



National Transportation Safety Board Aviation Accident Final Report

Location:	Groveland, CA	Accident Number:	WPR16LA105
Date & Time:	05/10/2016, 1215 PDT	Registration:	N2052L
Aircraft:	BEECH B24R	Aircraft Damage:	Substantial
Defining Event:	Miscellaneous/other	Injuries:	2 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The passenger, who was a student pilot, recently purchased the airplane in an estate sale. He and the airline transport pilot, both of whom lived in Mississippi, had traveled to California to retrieve the airplane and fly it back to Mississippi. Before the purchase, the airplane had not been maintained, operated, or flown in almost 11 years. Following the purchase, the owner contracted with a mechanic in California to ensure the airplane was in airworthy condition, which the mechanic reportedly did. The day before the accident, the pilot and owner took the airplane for its first flight after its dormant period and flew one uneventful circuit in the airport traffic pattern, as planned. The following day, the pilot and owner planned to fly the airplane for some systems evaluations. During that takeoff attempt from runway 9, the airplane became airborne but failed to climb and struck trees and terrain beyond the runway end. Although the pilot believed that he was taking off into the wind, witness statements and other evidence indicated that the takeoff was attempted with an approximate 5-knot tailwind. The first 1,000 ft of the runway was level, but the remaining 2,000 ft was sloped uphill. Although the Pilot's Operating Handbook specified using 15° flaps for takeoff, and the pilot reported that he used that setting and did not alter the flap position during the flight, the flaps were found to have been fully retracted at impact.

Surveillance camera imagery captured about 2 seconds of the flight, when the airplane was about midfield and 4 ft above ground level (agl). Review of that imagery and audio data indicated that the ground speed was about 68 knots and that the engine speed was about 2,640 rpm; both values were consistent with normal takeoff values. However, the exact winds (and thus airspeed) were unknown, and because the propeller was a constant-speed model, nominal takeoff rpm could be achieved even if the engine was not developing full-rated power.

Detailed examination of the airplane, including the engine, revealed that, although its condition was not in accordance with Federal Aviation Administration and manufacturer guidance, none of the observed deficiencies could have caused or contributed to the loss of climb performance, except for one magneto that was found to be mistimed to the engine by 7°. Evidence suggested that this was likely a result of the accident but that could not be

determined with certainty. Performance calculations conducted by the airplane manufacturer, which accounted for most of the known takeoff conditions, including fully retracted flaps, indicated that the distance to 50 ft agl was slightly more than the available runway. The estimated airplane takeoff weight was about 300 lbs (11%) below the maximum takeoff weight that was used in the calculations, which would yield better performance than the calculated results. However, those calculations did not account for off-nominal values of the many other variables that could adversely affect takeoff performance, including pilot technique, airframe and engine deterioration, and inaccurate or improperly set instrumentation and controls. Thus, although a successful downwind takeoff with no flaps was unlikely, it might have been possible, but there were too many other unknowns to determine its likelihood with greater certainty.

The reason(s) for the retracted flaps could not be determined. It is possible that the pilot forgot to extend them or that they were inadvertently and unknowingly retracted. Given the location of the flap control switch and its design (momentary, paddle-type), it is possible that the pilot extended the flaps to the proper takeoff setting of 15° but that they were subsequently retracted when the nonpilot passenger inadvertently contacted and actuated the flap control. The size and location of the flap position indicator gauge, combined with the location of the flaps (behind the pilot on the low-wing airplane), minimized the possibility that the pilot would notice that they had been retracted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's decision to conduct an upslope, downwind takeoff combined with an improper flap setting, which resulted in the airplane's inability to clear trees beyond the runway end. The reason for the improper flap setting could not be determined.

Findings

Aircraft	Climb rate - Capability exceeded (Cause)
Personnel issues	Decision making/judgment - Pilot (Cause) Use of equip/system - Pilot (Cause)
Environmental issues	Sloped/uneven terrain - Decision related to condition (Cause) Wind - Decision related to condition (Cause)

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Takeoff	Other weather encounter
Initial climb	Collision with terr/obj (non-CFIT)
Takeoff	Miscellaneous/other (Defining event)

On May 10, 2016, about 1215 Pacific daylight time, a Beech B24R Sierra, N2052L, was substantially damaged when it impacted terrain during an attempted departure from Pine Mountain Lake Airport (E45), Groveland, California. The pilot and the passenger/owner received minor injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed.

