



Aviation Investigation Final Report

Location:	Longview, Texas	Accident Number:	CEN19FA094
Date & Time:	March 9, 2019, 10:47 Local	Registration:	N922EJ
Aircraft:	Cessna T337	Aircraft Damage:	Destroyed
Defining Event:	Windshear or thunderstorm	Injuries:	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The non-instrument-rated private pilot and three passengers departed on a cross-country flight in a multi-engine airplane, even though the pilot did not hold multiengine rating. At the time of departure, the weather was reported to be clear. However, a line of thunderstorms and high winds were along the flight route. Radar data showed that the airplane initially flew eastward and that, after entering an area of convective weather, it turned westward, likely to avoid the area of weather. The airplane then flew northeast before resuming eastward flight and entering another area of weather. The airplane then entered a series of descending spiral turns until impact. About 10 hours after the accident, a witness noted wreckage near a roadway, and the airplane was located shortly thereafter.

No preimpact anomalies were found with the airframe or engines that would have precluded normal operation of the airplane. All separations were consistent with overload.

Parts of the right wing were located between 1 and 3 nautical miles from the main wreckage, indicating that an in-flight breakup of the airplane had occurred. Radar data showed that the airplane was flying at a groundspeed of between 160 and 190 kts before it entered the spiral shaped flight track. According to the manufacturer, the airplane's maximum maneuvering speed was about 135 kts. Thus, the in-flight breakup occurred because the airplane was operating above its maximum maneuvering speed, which exceeded the design load factor of the airplane.

Various aviation weather products indicated that the airplane entered areas of significant convective weather twice. Once the airplane entered the clouds and precipitation associated with thunderstorms, the airplane was also in areas that were favorable for icing conditions. No evidence indicated that the pilot received a weather briefing on the day before or the day of the accident. If he had received a weather briefing, he could have been aware of the severe thunderstorms predicted for the flight route.

Toxicology testing showed the pilot had taken a beta blocker used in the treatment of hypertension and certain arrhythmias.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The noninstrument-rated pilot's improper decision to continue flight into convective weather conditions, which resulted in the airplane exceeding its maximum maneuvering speed and the subsequent in-flight breakup. Contributing to the accident was the pilot's inadequate preflight weather planning and his inadequate inflight weather avoidance of that weather.

Findings

Aircraft	Airspeed - Capability exceeded
Aircraft	(general) - Capability exceeded
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Weather planning - Pilot
Personnel issues	Qualification/certification - Pilot
Environmental issues	Thunderstorm - Contributed to outcome
Environmental issues	Thunderstorm - Effect on operation
Environmental issues	Thunderstorm - Response/compensation
Environmental issues	Thunderstorm - Decision related to condition

Factual Information

History of Flight

Enroute	Windshear or thunderstorm (Defining event)
Enroute	Aircraft structural failure
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On March 9, 2019, about 1047 central standard time, a Cessna T337C airplane, N922EJ, was destroyed during an inflight breakup and subsequent collision with trees and terrain near Longview, Texas. The private pilot and three passengers were fatally injured. The airplane was owned and operated by the pilot, who was operating it as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Day instrument meteorological conditions with convective activity prevailed in the area about the time of the accident, and no flight plan was filed. The cross-country flight departed from the Lancaster Regional Airport (LNC), near Lancaster, Texas, about 0930, and was destined for the Lakefront Airport, near New Orleans, Louisiana.

An employee at LNC reported that the pilot and 3 other people came to the airport. The pilot came inside and bought 1 quart of oil. The employee indicated the pilot was in a good mood and that the pilot said they were flying to Louisiana. The pilot then went out and conducted a 10-minute long preflight where he put the oil in the front engine. Then they entered the airplane, started it up, and let the airplane run for about 5 minutes. The airplane was then taxied toward the south ramp out of sight. The self-serve fuel was located in that area and the employee indicated it was a long enough period of time for the pilot to service the airplane with fuel. Afterward, the airplane took off and flew away. The employee said that a severe thunderstorm went through about 0730-0830. At the time of departure, the thunderstorm had passed through and the weather present at LNC was "clear."

