Aviation Investigation Final Report

Location:	Patterson, Louisiana	**Accident Number:**	CEN24FA010
Date & Time:	October 12, 2023, 15:21 Local	**Registration:**	N880A
Aircraft:	Cessna 414	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane landed at the airport and the pilot taxied to the ramp, boarded the passenger without shutting down the airplanes' engines, then taxied back out to the runway and the airplane departed. Video footage captured part of the accident sequence, showing the airplane descending in an extreme, nose-low attitude while rolling through inverted, consistent with uncontrolled flight, and impacting a field near the departure end of the runway.

A witness, who was driving in her vehicle near an intersection just to the west of the airport, observed the airplane shortly after it departed from the runway. She observed the airplane was "tilted to the left," turned on its side, and then entered a nosedive. She observed the airplane impact a field, explode, and both the wreckage and surrounding area caught fire.

Examination of the airframe did not reveal any preimpact mechanical malfunctions or failures. During the examination, the elevator trim was found in a significant nose up position. The elevator trim was likely left at the setting from when the airplane landed at the airport just prior. While the pilot might have been distracted with getting the passenger settled in the airplane, and/or may have been in a rush, the investigation was unable to determine why the pilot did not set the elevator trim before takeoff. The takeoff checklist for the airplane included instructions to properly set the trim tabs before takeoff. The elevator trim position likely resulted in the airplane's nose-up attitude, which led to an exceedance of the airplane's critical angle of attack and an aerodynamic stall during the takeoff.

While multiple valve springs from the right engine were found fractured from fatigue cracking, examination of the propellers showed the degree of damage was similar between left and right propellers, suggesting engine power symmetry at the time of impact. For example, chordwise/rotational scoring, leading edge gouging, and blade retention pocket damage

indicated rotation at the time of impact. Internal impact marks indicated the propeller blade angle was in the low range of normal operation during the impact sequence. The damage signatures were consistent with forceful rotation toward low blade angle and at low to moderate power condition on both propellers at the time of impact.

The pilot had a history of high blood pressure and diabetes. There is no evidence that these conditions were causing impairment at the time of the accident, although they do indicate somewhat elevated general cardiovascular risk, autopsy assessment of which was limited by injury. The pilot also had used the antidepressant medication sertraline, which was not among the medications reported at his last aviation medical examination. Whether he was experiencing any impairing effects of an underlying condition such as depression, or any adverse side effects of sertraline use, is unknown.

Probable Cause and Findings

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

The pilot's failure to properly set the elevator trim before takeoff, which resulted in an exceedance of the airplane's critical angle of attack and an aerodynamic stall during takeoff.

Findings

Personnel issues	Incorrect action selection - Pilot
Personnel issues	Aircraft control - Pilot
Personnel issues	Task monitoring/vigilance - Pilot
Aircraft	Elevator control system - Incorrect use/operation
Aircraft	Angle of attack - Capability exceeded

Factual Information

History of Flight

Prior to flight	Miscellaneous/other
Takeoff	Loss of control in flight (Defining event)
Takeoff	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Post-impact	Explosion (post-impact)
Post-impact	Fire/smoke (post-impact)

On October 12, 2023, about 1521 central daylight time, a Cessna 414 airplane, N880A, was destroyed when it was involved in an accident near Patterson, Louisiana. The commercial pilot and the pilot-certificated passenger sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot's family, the purpose of the flight was to transport the passenger to the Sugarland Regional Airport (SGR), Houston, Texas, where a family member would pick him up. According to the passenger's family, the purpose of the flight was for the passenger to travel to Houston for a medical appointment.

A review of ADS-B data showed that the airplane departed from the Gonzales Regional Airport (REG), Gonzales, Louisiana, at 1456 and landed at 1511 at the Harry P. Williams Memorial Airport (PTN), Patterson, Louisiana.

