Aviation Investigation Final Report

Location:	Gregory, Michigan	**Accident Number:**	CHI06FA152
Date & Time:	June 8, 2006, 19:15 Local	**Registration:**	N65EL
Aircraft:	Beech B36TC	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane struck trees and terrain during an emergency landing following a reported loss of engine power. The airplane was being flown on its first flight after an annual inspection. A cylinder was replaced, a turbocharger leak was fixed, and the right fuel bladder was removed, repaired, and reinstalled during the annual inspection. The fuel from the removed fuel bladder was recovered, stored, and was returned to the bladder when it was reinstalled. The airplane was also serviced with about 67 gallons of 100 low lead aviation gasoline. The fuel in the airplane's fuel tanks were reported to have been checked by observing samples collected from the fuel sumps prior to the flight. The airplane battery was low and external power was used to start the engine for the flight. A replay of radar data showed the airplane was at 5,000 feet above mean sea level (MSL) and was traveling eastward at about 170 knots groundspeed when it checked on with approach. About 1907, the radar data replay showed the airplane descending to 4,800 feet and its groundspeed slowing to 160 knots. The air traffic controller issued the flight a descent clearance to 3,000 feet MSL. The pilot responded back that he had an emergency, had lost engine power, had switched fuel tanks, and needed the closest airfield. The pilot was given a heading of 360 degrees to an airfield. While en route to the airfield, the pilot was asked if his engine was completely out and if he was gliding into the airport. The pilot reported that was correct. About 1910, the air traffic controller pointed out another closer airport. No further response was received from the airplane. The last recorded radar data was at 1910. The radar showed the airplane was about 2 miles from the closer airport at 2,000 feet MSL and traveling northbound at about 80 knots groundspeed. About 1918, the police department received notification of a downed aircraft. The cabin area of the fuselage, left and right inboard fuel tank sections, and upper forward section of the empennage were destroyed by a post impact fire. An on-scene investigation and follow up examinations revealed no-pre-impact anomalies. The airplane's track was reviewed in reference to satellite images of the area. The airplane had over flown open fields prior to impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The non-mechanical loss of engine power for undetermined reasons during cruise flight and the unsuitable terrain the pilot selected for the forced landing. A factor was the tree that was impacted during the forced landing. An additional factor was the inadequate planned approach during the forced landing when the pilot over flew open fields on the way to the intended airfield.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: CRUISE - NORMAL

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
2. (F) OBJECT - TREE(S)
3. (F) PLANNED APPROACH - INADEQUATE - PILOT IN COMMAND
4. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - SELECTED - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On June 8, 2006, about 1915 eastern daylight time, a Beech B36TC, N65EL, piloted by a private pilot, was substantially damaged on impact with trees and terrain during an emergency landing following a loss of engine power near Richmond Field Airport (69G), Gregory, Michigan. A post impact fire occurred. The personal flight was operating under 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed at the time of the accident. An instrument flight rules (IFR) flight plan was on file and was activated. The pilot sustained fatal injuries. The flight originated from the Kalamazoo/Battle Creek International Airport (AZO), near Kalamazoo, Michigan, about 1843 and was destined for the Willow Run Airport (YIP), near Ypsilanti, Michigan.

The airplane was being flown on its first flight after an annual inspection. A copy of the annual inspection's endorsement showed that a cylinder was replaced, a turbocharger leak was fixed, and the right fuel bladder was removed, repaired, and reinstalled during the annual inspection. The fuel from the removed fuel bladder was recovered, stored, and was returned to the bladder when it was reinstalled. The airplane was also serviced with about 67 gallons of 100 low lead aviation gasoline. The fuel in the airplane's fuel tanks were reported to have been checked by observing samples collected from the fuel sumps prior to the flight. The airplane battery was low and external power was used to start the engine for the flight.

During the flight, the pilot was given a clearance of direct to YIP at about 1905. A replay of Federal Aviation Administration (FAA) radar data showed the airplane was about 35 miles northwest of YIP at 5,000 feet above mean sea level (MSL) and was traveling eastward at about 170 knots groundspeed when the pilot checked in with Detroit approach. About 1907, the radar data replay showed the airplane descending to 4,800 feet and its groundspeed slowing to 160 knots. The air traffic controller issued the flight a descent clearance to 3,000 feet MSL. The pilot responded back that he had an emergency, had lost engine power, had switched fuel tanks, and needed the closest airfield.