The passenger, who was a student pilot, recently purchased the airplane in an estate sale. Both the pilot and owner lived in Mississippi, and had traveled to E45 to retrieve the airplane, and fly it back to Mississippi. The airplane was domiciled at E45, and had not been maintained, operated, or flown in over 10 years. Subsequent to his purchase, the new owner contracted with a mechanic at E45 to conduct maintenance on the airplane, in preparation for the flight to Mississippi.

The day prior to the accident, both fuel tanks were filled, and the pilot and owner took the airplane for its first flight after its dormant period. The airplane departed on runway 27, and flew one circuit in the airport traffic pattern, as planned. That flight was uneventful. The next day, the pilot and owner planned to again fly the airplane, this time departing the area for some systems evaluations, before returning to E45. This takeoff attempt, which terminated in the accident, was conducted on runway 9. The pilot reported that the first part of the takeoff roll and liftoff "appeared normal but during or at gear retraction the aircraft started losing power." He stated that with about 1,000 feet of runway remaining, the engine "was not producing enough power to climb or accelerate," and that it was apparent the airplane was not going to clear the trees beyond the runway end. The pilot focused on attempting to climb, while simultaneously avoiding a stall.

The airplane struck trees and a utility pole, and then thick underbrush and the ground. The airplane came to rest about 1,800 feet beyond the end of the runway, at a point slightly north (left) of the extended runway centerline. The fracture-separated outboard right wing was located adjacent to the utility pole, and the engine had separated from the fuselage. The fuselage was slightly crumpled and otherwise deformed, but the cabin retained its normal occupiable volume. There was no fire.

Pilot Information

Certificate:	Airline Transport; Flight Engineer	Age:	82, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Lap Only
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without Waivers/Limitations	Last FAA Medical Exam:	01/07/2015
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	05/27/2015
Flight Time:	(Estimated) 22812 hours (Total, all aircraft), 1 hours (Total, this make and model), 15710 hours (Pilot In Command, all aircraft), 15 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Pilot

The pilot reported that for both flights, he was seated in the left front seat, and was the sole manipulator of the controls. He held an airline transport pilot certificate, and reported about 22,800 total hours of flight experience, including about 4,310 hours in single engine airplanes. Prior to his flight in the airplane the day before the accident, the pilot had no experience in the accident airplane make and model. His most recent flight review was completed in May 2015, and his most recent Federal Aviation Administration (FAA) third-class medical certificate was issued in January 2015.

Owner

The owner was seated in the right front seat for both flights. He reported that he held a student pilot certificate, but had no experience in the accident airplane make and model, and was only an observer on the two flights.

Mechanic

The individual who conducted the maintenance on the airplane for the new owner, and who most recently made entries in, and signed, the airplane maintenance records, resided and had a hangar at E45. He also owned and operated a repair facility, Buchner Aircraft Specialties, at Fresno Chandler Executive Airport (FCH) in Fresno, California. According to FAA records, the individual had previously held a mechanic certificate, with Airframe, Powerplant, and Inspection Authorization (IA) ratings. However, during the period when the mechanic performed the maintenance on the accident airplane and returned it to service, his IA rating was not valid, due to its expiration more than a year prior.

FAA regulations require that IA ratings be renewed biennially, or they become invalid. One renewal method allows the applicant to take approved classes within a specified period near

the end of their biennial period. If an applicant fails to renew in that manner within the designated timeframe, they must take specified FAA tests to re-validate their IA rating.

In March 2015, for undetermined reasons, the mechanic did not renew his IA rating within the designated period. He then attempted to re-validate his IA rating by taking the required FAA tests, but he did not successfully pass them; thus his IA rating remained expired/invalid.

Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	Registration:	N2052L
Model/Series:	B24R	Aircraft Category:	Airplane
Year of Manufacture:	1976	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	MC-437
Landing Gear Type:	Retractable - Tricycle	Seats:	
Date/Type of Last Inspection:	12/22/2005, Annual	Certified Max Gross Wt.:	2750 lbs
Time Since Last Inspection:	1 Hours	Engines:	1 Reciprocating
Airframe Total Time:	1461 Hours as of last inspection	Engine Manufacturer:	LYCOMING
ELT:	Installed	Engine Model/Series:	IO360 SER
Registered Owner:	MOSLEY PEGGY A	Rated Power:	hp
Operator:	On file	Operating Certificate(s) Held:	None

FAA information indicated that the airplane was manufactured in 1976, and was equipped with retractable landing gear, and a Lycoming IO-360-A1B6 series engine. The engine drove a constant-speed, two-blade propeller. The airplane's most recent FAA registration expired in 2011.

Excluding the maintenance conducted just prior to the accident, the most recent annual inspection had been completed in December 2005.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	O22, 2121 ft msl	Distance from Accident Site:	15 Nautical Miles
Observation Time:	1237 PDT	Direction from Accident Site:	315°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	250°	Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	29.96 inches Hg	Temperature/Dew Point:	25° C / 12° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Groveland, CA (E45)	Type of Flight Plan Filed:	None
Destination:	Groveland, CA (E45)	Type of Clearance:	None
Departure Time:	1215 PDT	Type of Airspace:	Class G

E45 was not equipped with any official weather sensing or recording equipment. Resident and eyewitness reports indicated that about the time of the accident, the temperature was about 75 degrees F (23 C), and there was a light wind from the west. An individual who was a flight instructor and FAA-designated pilot examiner estimated that the tailwind component along runway 9 was about 5 knots.

Calculations using the available information indicated that the temperature was about 14 degrees C above the standard atmosphere value ("ISA"), and that the resulting density altitude was 4,686 feet.

Airport Information

Airport:	Pine Mountain Lake (E45)	Runway Surface Type:	Asphalt
Airport Elevation:	2932 ft	Runway Surface Condition:	Dry
Runway Used:	9	IFR Approach:	None
Runway Length/Width:	3624 ft / 50 ft	VFR Approach/Landing:	None

E45 was situated at an elevation of 2,933 feet above mean sea level, and was equipped with a single paved runway designated 9/27, which measured 3,624 ft by 50 ft. The western-most 1,000 ft segment of the runway was relatively level, but then the runway sloped uphill beyond that (towards the east). The slope of that uphill portion was not constant; a maximum up slope of 1.8 per cent was present for the segment between 2,500 and 3,000 ft from the threshold of runway 9. The overall average gradient was 1.1 per cent.

There was a 100 ft gravel overrun at the east end of the runway. Beyond that, the terrain descended about 30 feet, but that region was populated with numerous trees as high as about 100 feet.

Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	37.858889, -120.166667 (est)

FAA inspectors examined the wreckage the day after the accident, before it was recovered. The airplane struck several trees and came to rest upright, in dense undergrowth. The cabin and fuselage remained relatively intact, which afforded protection for the occupants during impact. Both wings sustained significant impact damage, but remained attached to the fuselage. The left wing remained securely attached. The right wing was partially fracture-separated at the wing root, and its outboard end was fracture-separated; it was found at the base of the power pole that was struck about 20 feet agl. The ailerons and flaps remained attached to their respective wings. The right fuel tank was breached, but the left tank was full of fuel. The vertical stabilizer remained securely attached to the aft fuselage, and the rudder remained securely attached to the vertical stabilizer. The stabilator remained securely attached to the aft fuselage, and the pitch trim tab remained securely attached to the stabilator.

The engine was fracture-separated from the airframe, and came to rest inverted, about 10 feet ahead of the airplane. Both blades of the propeller remained securely installed in the propeller hub, and the hub remained attached to the engine.

All components of the airframe were accounted for, and were located in the debris path, or on or near the airplane. A detailed examination of the recovered wreckage was conducted a few weeks after the accident. There was no evidence of any in-flight or post-accident fire. No evidence consistent with any pre-impact malfunctions or failures of any airframe components that would have precluded continued normal operation was observed.

The fuselage had been cut for recovery, but flight control continuity was established for all flight controls. The cockpit stabilator trim tab indicator was observed to be set within the normal takeoff range. The stabilator trim actuator extension measurement was consistent with a stabilator trim tab position of 10° training edge down. However, because the fuselage had been cut and otherwise disturbed for the recovery, these values could not be considered to represent the takeoff pitch trim setting.

