



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Fullerton, California	Accident Number:	WPR19FA115
Date & Time:	April 18, 2019, 19:51 Local	Registration:	N65MY
Aircraft:	Beech 60	Aircraft Damage:	Destroyed
Defining Event:	Ground handling event	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot began the takeoff roll in visual meteorological conditions. The airplane was airborne about 1,300 ft down the runway, which was about 75% of the normal ground roll distance for the airplane's weight and the takeoff environment. About 2 seconds after rotation, the airplane rolled left. Three seconds later, the airplane had reached an altitude of about 80 ft above ground level and was in a 90° left bank. The nose then dropped as the airplane rolled inverted and struck the ground in a right-wing-low, nose-down attitude. The airplane was destroyed.

Postaccident examination did not reveal any anomalies with the airframe or engines that would have precluded normal operation. The landing gear, flap, and trim positions were appropriate for takeoff and flight control continuity was confirmed. The symmetry of damage between both propeller assemblies indicated that both engines were producing equal and high amounts of power at impact.

The autopsy revealed no natural disease was present that could pose a significant hazard to flight safety.

Review of surveillance video footage from before the accident revealed that the elevator was in the almost full nose-up (or trailing edge up) position during the taxi and the beginning of the takeoff roll. Surveillance footage also showed that the pilot did not perform a preflight inspection of the airplane or control check before the accident flight.

According to the pilot's friend who was also in the hangar, as the accident pilot was pushing the airplane back into his hangar on the night before the accident, he manipulated and locked the elevator in the trailing edge up position to clear an obstacle in the hangar. However, no evidence of an installed elevator control lock was found in the cabin after the accident.

The loss of control during takeoff was likely due to the pilot’s use of an unapproved elevator control lock device. Despite video evidence of the elevator locked in the trailing edge up position before the accident, an examination revealed no evidence of an installed control lock in the cabin. Therefore, during the night before the accident, the pilot likely placed an unapproved object between the elevator balance weight and the trailing edge of the horizontal stabilizer to lock the elevator in the trailing edge up position.

The loss of control was also due to the pilot’s failure to correctly position the elevator before takeoff. The pilot’s friend at the hangar also reported that the pilot was running about one hour late; the night before, he was trying to troubleshoot an electrical issue in the airplane that caused a circuit breaker to keep tripping, which may have become a distraction to the pilot. The pilot had the opportunity to detect his error in not freeing the elevator both before boarding the airplane and again while in the airplane, either via a control check or detecting an anomalous aft position of the yoke. The pilot directed his attention to the arrival of a motorbike in the hangar alley shortly after he pulled the airplane out of the hangar, which likely distracted the pilot and further delayed his departure. He did not conduct a preflight inspection of the airplane or control check before the accident flight, due either to distraction or time pressure.

Probable Cause and Findings

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

The pilot’s use of an unapproved elevator control lock device, and his failure to remove that device and correctly position the elevator before flight, which resulted in a loss of control during takeoff. Contributing to the accident was his failure to perform a preflight inspection and control check, likely in part because of distractions before boarding and his late departure time.

Findings

Aircraft	Pitch control - Attain/maintain not possible
Aircraft	Parking/storage - Incorrect use/operation
Personnel issues	Attention - Pilot
Personnel issues	Use of checklist - Pilot
Personnel issues	Forgotten action/omission - Pilot
Personnel issues	Preflight inspection - Pilot

Factual Information

History of Flight

Prior to flight	Ground handling event (Defining event)
Takeoff	Miscellaneous/other
Initial climb	Loss of control in flight

On April 18, 2019, about 1951 Pacific daylight time, a Beech B60, N65MY, was destroyed when it was involved in an accident near Fullerton, California. The private pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot’s relatives, he typically flew the accident airplane from Heber City, Utah, to Fullerton on Monday mornings and returned Thursday nights. If the weather was bad, he would take a commercial flight.

The accident sequence was captured by a series of video surveillance cameras located at multiple vantage points on the airport property. Review of the video data revealed that the pilot boarded the airplane at his hangar about 1928. He started the engines and taxied about 500 ft to the runup area at the east end of the airport, where the airplane remained for the next 11 1/2 minutes. During that time, the pilot was provided his instrument flight rules (IFR) clearance by the tower controller. The airplane then taxied to the hold short line on taxiway A at the approach end of runway 24.

After the pilot was given the takeoff clearance, the airplane began the takeoff roll. The airplane was airborne after traveling about 1,300 ft down the runway, and about 2 seconds after rotation, it began to roll to the left. Three seconds later, the airplane had reached an altitude of about 80 ft above ground level and was in a 90° left bank (figure 1). The nose then dropped as the airplane rolled inverted and struck the southern side of taxiway E in a right-wing-low, nose-down attitude.



