Aviation Investigation Final Report

Location:	Uvalde, Texas	**Accident Number:**	CEN18LA213
Date & Time:	June 7, 2018, 10:24 Local	**Registration:**	N3291X
Aircraft:	Beech F33A	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot departed on a cross-country flight, which was the second flight after recent maintenance. The pilot reported that, about 48 minutes into the flight at 8,500 ft mean sea level, the manifold pressure suddenly dropped with a simultaneous engine explosion; oil was on the windshield, and "there was fire everywhere." He reduced the mixture, throttle, and propeller controls. The pilot reported the emergency to air traffic control and received vectors to the closest airstrip, which was about 6 nautical miles south-southeast. He indicated that he had difficulty maintaining glide speed because the nose of the airplane was pitching upward. During the descent, he extended the landing gear, and the airplane impacted trees and terrain and came to rest about 500 yards west of the intended runway. The airplane was destroyed by a postimpact fire.

A postaccident examination of the airplane revealed that the engine exhibited excessive heat signatures consistent with a lack of oil lubrication. The lack of oil resulted in the No. 2 connecting rod becoming disconnected from the crankshaft, which punctured a large hole in the crankcase. The engine oil filter was found loose on its mount and safety wired in the counterclockwise direction. During the examination, when the oil filter was manually rotated about one-half turn clockwise to tighten, the safety wire prevented it from further rotation; however, the oil filter could have rotated further. Due to the fire damage, investigators could not determine if there had been a gasket installed between the oil filter and mount. The exhaust manifold directly underneath the oil filter had burn marks, which were likely from oil that had leaked from the oil filter onto the exhaust manifold. Based on the available evidence, it is likely that the loose oil filter allowed oil to leak from the engine and resulted in oil starvation and a total loss of engine power.

Probable Cause and Findings

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

The loose oil filter, which resulted in oil starvation and a total loss of engine power in flight.

Findings

Aircraft	Oil - Incorrect service/maintenance
Aircraft	Oil - Fluid level

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)
Enroute	Fire/smoke (non-impact)
Enroute	Explosion (non-impact)
Enroute	Off-field or emergency landing
Post-impact	Fire/smoke (post-impact)

On June 7, 2018, about 1024 central daylight time, a Beech F33A airplane, N3291X, experienced a total loss of engine power inflight and made a forced landing near Annandale Ranch Airport (2XS7), Uvalde, Texas. The pilot sustained serious injuries and the airplane was destroyed by a post-impact fire. The airplane was registered to and operated by a private individual under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time and no flight plan had been filed. The flight departed from Live Oak County Airport (8T6) George West, Texas, about 0930 and was en route to Sierra Blanca Regional Airport (SRR), Ruidoso, New Mexico.

On June 5, 2018, the airplane's annual inspection was completed at a maintenance facility located at Card Airfield (4XA2), Kenedy, Texas. The pilot reported that he flew the airplane from 4XA2 back to his home base 8T6 on June 6, 2018. The flight from 4XA2 to 8T6 was 31 nautical miles.

The pilot reported that on the morning of the accident flight he topped off the airplane's fuel tanks and departed 8T6. While en route the weather was clear and he received a transponder code for visual flight rules (VFR) flight following from air traffic control (ATC) and was cleared through 8,500 ft mean sea level (msl). He reported that "suddenly the manifold pressure dropped with a simultaneous engine explosion…the engine access doors were blown open…oil was spewing on the windshield…there was fire everywhere." He reduced the mixture, throttle, and propeller controls. After reporting the emergency to ATC, they issued vectors to the closest airstrip, 2XS7. The pilot added that it was very difficult to maintain glide speed because the nose was pitching upward. He reported that he had to hold the yoke forward as hard as he could in order to keep the nose down. During the descent he extended the landing gear. The pilot stated that there was a second explosion when the airplane collided with trees and rocks. The airplane was engulfed in flames as he removed his seatbelt and egressed. The pilot was air lifted to a local hospital and treated for 2nd and 3rd degree burns.