According to the PTN airport manager, the airplane taxied over to the fixed-base operator and remained at idle while the passenger boarded the airplane. Video footage showed that the passenger pulled a rolling suitcase out to the airplane. Once the passenger boarded, the pilot then got out of the airplane and walked over to the left side, where he appeared to look at something on the airplane. The pilot then boarded the airplane and taxied to runway 24 for departure. The pilot announced on the airport common traffic advisory frequency that the airplane was departing runway 24, and no further radio transmissions were heard from the airplane.

No ADS-B data were available for the airplane's takeoff. Video footage captured part of the accident sequence, showing the airplane in an extreme, nose-low attitude while rolling through inverted and impacting a field near the departure end of runway 24.

A witness, who was driving in her vehicle near an intersection just to the west of PTN, observed the airplane shortly after it departed from runway 24. She observed that the airplane was "tilted

to the left," turned on its side, and then entered a nosedive. She observed the airplane impact a field, explode, and both the wreckage and surrounding area caught fire. She could not tell if the airplane's engines sounded abnormal before impact, as she was driving at the time, nor did she observe any smoke or flames emitting from the airplane before impact. She said that, from her position, it did not appear that the airplane was trying to turn back to the airport.

Pilot Information

Certificate:	Commercial; Flight instructor; Remote	**Age:**	48,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Unmanned (sUAS)	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	March 10, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 985 hours (Total, all aircraft)		

Pilot-rated passenger Information

Certificate:	Private	**Age:**	69,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	December 13, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 775 hours (Total, all aircraft)		

The pilot's logbooks were not available for review.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N880A
Model/Series:	414 Undesignated Series	**Aircraft Category:**	Airplane
Year of Manufacture:	1973	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	414-0397
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	April 1, 2023 Annual	**Certified Max Gross Wt.:**	6350 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	8787.1 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C91 installed, not activated	**Engine Model/Series:**	TSIO-520-NCNB
Registered Owner:	MJ Aviation LLC	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None
Operator Does Business As:	None	**Operator Designator Code:**	None

According to FAA registration records, the pilot purchased the airplane on May 23, 2018.

A review of the maintenance records identified a customer invoice dated July 20, 2023, that listed multiple maintenance discrepancies with the airplane that were not resolved within that work order. One of the unresolved discrepancies included, “the right-hand tachometer is not indicating.” The maintenance records indicated that an annual inspection of the airframe, engines, and propellers was completed on April 1, 2023.

The FAA-approved Cessna 414 Airplane Flight Manual lists the required before takeoff checklist, which includes “Trim Tabs – Set.”

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KPTN,9 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	15:11 Local	**Direction from Accident Site:**	42°
Lowest Cloud Condition:	Scattered / 2200 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.74 inches Hg	**Temperature/Dew Point:**	23°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Patterson, LA (PTN)	**Type of Flight Plan Filed:**	None
Destination:	Sugar Land, TX (SGR)	**Type of Clearance:**	None
Departure Time:	15:20 Local	**Type of Airspace:**	Class E

The estimated density altitude for PTN was 1,397 ft.

Airport Information

Airport:	HARRY P WILLIAMS MEML PTN	**Runway Surface Type:**	Asphalt
Airport Elevation:	8 ft msl	**Runway Surface Condition:**	Dry;Vegetation
Runway Used:	06/24	**IFR Approach:**	None
Runway Length/Width:	5399 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	29.702526,-91.347746(est)

The airplane came to rest about 0.32 mile southwest from the departure end of runway 24. The wreckage was destroyed by the postimpact fire. All major structural components of the airplane were located at the accident site.

Airframe

Examination of the airframe revealed flight control continuity from the control surfaces (aileron, rudder, elevator, aileron trim, rudder trim, and elevator trim) to their respective attachment points in the cockpit.

The cockpit and the airframe fuel system were destroyed.

The elevator trim tab was deflected down about 2.3 inches, and the elevator trim actuator showed about 1.3 inches of extension. According to the airframe manufacturer, this amount of elevator trim actuator extension corresponded to an elevator trim tab deflection of about 15° tab down (meaning that the airplane was trimmed nose up).