Figure 1. Composite video surveillance image of takeoff as viewed from the north.

Pilot Information

Certificate:	Private	Age:	48,Male
Airplane Rating(s):	Multi-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:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	February 21, 2019
Occupational Pilot:	No	Last Flight Review or Equivalent:	March 30, 2019
Flight Time:	380.5 hours (Total, all aircraft), 87 hours (Total, this make and model), 38.3 hours (Last 90 days, all aircraft), 26.8 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

The pilot held a private pilot certificate issued in May 2011. He attained his instrument and multiengine ratings in January 2012 and January 2014 respectively. His logbooks indicated 35.6 hours of pilot-in-command night flight experience.

Before the pilot began flying the accident airplane in October 2017, he had 2 hours of flight experience in the airplane type. Of the 101 hours of flight time that he accrued between October 2017 and the accident, 87 hours were flown in the accident airplane.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N65MY
Model/Series:	60 B	Aircraft Category:	Airplane
Year of Manufacture:	1974	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	P-314
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	December 26, 2018 Annual	Certified Max Gross Wt.:	6965 lbs
Time Since Last Inspection:	49.5 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	5419.3 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	TIO-541-E1C4
Registered Owner:		Rated Power:	380 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Dusk
Observation Facility, Elevation:	KFUL, 96 ft msl	Distance from Accident Site:	0.25 Nautical Miles
Observation Time:	19:53 Local	Direction from Accident Site:	180°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.1 inches Hg	Temperature/Dew Point:	19°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fullerton, CA (FUL)	Type of Flight Plan Filed:	IFR
Destination:	Heber, UT (HCR)	Type of Clearance:	IFR
Departure Time:	18:50 Local	Type of Airspace:	Class D

On the day of the accident, sunset occurred in Fullerton at 1825, and clear skies with light wind conditions were forecast for Heber City throughout the evening.

Airport Information

Airport:	Fullerton FUL	Runway Surface Type:	Asphalt
Airport Elevation:	96 ft msl	Runway Surface Condition:	Dry
Runway Used:	24	IFR Approach:	None
Runway Length/Width:	3121 ft / 75 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:		Aircraft Explosion:	On-ground
Total Injuries:	1 Fatal	Latitude, Longitude:	33.871387,-117.98139

An on-site examination showed that the first identified point of impact was located on taxiway E about 100 ft south of the runway 24 centerline. A set of four impact gouges were oriented diagonally across the centerline and spaced about 8 inches apart and matched the approximate dimension of the right propeller blades; a similar set of gouges were on the pavement about 18 ft to the southwest. Fragmented sections of the outboard right wing were distributed around the impact point and on the adjacent runway surface.

The main wreckage came to rest on taxiway A, about 100 ft beyond the second set of gouges. The main wreckage was comprised of the pressurized section of the cabin, both engines, the left wing, and the tail section, all of which sustained extensive thermal damage. The entire tail structure aft of the pressure bulkhead was thermally consumed, and only ash remnants of the vertical and horizontal stabilizer and flight control surfaces remained. The landing gear actuator was fully extended. Although the left flap actuator was partially consumed, the right flap actuator displayed an extension which corresponded with the flaps set to about 10°. Examination of video footage also confirmed that the flaps were extended as the airplane taxied onto the runway and that the landing gear was in the down position at the time of impact.

The cockpit instruments and circuit breakers were all fire damaged, which precluded an accurate assessment of their readings and positions. The throttle and propeller engine controls were in the full forward position. The pilot seat, which was equipped with forward and aft seat stops, had detached but did not appear to be positioned close to the aft limits of the seat rails at impact.

There were no tools or foreign objects present in the footwell area enclosing the aileron pulleys and servo. Although the flight control systems sustained varying degrees of impact and thermal

damage, control continuity was confirmed between the cabin controls and the respective control surfaces.

The elevator trim actuator was in a 5° tab down position, and the aileron trim actuator was in a 1° tab up position. Both fuel selector valves were fire damaged but appeared set to the “ON” position.

Most of the right wing’s structure was consumed, exposing the landing gear actuators, engine control cables, and fuel selector valve. The left wing remained attached to the fuselage; its main spar was intact along its full length, and the aft spar and trailing skins were mostly consumed by fire.

On-site examination showed that both propeller hub assemblies had separated from their respective engines at the crankshaft and were located on the grass adjacent to the impact point. Postaccident examination of the propellers revealed that multiple blades of both propellers exhibited similar curl and twist damage opposite the direction of rotation as well as leading edge gouges and scoring. The symmetry of damage between both propeller assemblies was consistent with both engines producing equal amounts of power at impact.