A review of the Federal Aviation Administration (FAA) air traffic control (ATC) data revealed that the airplane's recorded flight track began at 0937 about 5 nautical miles northwest of 8T6. The pilot was in contact with ATC and the airplane was in cruise flight about 8,500 ft msl and 110 nautical miles from 8T6 when the emergency was declared. At 1018 the airplane made a left descending turn toward 2XS7. The final radar return at 1023 showed the airplane about 2,300 ft msl (1,000 ft above ground level (agl)) on a 99° heading. Figure 1 shows the final radar track with the accident site and 2XS7 labeled.

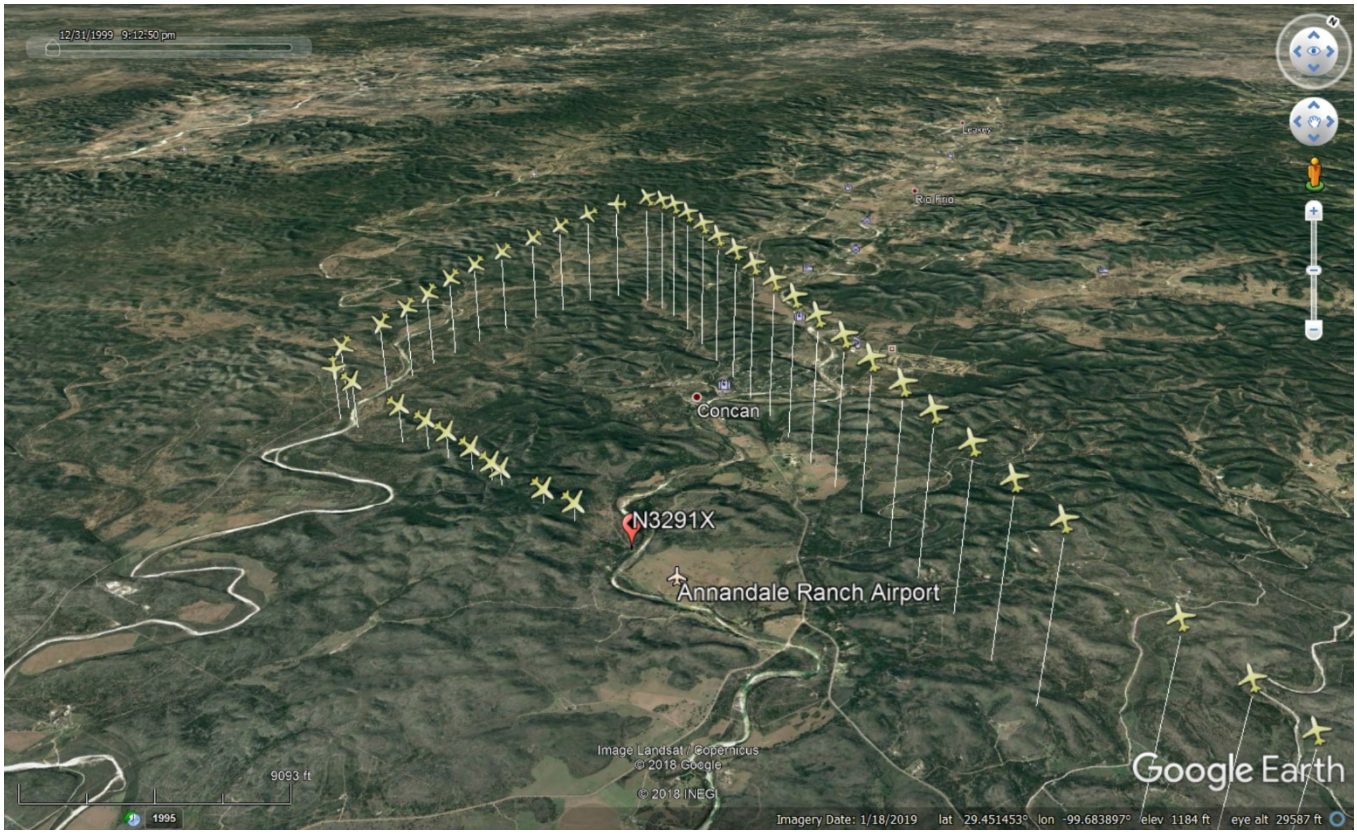

Figure 1 – Radar track with the accident site and airport labeled

The responding FAA inspector stated that the airplane was found among trees on the west side of 2XS7 about 500 yards from the threshold of runway 8. The post-impact fire consumed a majority of the airplane. The wreckage debris path began with the left horizontal stabilizer and elevator that were sheared off, followed by the left wing, the left wing tip fuel tank, and nosewheel. The right wing, right wing tip fuel tank, fuselage, main landing gear, and engine/engine compartment remained together at the final resting position. The fuel tanks were breached and there was evidence of a large fire around the airplane as seen in Figure 2.