A witness who was near the accident site about the time of the accident reported that he was waiting for the storm to come and pass through. The wind picked up, "hard" out of the west gusting over 35 mph, and rain fell in "sheets." There was a single lighting strike. He said that the strike seemed to hit ground about 1/4 mile northwest of his house. It was the only local strike of the storm that he heard. Approximately a minute after the strike, the witness heard what sounded like an "Air Tractor" coming in for a pass. He heard no impact and saw nothing in the air. The ceiling was "no more than 100 ft." He said, "I didn't really believe at the time it could have possibly been an aircraft. Thought maybe static electricity in the clouds, or maybe a small tornado attempting to form."

A friend of the family later reported that the airplane was missing and an alert notice was issued.

A witness was driving down a road to go hunting. While driving he noticed scattered trash along a clearway above an underground pipeline in a wooded area. He looked further at the trash and saw that it was an airplane crash. He subsequently called 9-1-1. The time was about 1900.

Pilot Information

Certificate:	Private	Age:	51,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	August 8, 2018
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1200 hours (Total, all aircraft)		

According to information from the Federal Aviation Administration (FAA), the 51-year-old pilot held a private pilot certificate with an airplane single-engine land rating. The pilot's last aviation medical examination was on August 8, 2018, during which he applied for an FAA third-class medical certificate. The pilot reported on that medical certificate application that he had accumulated 1,200 hours of total flight time and no hours of flight time in the previous 6 months. He also reported taking dapagliflozin (a medication to treat diabetes), which is not permitted for use by pilots, and was subsequently issued a denial of that medical certificate. The pilot's logbook was found in the wreckage. The entry before the last entry was dated May 7, 2005. The last entry was dated August 23, 2018 and using flight time carried forward on the last page, the pilot's total logged flight time was 250.9 hours. The investigation was not able to determine how much total flight time the pilot had accumulated flying the accident airplane.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N922EJ
Model/Series:	T337 C	Aircraft Category:	Airplane
Year of Manufacture:	1968	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	337-0944
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:		Certified Max Gross Wt.:	4500 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Continental
ELT:		Engine Model/Series:	TSIO-360
Registered Owner:		Rated Power:	210 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The airplane had a total standard fuel capacity of 93 gallons (92 gallons useable) distributed between two wing fuel tanks. The airplane also had a total auxiliary fuel capacity of 38 gallons (36 gallons useable) distributed between two inboard wing fuel tanks. The airplane's maximum maneuvering speed was 155 mph (about 134.7 kts). According to the airplane owner's manual, maneuvering speed is the "maximum speed at which abrupt control travel can be used without exceeding the design load factor" of the airplane.

The previous owner of the airplane, stated that he sold the airplane to the accident pilot "in the fall" of 2018, but there was no FAA record of the purchase. The previous owner, in part, reported, "The plane performed perfectly. Total airframe time was about 1800 hrs motors were both about 600 hrs. Excellent flying airplane. Good radios and everything worked properly the last time I flew it." In addition, the previous owner stated that the airplane underwent an annual inspection shortly after the accident pilot purchased the airplane.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	KGGG, 373 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:	10:25 Local	Direction from Accident Site:	242°
Lowest Cloud Condition:	Scattered / 2600 ft AGL	Visibility	10 miles
Lowest Ceiling:	Broken / 3200 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	18 knots / 28 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	220°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.71 inches Hg	Temperature/Dew Point:	23°C / 19°C
Precipitation and Obscuration:	Light - Thunderstorm - Rain		
Departure Point:	Lancaster, TX (LNC)	Type of Flight Plan Filed:	None
Destination:	New Orleans, LA (NEW)	Type of Clearance:	None
Departure Time:	09:30 Local	Type of Airspace:	

A National Transportation Safety Board (NTSB) senior meteorologist collected factual weather data in reference to the accident flight and produced a Factual Weather Report, which is appended to the docket material associated with this investigation. The report, in part, indicated that a search of the official Automated Flight Service Station weather briefing provider Leidos Flight Service (LFS) and third-party vendors utilizing the LFS system did not have any contact with the pilot on the day before or the day of the accident.

A National Weather Service (NWS) surface analysis chart for 0900 depicted that the accident site was located ahead of a cold front and near a secondary trough of low pressure in an area favorable for the development of a multicellular line thunderstorm or squall line.