Postaccident engine examination of both engines revealed varying degrees of thermal and impact damage but no evidence of catastrophic internal failure. Drive train continuity was confirmed, and both the fuel and oil filters were free of debris.

Medical and Pathological Information

According to the autopsy performed by the Orange County Sheriff-Coroner, the cause of death was multiple traumatic injuries with a finding of hypertrophic cardiomegaly (enlarged heart), but otherwise no natural disease was present.

Toxicology testing performed at the Federal Aviation Administration Forensic Sciences Laboratory did not identify the presence of any tested-for drugs, ingested alcohol, or carbon monoxide.

Tests and Research

Engine Monitor

The airplane was equipped with a G4 graphic engine monitor that was manufactured by Insight Avionics. It was configured to monitor and record cylinder head temperature (CHT), exhaust gas temperature (EGT), turbine inlet temperature (TIT), and fuel flow information for both engines.

Despite thermal damage to the engine monitor, the NTSB's Vehicle Recorders Division extracted accident flight data from the device.

The data revealed that the EGT, CHT, and TIT values approximately matched between both engines from initial power-up through to the accident. The fuel flow for the right engine varied between about 5 and 15 gallons per hour (gph) for the first 20 minutes, which corresponded roughly from engine start to taxi. For the final 30 seconds of the accident flight, the fuel flow for the right engine increased to about 36 gph. The fuel flow for the left engine remained at 0 gph throughout the entire recording, which was inconsistent with video data and the other recorded engine parameters.

Elevator Positions

The airplane was stored in a hangar on the southeast side of the airport. A friend of the pilot who had an adjacent hangar said he was approached the evening before the accident by the pilot, who explained that one of the landing lights on the accident airplane had failed. They then worked together to replace the light bulb, and during those interactions, the pilot mentioned that one of the airplane's circuit breakers kept tripping. The friend could not recall specifically what circuit breaker the pilot stated was tripping.

After completing the repair, they pulled the airplane out of the hangar, and the accident pilot taxied it to the fuel island. After adding fuel, they taxied to the runup area so the pilot could check the circuit breaker. He performed an engine runup, but it did not trip. The pilot's friend was seated in the back and did not have a clear view of the instrument panel while the pilot was troubleshooting the circuit breaker issue.

As they later pushed the airplane back into the hangar, the accident pilot indicated that the elevator in the trailing edge down position typically would not clear the propeller blade of another airplane in the hangar, which the friend observed. The accident pilot then walked to the back of the airplane and appeared to move the elevator from the trailing edge down position to the trailing edge up position, where it remained, to clear the tip of the blade.

One of the surveillance cameras was positioned above the pilot's hangar and captured the airplane as it was being moved inside that night. Review of the footage revealed that, as the airplane was first being maneuvered, the elevator was hanging at about the 15° trailing edge down position, consistent with the pilot's friend's observation. The following evening, as the pilot pulled the airplane back out of the hangar for the accident flight, the elevator was at about the 15° trailing edge up position such that the elevator balance weight hung below the lower skin of the horizontal stabilizer trailing edge.

The video footage also revealed that shortly after the pilot pulled the airplane out of the hangar, someone arrived at an adjacent hangar and the pilot assisted them with removing a motorbike

from a trailer, talked to several individuals who had arrived, walked toward the restroom, and returned to the hangar, before immediately boarding the airplane. He did not perform a “walk around” inspection at any time after he took the airplane out of the hangar.

Review of video footage throughout the airport revealed that the elevator remained in the same trailing edge up position throughout taxi, in the runup area, and at the runway hold short line.

The video footage on the day of the accident was compared with video footage of the last time the pilot flew the airplane on April 11, 2019. On that day, the elevator was in the trailing edge down position as the airplane was maneuvered out of the hangar and remained in that position while it taxied to the runup area (figures 2 and 3). While in the runup area on April 11, the elevator moved up and down, consistent with the pilot performing a flight control check.



Figure 2 - Composite image of the elevator position outside of the hangar on April 11, 2019 (top) and April 18, 2019 (bottom). (Video timestamp, 07:07 slow)