Figure 2 – Right side of the accident airplane with significant fire damage

The FAA inspector's examination of the wreckage revealed significant fire damage to the rear of the engine compartment at the engine accessory area. There was evidence of a thick white/grey, powdery ash covering the damaged accessory area. Also, there was an estimated 8-inch hole in the crankcase under the left magneto. As viewed from the hole in the crankcase, there appeared to be little to no oil inside the engine and very little oil around the outside of the hole. The top front section of the engine remained mostly free of damage and ash. The exhaust tubing and routing for the turbo-normalizing system showed no damage or apparent anomalies. Visual examination of the oil tubing, oil filter, and oil

cooler revealed that some components had been consumed by fire. The oil filter was loose on its mount. The inspector recorded a video of the oil filter as it was manually rotated clockwise to tighten. The filter rotated about one-half of a full turn until the safety wire restricted further rotation. The filter was then rotated counterclockwise back to the original position until the safety wire again restricted rotation. The inspector reported that the oil filter was not completely tightened on it's mount when it was rotated clockwise but was unable to determine why there was additional space for rotation. The oil filter gasket had been consumed by fire. The exhaust manifold directly below the oil filter and oil cooler exhibited burn marks.

The wreckage was recovered to a secure storage facility where it was examined by the investigative team under the supervision of the NTSB IIC. The examination confirmed that the forward fuselage, firewall, engine and propeller were complete in one piece. The fuselage was mostly consumed by fire. The wings were impacted damaged and partially consumed by fire. The flight control cables exhibited overload separations in multiple locations. The rear of the engine and firewall sustained thermal damage but remained mostly intact. The cylinders remained attached to the crankcase. The No. 2 connecting rod was loose inside the large hole in the case. The engine was equipped with a turbo normalizing system in accordance with supplemental type certificate STC SE5222NM. The oil lines to and from turbo controller remained intact but the controller was separated from its mount.

The engine was removed from the firewall for further examination and a full tear down was conducted at the manufacturer's facility. The examination revealed that the left magneto was broken from its mount. There was a hole in the crankcase above the number two cylinder. The number two connecting rod was separated from the crankshaft. Some of the connecting rod was still attached to the No. 2 piston pin and was found in the No. 2 cylinder. The Nos. 3 and 4 connecting rods exhibited thermal damage consistent with a lack of oil lubrication. All the oil passages in the crankshaft and the crankcase were clear of any blockages. The No. 2 rod journal was thermally damaged and the oil passage was melted and smeared closed due to excessive heat. Excluding the mechanical damage from the internal engine components and the post-crash fire, the remainder of the engine exhibited normal operating signatures and no additional anomalies were noted.

Pilot Information

Certificate:	Private	**Age:**	72,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	September 9, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3291X
Model/Series:	F33A	**Aircraft Category:**	Airplane
Year of Manufacture:	1991	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	CE-1593
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 5, 2018 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3215.8 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:		**Engine Model/Series:**	IO-550-BA
Registered Owner:		**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KUVA,942 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	10:15 Local	**Direction from Accident Site:**	190°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	28°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	GEORGE WEST, TX (8T6)	**Type of Flight Plan Filed:**	None
Destination:	RUIDOSO, NM (SRR)	**Type of Clearance:**	VFR;VFR flight following
Departure Time:	09:30 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	ANNANDALE RANCH 2XS7	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1205 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	08	**IFR Approach:**	None
Runway Length/Width:	4000 ft / 50 ft	**VFR Approach/Landing:**	Forced landing;Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	Both in-flight and on-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	Unknown
Total Injuries:	1 Serious	**Latitude, Longitude:**	29.454444,-99.694168(est)

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Christian Morales; Federal Aviation Administration; San Antonio, TX Kurt Gibson; Continental Motors; Mobile, AL Henry Soderlund; Textron Aviation; Wichita, KS
Original Publish Date:	June 3, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97413