



AVIATION



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Aviation Investigation Final Report

Location:	Aguadilla, Puerto Rico	Accident Number:	ERA24FA301
Date & Time:	July 11, 2024, 09:23 Local	Registration:	N4167G
Aircraft:	Cessna 402B	Aircraft Damage:	Destroyed
Defining Event:	Loss of engine power (partial)	Injuries:	1 Fatal, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

About 3 months before the accident, the twin-engine airplane underwent an annual maintenance inspection during which the mechanic identified numerous discrepancies with both engines and the airframe. The airplane was not subsequently approved for flight and the owner was provided a list of the discrepancies. The purpose of the accident flight was to relocate the airplane to another airport where the pilot planned to have the discrepancies addressed. The mechanic reported that he had advised the pilot that he needed to apply for a ferry permit from the FAA in order to complete the accident flight, but there was no evidence that the pilot had obtained one.

On the day of the accident flight, air traffic control data showed that the pilot departed and climbed the airplane to about 1,500 ft mean sea level (msl). About 2 miles from the departure airport the pilot advised air traffic control of his intent to return to the departure runway due to a vibration of the right engine. The controller immediately cleared the pilot to enter the left downwind for the departure runway. The airplane then turned to the left and began a descent toward the left downwind leg of the traffic pattern. When the airplane was about a mile from the airport, the pilot reported that the airplane had an "engine failure" and that he intended to land on the departure runway, but in the opposite direction. Recorded flight track data showed that the airplane then turned directly toward the approach end of that runway and that during the final 30 seconds of track data, the airplane's altitude and groundspeed decreased rapidly. Surveillance video captured the final few seconds of flight, and showed the airplane in a steep vertical descent and a right roll. The airplane impacted a residential area into trees, powerlines, and propane fuel tanks. After the impact, the airplane sustained significant postimpact fire damage.

Postaccident examination of the airplane revealed no evidence of any preimpact mechanical malfunctions or failures of the airplane’s flight controls. Although the right engine’s fuel manifold was damaged by thermal forces, it contained visible corrosion and remains of diaphragm material when opened. Below the fuel screen at the fuel inlet within the manifold was a large quantity of debris and foreign material that was likely present before the accident. Based on the available evidence, it is possible that this contamination resulted in the total loss of engine power to the right engine that was reported by the pilot; however, given the multiple discrepancies that had been documented with the engine prior to the flight, and the extent of the post impact fire damage to the engine, it is possible that the loss of reported loss of engine power may have been due to other unresolved maintenance issues.

The final recorded position showed the airplane about .3 miles the runway threshold at 200 ft msl and 73 kts groundspeed, on a heading of 209°. The Pilot’s Operating Handbook for the accident airplane model listed the minimum controllable airspeed as 82 knots indicated airspeed. Considering the wind information provided by air traffic control to the pilot of 090° at 10 knots, gusting to 14 knots, it is likely that the airplane’s airspeed likely decreased below its minimum controllable airspeed which resulted in a loss of control from which the pilot was not able to recover.

Probable Cause and Findings

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

The pilot’s decision to operate the airplane with known maintenance discrepancies, which resulted in a total loss of right engine power. Contributing to the outcome was the pilot’s failure to maintain airspeed while returning to the airport with a single operating engine, which resulted in a loss of airplane control.

Findings

Personnel issues	Decision making/judgment - Pilot
Aircraft	Return to service - Not serviced/maintained
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Approach-VFR pattern crosswind	Loss of engine power (partial) (Defining event)
Approach-VFR pattern crosswind	Loss of control in flight
Approach-VFR pattern downwind	Collision with terr/obj (non-CFIT)

On July 11, 2024, about 0923 Atlantic standard time, a Cessna 402B airplane, N4167G, was destroyed when was involved in an accident near the Rafael Hernandez Airport (BQN), Aguadilla, Puerto Rico. The private pilot was fatally injured, and a person on the ground sustained minor injuries. The airplane was operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight.

According to a mechanic who assisted the pilot with his preflight inspection, the pilot planned to complete the flight from his home airport, BQN, to Luis Munoz Marin International Airport (SJU), San Juan, Puerto Rico, where he planned to have several maintenance discrepancies addressed. The mechanic reported that the four fuel tanks were found near empty or about one-third full during the preflight inspection. A fuel receipt showed that the pilot purchased 13 gallons of 100LL AvGas before the accident flight.

The mechanic reported that, after the fuel was added, the left main fuel tank contained about 15 gallons and the right main fuel tank contained about 6-8 gallons. He estimated that the left auxiliary tank contained about 20 gallons and the right auxiliary tank contained about 15 gallons. He did not observe the pilot sump the fuel tanks during the preflight inspection and the correct fuel measuring dip stick was not present with the airplane. He reported that the pilot told him that he planned to use the main tanks for takeoff and then the auxiliary tanks while enroute.

The mechanic observed the pilot start the engines and complete a normal engine run-up, but did not witness the airplane take off.

FAA ADS-B data showed that the airplane departed runway 8 and climbed to about 1,500 ft mean sea level (msl) about 2 miles east of the approach end of runway 8. The airplane then made a turn to the left and began a descent. When the airplane reached about one mile northeast of the airport, the track turned directly toward the approach end of runway 26. In the final 30 seconds of track data, the altitude and groundspeed continued to decrease rapidly.

The final track data point showed the airplane about .3 miles northeast of the runway 26 threshold at 200 ft msl and 73 knots groundspeed, on a heading of 209°.