In addition, an NWS convective outlook graphic issued at 0700 depicted that a slight risk of severe thunderstorms were possible for the route of flight over eastern Texas and Louisiana, including the accident site. A convective outlook bulletin indicated that a line of strong-to-severe thunderstorms had

already developed over northeast Texas ahead of the cold front and was moving to the east-northeast. The convection was identified as linear in nature with embedded line echo wave pattern and bow echoes formations and isolated supercell-type thunderstorms. The line was expected to produce damaging winds, sporadic hail, and the threat of a tornado.

The NWS issued a series of in-flight aviation weather advisories that were valid for the time surrounding the accident and the route of flight. The advisories warned of severe thunderstorms, IFR conditions, moderate turbulence, low-level wind shear, and icing.

The closest official weather reporting site was about 10 miles west of the accident location was at East Texas Regional Airport (GGG), Longview, Texas. At 1040, the recorded special weather observation at GGG included wind from 260° at 21 kts, gusting to 36 kts; visibility 2 ½ statute miles in thunderstorm, heavy rain, and mist; ceiling broken at 2,600 ft above ground level (agl), broken at 6,000 ft agl, and overcast at 9,500 ft agl; temperature 18°C; dew point 17°C; and altimeter 29.78 inches of mercury. The remarks section indicated peak wind from 250° at 36 kts occurred at 1035, lightning distant southwest through north, rain and thunderstorm began at 1025, pressure rising rapidly, hourly precipitation 0.16 inch, temperature 18.3°C, and dew point 17.2°C.

A composite radar mosaic for 1045 showed that the accident site was located on the east side of a line of intense echoes, which extended over the route of flight.

A constant pressure chart depicted a low-level jet stream with a southwesterly wind of 60 kts at an altitude that was about 5,000 ft above the accident site. Another constant pressure chart depicted a west-southwesterly wind of 55 kts at 18,000 ft.

A High-Resolution Rapid Refresh (HRRR) model sounding for 1100 was created. The sounding supported a layer of clouds between the lifted condensation level (1,055 ft) and 9,000 ft, where the relative humidity exceeded 90%. The freezing level was identified at 12,412 ft. The sounding showed an unstable environment with a potential height of convective clouds to about 38,000 ft. The potential hail size was calculated at 0.82 inch with a maximum vertical velocity of 108 kts. The sounding also supported the risk of strong storms with multicellular line- and supercell-type storms.

HRRR model parameters indicated that, at the accident airplane's cruising altitude of about 9,500 ft, the wind was from 235° at 55 kts, and the temperature was 8°C. The model parameters also indicated that, after the accident airplane climbed to an altitude of 16,200 ft when it entered the area of precipitation, the wind was from about 240° at 65 kts, and the temperature was -8°C.

The Geostationary Operational Environmental Satellite No. 16 visible image at 1037 depicted a line of convection across Texas with the accident site under an enhanced area of cumulonimbus-type clouds.

The closest NWS Weather Surveillance Radar 1988 Doppler was in Shreveport, Louisiana, which was about 35 miles east of the accident site. Base reflectivity images revealed that the accident airplane entered an area of heavy-to-intense echoes by 1038 with hail to 0.67 inch indicated.

Lightning data, obtained from archive data from Earth Networks, showed that, between 1030 and 1050, there were 836 total lightning flashes within about a 40-mile radius of the accident site. There were 53

cloud-to-ground lightning strikes and 783 in-cloud lightning flashes.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	3 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 Fatal	Latitude, Longitude:	32.461112,-94.539169(est)

The main wreckage, which consisted of the fragmented fuselage, empennage, inboard wings sections, left outboard wing section, and both engines, was found embedded about 6 to 8 ft below grade in wooded terrain about 62° and 10 nautical miles from GGG. One fuel tank was found fragmented near the main wreckage in the woods and one fuel tank was found in a clearway for an underground pipeline near the main wreckage. Highly fragmented sections of the fuselage, wings, and empennage were found in the woods widely distributed around the main wreckage.

A backhoe was used to raise the wreckage from below grade. The rear propeller blades were attached to their hub and that hub remained attached to its propeller flange. However, the flange was separated from its engine crankshaft just forward of its flange. One blade exhibited leading edge nicks and the other blade exhibited S-shaped bending. The front propeller hub remained attached to its engine. However, the hub's blades did not remain attached. One inboard section of a front propeller blade was identified on site, and one outboard section of a front propeller blade was identified on site. Those sections exhibited separations in overload and chordwise abrasion. The outboard section exhibited S-shaped bending. A disassembled instrument gyro exhibited rotational scoring on its rotor and rotor housing. The recovered main accident site wreckage was subsequently taken to a storage facility.

