### Airframe

While on-scene, investigators established flight control continuity from the cockpit to the rudder, rudder trim and elevators, as well as from the left aileron to the left wing root.

The left wing flight control cables had separated and the separation points were broomstrawed. The control cables for the right aileron were underneath the main wreckage and severely fire damaged. As a result of the damage to the right aileron, flight continuity could not be established. The separated ends of the right control cables also showed evidence of broomstrawing.

Remains of the right flap and aileron were located in the main wreckage. No evidence of an in-flight structural failure was found (reference Hawker Beechcraft report that is in the docket for this accident).

### Engines and Propellers

The engines and propeller assemblies were shipped to the Walter Engine Facility in the Czech Republic for further inspection.

### Left Engine

The examination of the engine revealed that the case was deformed toward the right and twisted opposite the propeller rotation. The reduction gearbox chip detector had no metal chips. The accessory gearbox chip detector sustained fire damage and the oil filter cartridge contained no metal chips.

The first and second stage compressor blades had slight damage to the leading edge as well as extensive sooting on the blades. Sooting of the vanes and shrouds was also observed on the compressor's first and second stage vanes and shrouds, with no other apparent damage.

Investigators noted no damage to the combustion section. The power turbine blades were embedded in the power turbine shroud. The compressor bleed valve was in the closed position and had sustained fire damage.

### Left Propeller

One of the five propeller blades had broken in the shank area. The remaining blades were all damaged with S-bending and were twisted toward low pitch. Chordwise scratching was evident from the leading to trailing edge of the blades. All of the preloading nuts on the outer bearing rings had sheared. Investigators were able to ascertain that there was no damage to the overspeed limiter, or the cylinder and piston. One pitch change pin block was broken, and

there were no significant marks on the bearing races. The rear plate on the yoke was broken at the number 1 blade position, and all of the back plates on the yoke were bent rearward. Due to the damage to the propeller assembly, investigators were not able to provide an estimate as to pitch blade angle.

#### Right Engine

The examination of the engine revealed that the case was deformed toward the right and twisted opposite the propeller rotation. The propeller speed governor was not attached to the engine, but the manual rotation indicated that the drive rotated freely.

The reduction gearbox chip detector was removed with no metal chips identified; the inner compartment was filled with dirt. The oil filter was removed and no metal chips were identified.

The compressor section was inspected with no damage noted. Extensive sooting on the first and second stage blades, vanes, shrouds, centrifugal impeller and centrifugal impeller shroud was also evident. The combustion section had no apparent damage. Investigators stated that manual rotation was achieved on the gas generator after removal of the power section and accessory gearbox. The tips of the blades showed rubbing, and metal deposits were noted on the gas generator turbine shroud; however, there was no additional damage noted in the turbine section. The power turbine blades were embedded in the power turbine shroud. Investigators noted that the compressor bleed valve was partially open.

#### Right Propeller

The propeller blades were all damaged with S-bending, and chordwise scratching from the leading to trailing edges of the blades. The actual blade angle at impact could not be determined; however, through multiple impact marks found on the front plates of the left hand yokes, an approximate blade angle was calculated to be 16 degrees.

#### Aircraft Performance

A weight and balance for the airplane was calculated utilizing the most current empty weight documented on November 7, 2006, as 7,730.5 pounds (lbs), and a moment of 1,431,433.25 inch-pounds (in-lb).

The operator provided a typical seating arrangement diagram as they had observed the passenger loading on several previous occasions with personnel from Southwest Skin and Cancer. The operator also provided an approximate list of passenger weights, as well as a list of baggage (medical supplies) and associated weight.

Prior to departure, the airplane had been refueled with 80 gallons of Jet-A fuel. Investigators estimated an approximate weight of 1,550 pounds of fuel on board the airplane at the time of the accident. The takeoff performance was calculated based on the estimated weight of the airplane of 10,842 pounds, a moment arm of 2,011,070.0 in-lb, and a center of gravity (cg) moment arm of 185.48 inches.

The aircraft performance section of the pilot operating manual (POM) for the accident airplane showed a maximum gross weight of 11,500 pounds, a maximum forward cg of 186.50 inches, and a maximum aft cg of 191.0 inches. Utilizing the "Maximum Take-Off Weight Permitted by Enroute Climb Requirements Graph" from the A100 approved Pilot's Operating Manual, and given the weather, pressure altitude, a 3-knot headwind, and zero degrees of flaps, the

maximum takeoff weight limit for the accident airplane was 10,500 pounds, which placed the airplane 342 pounds over the calculated weight of the airplane (10,842 pounds).