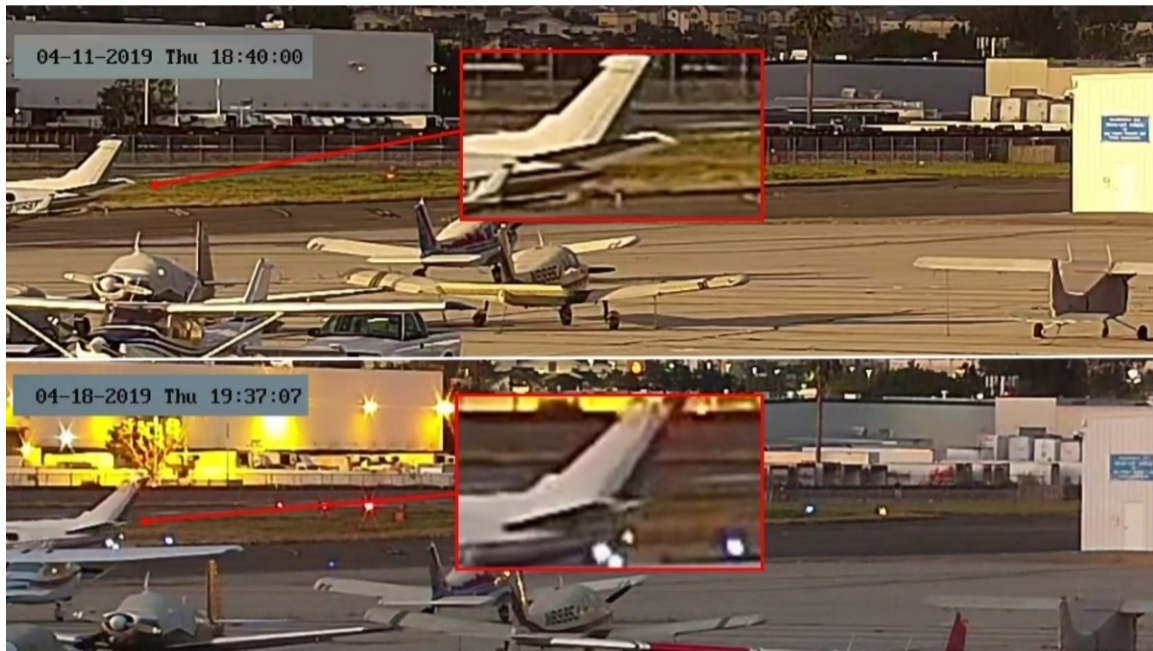


Figure 3 – Composite image of the elevator position after the airplane departed the runup area on April 11 (top) and April 18 (bottom). (Video timestamp, 07:07 slow)

The friend with an adjacent hangar reported that the pilot stated that he was running late on the night of the accident. The accident pilot had initially filed an IFR flight plan for a 1900 departure for the accident flight, but because the weather was better than expected, he was considering flying under visual flight rules with flight following.

Control Lock

Beech B60 airplanes were initially equipped with a control surface lock and throttle assembly (control lock), which was designed to lock both the control yoke and rudder pedals from within the cabin and inhibit use of the engine throttle controls. According to multiple acquaintances of the pilot, the accident airplane did not appear to be equipped with this original control lock. The airplane's previous owner stated that the airplane was not equipped with the original control lock at the time of sale.

Postaccident examination did not reveal evidence of an approved control lock in the airplane, although an incompatible yoke and foot pedal lock assembly for another airplane type was found undamaged in the aft cabin. Examination of the foot pedals and control yoke did not reveal any evidence of the use of any kind of control locking device.

The elevator travel limits were 15° elevator down, and 17° elevator up. The design of the airplane was such that with no elevator control input, the elevators will drop to the full trailing edge down position. Review of historical photos of the accident airplane while sitting on the ramp confirmed this position.

Fairings were utilized on the aft fuselage and empennage of the airplane, such that access to the elevator bellcrank and control assembly was not readily available without disassembly.

Examination of a similarly equipped B60 airplane revealed that, with the control lock installed, the elevator was fixed to about the 5° trailing edge up position, and the leading edge of the elevator balance weight assembly was in line with the lower surface of the trailing edge of the horizontal stabilizer.

Airplane Performance

Wind was variable at 6 knots at the time of the accident, and as discussed, video footage revealed that the airplane became airborne after travelling about 1,300 ft down the runway. Video from the previous flight on April 11 indicated that under similar wind conditions, it became airborne after travelling about 1,900 ft down the runway.

The airplane was equipped with a vortex generator system manufactured by Boundary Layer Research, Inc. The installation resulted in altered maximum gross weight and performance characteristics, which were documented in the airplane flight manual supplement. The normal takeoff chart in the supplement indicated that with an airplane gross weight of 6,250 lbs taking off from a paved sea-level runway with calm wind and a temperature of 20°C, the 50 ft obstacle clearance takeoff distance would be 2,200 ft with a ground roll distance of 1,738 ft.

Administrative Information

Investigator In Charge (IIC):	Simpson, Elliott		
Additional Participating Persons:	Tom Walters; Federal Aviation Administration FSDO; Long Beach, CA Peter Basile; Textron Aviation; Wichita , KS Mark Platt; Lycoming Engines; Williamsport, PA		
Original Publish Date:	July 15, 2021	Investigation Class:	3
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99285		

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