The pilot was given a heading of 360 degrees to Carriage Lane Airport, near Gregory, Michigan. While en route to the airfield, the pilot was asked if his engine was completely out and if he was gliding into the airport. The pilot reported that was correct. About 1910, the air traffic controller pointed out another closer airport. The closer airport was 69G. No further response was received from the airplane. The last recorded radar data was at 1910. The radar showed the airplane was about 2 miles from 69G at 1,700 feet MSL and traveling northbound at about 79 knots groundspeed.

About 1918, the Unadilla Township Police Department received notification of a downed

aircraft. The police and fire department responded. Neighbors had attempted to extinguish the fire with water from a creek. The fire department extinguished the ground fire with foam.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with single engine land and instrument airplane ratings. The pilot held a third class medical certificate, which was issued on January 25, 2006. The medical certificate was issued with a limitation for corrective lenses. On the application for that medical certificate the pilot reported that he had accumulated a total time of 950 flight hours.

AIRCRAFT INFORMATION

N65EL, a 1992-model Beech B36TC, serial number EA-535, was a single-engine, low-wing, six-place airplane, which had retractable tricycle landing gear. The annual inspection on the airplane was completed before this flight and the airplane's total time was 1,204.9 hours. The airplane was powered by a turbocharged, fuel-injected, direct drive, air-cooled, six-cylinder, horizontally-opposed Continental TSIO-520-UB (4) engine, serial number 527174, which was rated at 300 horsepower.

The airplane's pilot operating handbook, in part, stated:

> FUEL CELLS
>
> The 108-gallon fuel system consists of two interconnected bladder-type fuel cells located in each wing leading edge. Each wing contains a total of 54 gallons with a usable supply of 51 gallons. Each wing has a flush-type fuel filler cap covering an anti-siphon valve. To fill the tank, the filler cap must be removed and the fuel nozzle inserted into the anti-siphon valve. The tank is full when the fuel level reaches the spring-loaded door of the anti-siphon valve. In addition, each wing has a fuel quantity sight gage. The gage is for partial filling or off-loading of fuel and is to be used only when it reads within the calibrated area of 25 to 35 gallons. Each wing fuel tank system is vented to the atmosphere by an external main vent. If the main vent becomes blocked, pressure and vacuum relief valves operate to relieve pressure or vacuum through the flush alternate vent.
>
> The fuel tank system is a closed system. The vent line shutoff valve, located in a small container outside the main tank, closes to prevent fuel from draining overboard as it expands due to heating. If fuel

tank pressure exceeds a preset value, the pressure relief valve opens, allowing fuel to drain overboard through the flush alternate vent until the tank pressure drops below the relief valve preset level.

METEOROLOGICAL INFORMATION

At 1916, the recorded weather at the Livingston County Spencer J. Hardy Airport, near Howell, Michigan, was: Wind 320 degrees at 9 knots gusting to 14 knots; visibility 10 statute miles; sky condition clear; temperature 25 degrees C; dew point 9 degrees C; altimeter 29.89 inches of mercury.

AIRPORT INFORMATION

The airport elevation at 69G was 921 feet MSL. 69G was an uncontrolled airport with one runway, 18/36. Runway 18/36 was 2,471 feet long and 100 feet wide. That runway's surface was composed of turf.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest upright on about 170 degree magnetic heading near a creek about 2,000 feet from the approach end of runway 36 at 69G. A section of tree trunk and its canopy of leaves from the other side of the creek came to rest on the cabin area of the fuselage. The cabin area of the fuselage, left and right inboard fuel tank sections, and upper forward section of the empennage were destroyed by fire. The leading edge of the outboard section of the right wing exhibited a semicircular depression. The area around the depression was discolored. The tree canopy across the creek that remained upright exhibited fuel blight. The aft section of the engine and the aft section of engine cowl exhibited discoloring and were coated with a substance consistent with soot. Two propeller blades were visible and the third one was impacted in terrain.