An NTSB aerospace engineer and a safety investigator from the airplane manufacturer examined the recovered wreckage at a storage facility in Marshall, Texas, on June 17-18, 2019. The examination revealed that the wreckage from the main site was fragmented and exhibited fore-aft crushing with an accordion style deformation pattern. Three corners of the airplane, the front/fuselage, left wing, and empennage were identified in the wreckage from the main site.

The airplane manufacturer defines the location of parts of the airplane longitudinally and laterally using station locations and vertically using waterline locations measured in inches from a datum. The wing station (WS) datum is located at the centerline of the airplane and distances on the left and right sides are measured outboard to the ends of the wings.

A right outboard wing section was recovered about 72° and 1 nautical mile from the main wreckage. This outboard wing section was mostly intact from the outboard end rib inboard about 72 inches. Its aileron was mostly intact and attached. The right aileron rod end was attached to the aileron but fractured from its push-pull tube. The right aileron bellcrank control quadrant was not present in the right wing. However, the wing section exhibited damage in the area of the quadrant consistent with the quadrant being torn out. The right rear spar was fractured near WS 159. The right forward spar upper

cap was fractured near WS 112 and it exhibited upward deformation at the fracture. The right forward spar lower cap was fractured near WS 150 and no deformation was observed at the fracture. The right forward spar was twisted clockwise as viewed looking outboard. The right spar fractures had angular features and a dull, grainy appearance consistent with overstress separation.

A right outboard flap segment was recovered about 59° and 3 nautical miles from the main wreckage. The flap segment was about 50 inches long and it was mostly intact from leading edge to trailing edge. However, it exhibited buckling damage on its upper and lower skins.

A right outboard leading-edge segment was recovered about 72° and 1.7 nautical miles from the main wreckage. This section spanned from WS 110 to WS 133. Its landing gear inspection mirror remained intact. A portion of the landing light housing remained attached to the leading edge. However, no lights remained attached.

All separations in control cables exhibited a broom-straw appearance consistent with overload. All observed skin and structure separations exhibited an appearance consistent with overload. There was no evidence of corrosion or other pre-existing conditions on any of the primary structure examined.

A safety investigator from the engine manufacturer under NTSB supervision also examined the recovered engines at the storage facility. The front engine data plate was not present and was not located during the airplane recovery. However, its configuration was consistent with a Continental TSIO-360-A engine. The rear engine was a TSIO-360-A engine with serial number 184247-8-A.

The front engine exhibited several holes in its crankcase exposing the inside of the engine. No pre-impact failures were noted to its crankshaft or connecting rods. The No. 5 and 6 cylinder heads were impact separated and not observed. The No. 5 cylinder barrel had separated from the crankcase and the piston was lodged in the cylinder barrel, still connected to the crankshaft by the connecting rod. All of the remaining cylinder heads exhibited varying amounts of impact damage. The fuel pump, propeller governor, fuel manifold valve, magnetos, induction and exhaust systems were not observed with the engine.

The rear engine exhibited several crankcase breaches and no pre-impact failures were noted to its crankshaft or connecting rods. The No. 1 and 2 cylinder heads exhibited impact damage. The top spark plugs from No. 4, 5, and 6 cylinders were removed and exhibited light grey combustion deposits and the electrodes were worn out-normal when compared to the Champion Check a Plug chart. The fuel manifold valve remained partially attached to the engine. The fuel manifold valve was removed and disassembled with no anomalies noted. The fuel pump remained attached to the engine and exhibited impact damage. The fuel pump was removed, and the fuel pump drive was intact. The fuel pump did not turn and the pump was disassembled. Rust was noted in the fuel pumps rotor. No other anomalies were noted to the internal parts of the fuel pump. The throttle body remained partially attached and exhibited impact damage. The throttle plate turned freely by hand from stop to stop. The rear engine turbo charger remained partially attached to the engine mount and exhibited impact damage. The compressor scroll exhibited rotational scoring and the compressor blades were bent opposite of rotation.

Loose pieces

The following parts were located throughout the aircraft wreckage:

A starter with a portion of a starter adaptor that exhibited impact damage.