Witness marks on both sides of the fuselage, and on the inboard ends of both flaps, indicated

that the flaps were in the retracted position at the time of impact. This was corroborated by flap jackscrew extension and cockpit position indicator information. The cockpit flap control was a momentary paddle-type switch, and the flap position indicator was a circular display with a face diameter of about 1 inch. Both were situated on the right side instrument sub-panel, just to the right of the center-mounted engine control quadrant.

Damage patterns were consistent with the landing gear being near- or fully-retracted at the time of impact; the three landing gear were essentially undamaged. The landing gear control handle was in the UP position.

The airspeed indicator was properly marked; the colored speed arcs were in accordance with the Pilot's Operating Handbook (POH) values.

All three engine control (throttle, mixture, and propeller) push-pull cables had been fracture-separated from their respective engine components, at locations forward of the firewall; all three exhibited continuity from the cockpit control to the fracture locations forward of the firewall.

The fuel boost pump switch was set to the OFF, and the fuel selector valve was set to the right tank. Detailed examination of the airframe fuel system, including operation of the fuel boost pump and internal inspections of all components, did not reveal any indications of any pre-impact anomalies or deficiencies that would have precluded normal operation.

The engine bore no evidence of any pre-impact damage or failures. The engine-driven fuel pump was fracture-separated from the engine. The pump diaphragm was intact, and the engine actuator lever functioned with engine rotation. The fuel flow divider (distribution valve) and the fuel servo internal components were generally clean and intact. All lines and fittings were found to be secure. The spark plugs were new. Manual rotation of the engine resulted in thumb compression at all cylinders, in the proper sequence.

Both magnetos remained securely attached to the engine, but the left magneto bore impact damage. Magneto to engine timing was found to be 20 degrees for the right magneto, and 27 degrees for the left magneto. The Lycoming-specified timing is 20 degrees.

Both magnetos tested satisfactorily to rpm levels above the specified maximum rpm value of 2,700 for that engine/airframe combination. One harness lead exhibited an electrical short; any short would have manifested itself as engine roughness during the pilot's magneto check, but he did not report any such roughness. The cause/source of the short was not determined.

Aside from Airworthiness Directive (AD) 2015-19-07 (see below), the airplane, engine, magnetos, and fuel servo appeared to be in compliance with all applicable ADs.

The condition of the airframe and engine were not consistent with an airplane that had been subjected to a thorough annual inspection, and the requisite maintenance for a return to service. Items that were found to be non-conforming to the complete performance of an Annual or 100 Hour inspection and return to service included:

- Age hardened, deteriorated fuel injector line support clamp cushions, not in compliance with AD 2015-19-07 per Lycoming Service Bulletin 342G
- Uncleaned fuel injector nozzles (evidenced by sooty, partially-obstructed air bleed screens)
- Re-used, un-annealed M-674 spark plug gaskets
- Spark plug 2T found installed finger-tight
- Severely deteriorated internal muffler baffling
- All (except propeller governor) non-metallic flexible fuel and oil pressure hoses were over 40 years old
- Fuel cap external and internal seals age-deteriorated and cracked
- Fuel strainer gaskets age-deteriorated and cracked

Additional Information

Mechanic and Maintenance Record Information

According to the pilot and the owner, a few weeks prior to the accident, the owner had contracted with a mechanic at E45 to conduct an annual inspection on the airplane, and to perform the maintenance necessary to render the airplane airworthy for its return to service. They also reported that subsequent to the maintenance, and prior to the accident flight, the mechanic made airframe and engine logbook entries that indicated that the airplane had been inspected in accordance with an annual inspection, was in airworthy condition, and that the mechanic's signature block denoted that he was an IA. Subsequent to the accident, the mechanic refused to provide the logbooks to the owner. The mechanic claimed that the owner owed him \$6,000 for the maintenance that he had performed, and that he was retaining the logbooks for security until he was paid.

FAA and NTSB attempts to convince the mechanic to release the logbooks to the FAA or NTSB were unsuccessful; again the mechanic stated that he was holding the logbooks as security until he was paid by the owner. The mechanic eventually allowed an FAA inspector to examine and photograph the two most recent entries in each logbook. The FAA inspector, and his photographs, indicated that portions of the original airframe and engine logbook entries by the mechanic had been altered with "whiteout" and overwritten. The revised airframe and engine entry text indicated that the airplane had been inspected in accordance with a "ferry inspection," and the revised mechanic's signature block indicated that he was an "A&P."