An on-scene investigation was conducted. Flight control cables were traced from the flight controls to all flight control surfaces and flight control continuity was established. Engine control cables were traced from the cockpit to the engine and engine control continuity was established. The fuel tank selector was positioned on the left tank. Air pressure was applied and no obstructions were found in the fuel selector valve. The propeller blades exhibited aft bending. The fuel line to the engine driven fuel pump was damaged by fire. The shear shaft on the fuel pump was intact. The fuel pump rotated by hand. The turbocharger impeller and turbine rotated by hand. The wastegate was found in the open position. The engine's top spark plugs were removed and no anomalies were detected. The engine produced a thumb compression at all cylinders when the crankshaft was rotated by hand. The magnetos produced spark at all top sparkplug leads. Oil was found in the engine's oil sump. Liquid was

found in the fuel manifold valve. That liquid was tested for water on-scene and the test did not show any presence of water. The line from the fuel flow transmitter to the fuel manifold valve contained a liquid. That liquid was collected for further examination. The engine and propeller were retained for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

The Livingston County Coroner's Office arranged for an autopsy to be performed on the pilot on June 9, 2006.

The FAA Civil Aeromedical Institute prepared a Final Forensic Toxicology Accident Report. The report stated:

DIPHENHYDRAMINE present in Urine
DIPHENHYDRAMINE NOT detected in Blood

FIRE

A post-impact ground fire occurred.

TESTS AND RESEARCH

The airplane's engine was examined at Teledyne Continental Motors, Mobile, Alabama, on March 12, 2007. The exhaust system exhibited impact crush and deformation. The throttle and metering assembly exhibited damage consistent with heat deformation. A substitute assembly was installed. The fuel pump was bound and its disassembly revealed no pre-impact anomalies. A substitute pump was installed. Ignition harness wires were damaged and were replaced. The induction "Y" pipe was damaged and replaced. The engine ran and no pre-impact anomalies were detected.

The alternator was tested at Teledyne Continental Motors. The alternator was operational during the test.

The airplane's propeller hub and blades were examined at McCauley Propeller Systems, Wichita, Kansas, on April 18, 2007. The propeller hub was intact. The propeller's mounting flange was intact. After the disassembly, the propeller blades' pitch change phenolic links were separated from their pins. Remaining propeller component parts were intact and unremarkable. Witness marks on a blade butt from an adjacent blade-actuating pin were consistent with a propeller blade angle near low pitch. No pre-impact anomalies were detected.

A governor inspection and test run was performed at Aircraft Systems, Inc. in Rockford, Illinois, on June 13, 2006. The governor inspection revealed no anomalies and the governor operated during the test run.

The collected liquid sample from the fuel line to the fuel manifold valve and fuel samples from the fixed base operator at AZO were taken to the Air National Guard unit at Selfridge, Michigan, and the samples were forwarded to the Aerospace Fuels Laboratory at Wright Patterson AFB, Ohio. The laboratory reported that the liquids were consistent with 100 low lead aviation gasoline.

ADDITIONAL INFORMATION

The airplane's track was reviewed in reference to satellite images of the area. The airplane had over flown open fields prior to impact.

The parties to the investigation included the FAA, Teledyne Continental Motors, McCauley Propeller Systems, and the Raytheon Aircraft Company.

The aircraft wreckage was released to a representative of the owner.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
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:**	January 1, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	950 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N65EL
Model/Series:	B36TC	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	EA-535
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 1, 2006 Annual	**Certified Max Gross Wt.:**	3850 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1204.9 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	TSIO-520-UB
Registered Owner:	Jack B. Anglin Co.	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OZW,962 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	19:16 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / 14 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	25°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	KALAMAZOO, MI (AZO)	**Type of Flight Plan Filed:**	IFR
Destination:	Ypsilanti, MI (YIP)	**Type of Clearance:**	IFR
Departure Time:	18:43 Local	**Type of Airspace:**	

Airport Information

Airport:	RICHMOND FIELD 69G	**Runway Surface Type:**	Grass/turf
Airport Elevation:	921 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	3471 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	42.447223,-84.077224

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Marty V Solvberg; Federal Aviation Administration; Belleville, MI Eric Thomas; Teledyne Continental Motors; Mobile, AL Timothy D Rainey; Raytheon Aircraft Company; Wichita, KS Tom Knopp; McCauley Propeller Systems; Wichita, KS
Original Publish Date:	November 29, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63905