The calculated climb out was estimated to be 1,300 feet per minute; with a single-engine climb capability of 90 feet per minute. The calculations assume that both engines were running, the landing gear was retracted, and the takeoff climb airspeed was 118 knots.

#### ORGANIZATIONAL AND MANAGEMENT INFORMATION

Leavitt Group Wings, LLC., operated the flight under 14 CFR Part 91 subpart F (Large and Turbine-powered Multiengine Airplanes and Fractional Ownership Program Aircraft), 91.501 (b) (6), (c), and (d). A review of the Time-Share Agreement between the Leavitt Group Wings, LLC., and Southwest Skin and Cancer, LLC., revealed that the contract met the requirements for operation under 91.501 (b) (6), (c), and (d). A Time-Share Agreement contract was signed on February 20, 2007, and was current at the time of the accident.

The airplane was maintained and inspected under 14 CFR Part 91.409 (f) (3), as such; the use of this maintenance/inspection program was permitted by the FAA under exemption 7879B.

The Leavitt Group Wings, LLC., is a member of the National Business Aviation Association (NBAA). Exemption 7879B allows members of the NBAA to operate small civilian airplanes of United States registry under the operating rules of Federal Aviation Regulations (FAR) 91.503 through 91.535. It also allows for the operator to select the inspection program as described in FAR 91.409 (f), subject to certain conditions and limitations.

#### ADDITIONAL INFORMATION

##### Federal Aviation Administration (FAA) Oversight

The Leavitt Group Wings, LLC., was operated entirely under the provisions of 14 Code of Federal Regulations Part 91. As such, the FAA was not required to do any surveillance of the operator, and the operator had only incidental interaction with the FAA. The FAA Salt Lake City Flight Standards District Office (FSDO) did not have a work program (FAA Order 1800.56J, Appendix A) that included oversight activities related to Leavitt Group Wings, LLC., nor was one required.

The FAA's Program Tracking and Reporting Subsystem (PTRS) tracks FAA inspector activities involving an operator, pilot, or aircraft, and records the activities. Ten entries for the accident airplane were entered into the PTRS records. The PTRS entries ranged from aircraft equipment review, aircraft modification approval, routine field approvals, and the issuance of a ferry permit due to a propeller strike. There were no PTRS records associated with the Leavitt Group Wings, LLC., or the pilot.

## History of Flight

Initial climb

Collision with terr/obj (non-CFIT) (Defining event)

## Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Instructor; Commercial	<b>Age:</b>	41, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 Without Waivers/Limitations	<b>Last Medical Exam:</b>	04/10/2008
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	07/31/2008
<b>Flight Time:</b>	1818 hours (Total, all aircraft), 698 hours (Total, this make and model), 38 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	BEECH	<b>Registration:</b>	N601PC
<b>Model/Series:</b>	A100	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	B-225
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	10
<b>Date/Type of Last Inspection:</b>	07/28/2008, AAIP	<b>Certified Max Gross Wt.:</b>	11500 lbs
<b>Time Since Last Inspection:</b>	879 Hours	<b>Engines:</b>	2 Turbo Prop
<b>Airframe Total Time:</b>	9263 Hours	<b>Engine Manufacturer:</b>	Walter Engine Incorporated
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	M601E-11A
<b>Registered Owner:</b>	Leavitt Group Wings LLC	<b>Rated Power:</b>	740 hp
<b>Operator:</b>	Leavitt Group Wings LLC	<b>Air Carrier Operating Certificate:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	CNY, 455 ft msl	Observation Time:	1753 MDT
Distance from Accident Site:	1 Nautical Miles	Direction from Accident Site:	210°
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	36° C / -4° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	4 knots, Variable	Visibility (RVR):	
Altimeter Setting:	29.93 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Moab, UT (CNY)	Type of Flight Plan Filed:	None
Destination:	Cedar City, UT (CDC)	Type of Clearance:	None
Departure Time:	1750 MDT	Type of Airspace:	

## Airport Information

Airport:	Canyonlands Field Airport (CNY)	Runway Surface Type:	
Airport Elevation:	4557 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	9 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	
Total Injuries:	10 Fatal	Latitude, Longitude:	38.729722, -109.766111

## Administrative Information

Investigator In Charge (IIC):	Tealeye Cornejo	Adopted Date:	11/02/2010
Additional Participating Persons:	Tanya Glines; Federal Aviation Administration; Salt Lake City, UT Mike Gibbons; Hawker Beechcraft Corporation; Wichita, KS		
Publish Date:	09/24/2014		
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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.