"Ferry inspection" is not a term that is defined, referenced, or otherwise recognized by the FAA.

FAA and NTSB conversations with other aircraft owners at E45 revealed that subsequent to March 31, 2015, the mechanic had continued to represent himself as a valid IA holder, and that he had conducted and signed off numerous aircraft as an IA.

Airplane Performance

Takeoff performance distance data (ground roll, and total over 50 ft obstacle) for the airplane were presented in table form in the POH. The performance table values were predicated on the following fixed conditions:

- Gross weight: 2,750 lbs
- Engine/propeller rpm: 2,700
- Engine leaned "to field elevation"
- Flaps: 15°
- Landing gear retracted after lift-off
- Runway: paved, level, dry surface
- Takeoff speeds: lift off, 71mph; 50 ft height, 75 mph

The table provided for variations in the following parameters:

- Headwind (no tailwind accountability)
- Pressure altitude
- Ambient temperature

Because the POH performance data did not account for runway slope, tailwind, or 0° flaps, the manufacturer provided calculated performance estimates that accounted for variations in those parameters for two example cases. The first case used the prescribed takeoff flap setting of 15°, and the second used the actual takeoff setting of 0°. Both cases use the calculated pressure altitude, a 1.1% runway upslope, a 5 knot tailwind, and all other fixed parameter values specified above.

The 15° flap case resulted in an estimated ground roll distance of about 1,900 ft, and an estimated distance to 50 ft agl of about 3,250 ft. The 0° flap case resulted in an estimated ground roll distance of about 2,300 ft, and an estimated distance to 50 ft agl of about 3,700 ft. It should be noted that these results do not represent certificated performance, and should not be construed as such.

The pilot estimated that the airplane actually weighed about 2,460 lbs for the takeoff. Although the POH performance table included a "NOTE" that provided a means to account for weights below 2,750 lbs, there was insufficient data to substantiate application of that correction factor to these two performance cases.

Other factors that can adversely affect takeoff performance, but whose specific values and effects could not be determined for this accident, included:

- Pilot techniques (engine leaning, airspeed, attitude) for the takeoff
- Airspeed indication system accuracy
- Engine, propeller, and airframe deterioration due to age, use, and care
- Engine rpm (tachometer, governor)
- Propeller blade pitch
- Ambient conditions (wind, temperature)

Airport Surveillance Video

There was a fixed-view surveillance camera mounted on a building on the north side of the runway at E45. The image and audio data from the camera was recorded, and the accident

takeoff was captured. The data recording of the takeoff was provided to the investigation for review.

The camera view was oriented perpendicular to the runway, looking south. The camera was situated approximately 2,500 feet along the runway from the west (9) threshold. Its field of view encompassed the runway segment approximately 155 feet to either side, for a total field of view of about 310 feet of the runway. The airplane traversed the image from right to left. The airplane was already fully in the frame at the beginning of the image file. When it first appeared, it was airborne, with its landing gear extended, and the landing gear appeared to be about 2 feet above the runway. When it exited the frame, the gear altitude appears to have increased to about 6 feet. When the airplane was in mid-frame, perpendicular to the camera, the airplane attitude was measured to be approximately 11° nose up. The flaps appeared to be retracted, but the image resolution was insufficient to positively ascertain the flap position.

Analysis by NTSB Recorders Laboratory personnel indicated that the airplane operated at an average ground speed of about 68 kts during the nearly 2 second period that the airplane was visible in the image. During the first 40% of that time, the estimated average speed was about 66 kts, and during the last 60% it was about 70 kts.

A frequency analysis of the audio recording of the engine/propeller was conducted by NTSB Recorders Laboratory personnel. The analysis indicated that the engine speed was 2,640 rpm.

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	Report Date:	09/06/2017
Additional Participating Persons:	Bjorn Beyens; FAA FSDO; Fresno, CA Jonathan Hirsch; Textron Aviation; Wichita, KS		
Publish Date:	09/06/2017		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93152		

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. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).