The flaps and the main landing gear were found in the retracted position.

Engines

The crankshaft for each engine was manually rotated using a bit inserted in the rear accessory drive port, and continuity of the crankshaft to the rear gears and to the valvetrain was confirmed for both engines. Thumb compression and suction were observed for all six cylinders for both engines. The interiors of the cylinders on both engines were observed using a lighted borescope and no anomalies of concern were noted.

All magnetos produced sparks from all ignition towers when the magneto drive assemblies were rotated during crankshaft rotation.

Multiple valve springs on the right engine were found fractured. Metallurgical examination revealed that the valve springs fractured from fatigue cracking that initiated at corrosion pits on the exterior of the valve springs. These corrosion pits contained iron oxides and salt elements typical of those found in the pitting corrosion of steel components.

Turbochargers

Both turbochargers exhibited remarkable rotational scoring marks on the compressor housings with corresponding blade damage consistent with the turbochargers turning at high rpm at the time of impact. There was nothing found during examination of either turbocharger that would preclude normal operation.

Propellers

Both left and right propellers separated from their respective engine during the impact sequence; all propeller components were accounted for near the main wreckage. Damage to both left and right propellers was similar. Leading edge gouging and chordwise/rotational

scoring were consistent with rotation. Blade bending and twisting characteristics were also consistent with the engine producing power at the time of impact.

Knob and fork impact marks on the preload plates of both propellers were consistent with the propeller blade angle being in the lower range of normal operation during the impact sequence. There were no indications that either propeller was at or near the feathered position.

Avionics

Examination of the Shadin Digiflo-L Fuel Flow Indicator showed that 14.6 gallons of fuel was used, and 148.4 gallons of fuel remained.

Flight recorders

The airplane was not equipped with a crashworthy voice or data recorder, nor was it required to be.

Medical and Pathological Information

At the pilot's last aviation medical examination on March 10, 2023, he reported a history of high blood pressure, which was noted to be qualified under Conditions Aviation Medical Examiners Can Issue (CACI) criteria. He reported using the prescription blood pressure medications losartan and amlodipine. He was issued a second-class medical certificate without limitation. He also had a past history of diabetes no longer requiring medication after weight loss.

Parish Forensics performed the pilot's autopsy for St. Mary Parish. According to the pilot's autopsy report, his cause of death was multiple blunt force injuries and his manner of death was accident.

The pilot's postmortem FAA toxicology testing detected sertraline and its metabolite desmethylsertraline, as well as amlodipine and chlorthalidone, in muscle and liver tissue.

Sertraline is a prescription antidepressant medication of the selective serotonin reuptake inhibitor (SSRI) class. Desmethylsertraline is a metabolite of sertraline. Sertraline commonly is used to treat depression and may also be used to treat a variety of other conditions. Major depression can cause cognitive impairment, particularly of executive function. By contrast, sertraline has low potential to cause cognitive or psychomotor impairment and may improve such impairment in individuals with major depression. Sertraline's side effects may include dizziness and drowsiness, and the drug typically carries a warning that users should not drive, operate heavy machinery, or do other dangerous activities until they know how the drug affects them.

Amlodipine and chlorthalidone are prescription medications commonly used to help control high blood pressure. They are not generally considered impairing.

Additional Information

The FAA Airplane Flying Handbook (FAA-H-8083-3C) discusses when an elevator stall may occur and states, in part:

> This situation may occur during a go-around procedure from a normal landing approach or a simulated, forced-landing approach, or immediately after a takeoff, with the trim set for a normal landing approach glide at idle power.

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Michael Barrow; FAA Baton Rouge FSDO; Baton Rouge, LA Tony Hershberger; Textron Aviation; Wichita, KS J Ferrell; Continental Aerospace Technologies; Mobile, AL Les Doud; Hartzell Aviation; Piqua, OH
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