A turbo charger was located that exhibited severe impact damage. The compressor scroll was not observed, and the compressor blades were heavily damaged.

A throttle body that was impact damaged and packed with mud.

One damaged magneto was located loose in the wreckage. The magneto drive did not turn by hand. The magneto was disassembled, and no pre-impact anomalies were noted.

Rear Propeller

The rear propeller was separated from the engine. The crankshaft propeller flange was fractured from the engine and remained attached to the rear propeller hub. Both blades remained attached to the hub and both exhibited forward bending throughout their entire span. Both blades exhibited chordwise scratching and leading-edge polishing. One blade exhibited two nicks in the trailing edge.

Front propeller

The front propeller was separated from the engine. The propeller hub was not observed and both blades were loose. One blade exhibited S bending, chordwise scratches and leading-edge polishing. The blade was fractured into two pieces about midspan. The other propeller blade exhibited leading edge polishing and chordwise scratches. It was fractured about midspan and the outer piece of the propeller blade was not recovered.

Both engines did not exhibit any anomalies or damage that could not be associated with the ground impact.

MEDICAL AND PATHOLOGICAL INFORMATION

Forensic Medical of Texas, P.A., Tyler, Texas, performed an autopsy of the pilot. The pilot's cause of death was severe blunt force injuries.

Toxicology testing performed at the FAA Forensic Sciences Laboratory identified propranolol (a beta-blocker used to treat hypertension and certain arrhythmias) in the pilot's muscle specimens.

Additional Information

In August of 2018, the pilot contacted a flight instructor at a fixed base operator (FBO) for a flight review in a Cessna 182. The pilot had gone through an online refresher course for his ground knowledge. The pilot advised that it had been about 4-5 years since he had last flown. He had purchased a Cessna 337 and intended to fly to southern Texas in it. The flight instructor advised the pilot that he would have to coordinate multi-engine training with a multi engine instructor to fly his Cessna 337. The instructor then developed a 2-hour block in the classroom for the flight review around preflight planning, weather products and preparation, as well as cross-country planning for a flight to southern Texas. The flight portion of the flight review in a Cessna 182 included slow flight, steep turns, power on and off stalls before returning to the airport for performance landings. Much of the flight time was used during maneuvers and repeated attempts. The pilot advised the instructor, "I don't think I'm comfortable enough to fly this airplane to my ranch this weekend. I felt behind the plane and think more time is needed." The instructor agreed and encouraged the pilot that in time he would get back to a state of comfortability and proficiency in the aircraft. The instructor did not complete nor endorse the pilot for the flight review or checkout in the 182.

In October 2018, the chief flight instructor at the FBO was contacted by the pilot for training in his Cessna 337. He advised the pilot that he had no 337 experience, but the pilot had the instructor fill out his insurance documents regardless. The insurance company replied that the chief instructor would be covered as a flight instructor for the pilot in his C337. The chief instructor flew about 2 hours in the 337. The pilot sat in the right seat and the chief instructor sat in the left seat during the 2 hour flight. However, no instruction was given to the pilot. The chief instructor reported that the airplane had a paint job that appeared to be done by spray paint can and the avionics were old. The powerplants operated nominally within parameters. He indicated it appeared that the airplane had not been updated but was airworthy. All primary systems operated nominally. The chief instructor provided the pilot an hour of instruction in a flight training device set up as a conventional multiengine aircraft. The airplane was returned to the hangar and the chief instructor never heard back from the pilot.

Communications

No records of air traffic control communication were found in reference to N922EJ.

Tests and Research

An NTSB senior air traffic investigator examined FAA data to include radar data and a video playback of a segment of the flight's track. The video is appended to the docket material associated with this investigation. The radar data was plotted to show the airplane's route of flight. The data showed the airplane east of LNC, traveling eastward. The airplane entered an area of weather and turned back westward out of the area of weather. The data further showed the airplane subsequently traveling eastward and entering another area of weather. The video showed the airplane was flying between 160 to 190 kts before it started a spiral shaped track. The radar data and video showed that the airplane descended during the spiral shaped flight track. The spiral shaped flight track is near the accident site.

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Brad Holt; FAA North Texas FSDO; Irving, TX Jennifer Barclay; Textron Aviation; Wichita, KS Chris Lang; Continental Motors; Mobile, AL
Original Publish Date:	April 20, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99077

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](#).