Review of FAA air traffic control (ATC) ground and tower communications found that about 0914 the pilot requested a visual flight rules (VFR) departure to the east and about 3 minutes later was cleared for takeoff from runway 8. At 0921:31, the pilot called the tower and stated, “yeah going back to runway 8 I just wanna check the uh vibration on the right engine uh uh no emergency for right now for 1 6 7 gulf” (see figure). The controller immediately cleared the pilot to enter the left downwind for runway 8 and provided him with the current weather and airport information. At 0922:25, the pilot stated “aguadilla ground mayday mayday I engine failure I will use the other side of the runway for 1 6 7 gulf.” The controller immediately cleared the pilot to land on runway 26 and provided him the current wind information of 090° at 10 kts, gusting to 14 kts. The pilot read back cleared to land and there were no further communications.

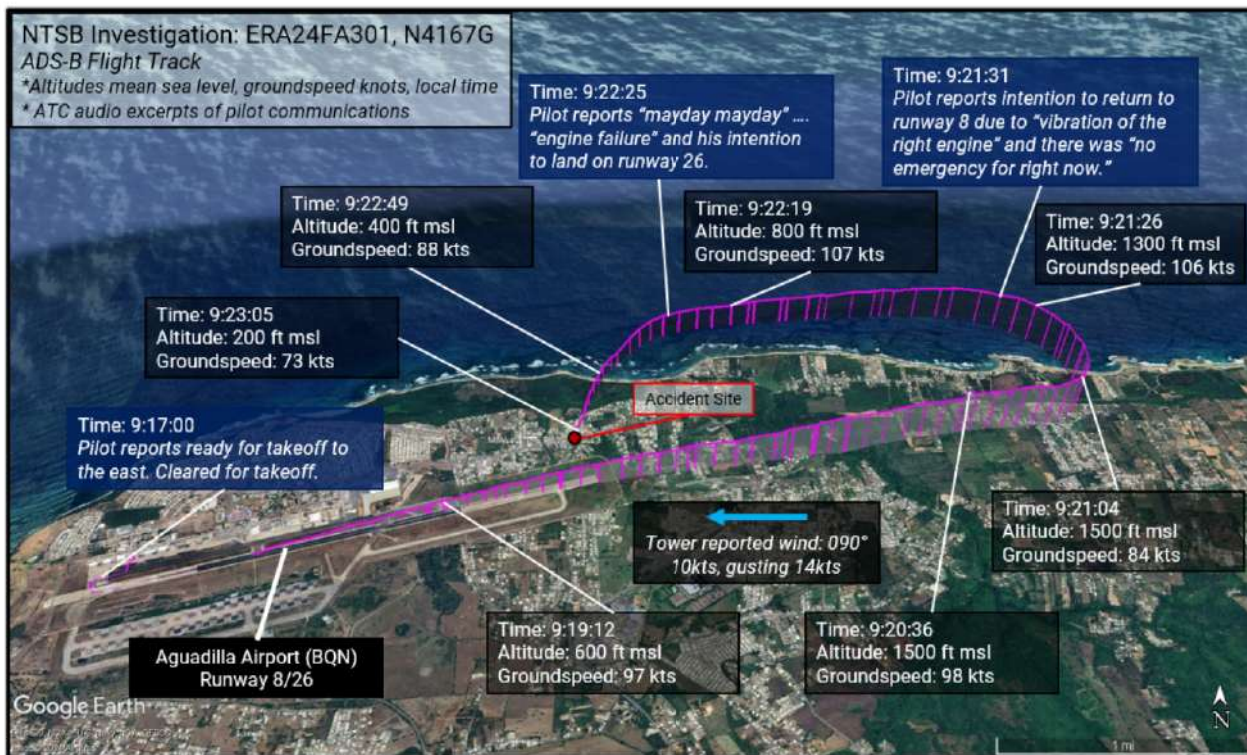


Figure: Overview of the airplane's flight path and excerpts of the pilot's communication with the ATC tower

Two air traffic controllers observed the airplane's flight path as it was flying directly toward the runway 26 threshold. They observed the airplane in its final few seconds of flight abruptly roll to the right and descend vertically into terrain. Before the descent, one controller reported that he did not observe anything abnormal about the airplane. Surveillance video captured the final few seconds of flight, which showed the airplane in a steep vertical descent and right roll with the landing gear retracted. After impact, an explosion and postaccident fire were observed.

Pilot Information

Certificate:	Private	Age:	47, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Unknown
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 3 None	Last FAA Medical Exam:	April 5, 2023
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1200 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N4167G
Model/Series:	402B NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	1976	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	402B1214
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	April 24, 2024 Annual	Certified Max Gross Wt.:	6850 lbs
Time Since Last Inspection:	2 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	12175 Hrs as of last inspection	Engine Manufacturer:	Continental Motors
ELT:	Installed, not activated	Engine Model/Series:	TSIO-520-E
Registered Owner:	W J MEDICAL CONSULTING	Rated Power:	300 Horsepower
Operator:	W J MEDICAL CONSULTING	Operating Certificate(s) Held:	None

The airplane's maintenance records included an annual inspection maintenance endorsement, dated April 24, 2024 (about 11 weeks before the accident), which denoted that the airplane was "UNAIRWORTHY." Attached to the endorsement was a discrepancy sheet that had 3 pages of items to be corrected, including discrepancies with both engines and the airframe. Some items annotated on the discrepancy sheet included left and right fuel tank caps that required replacement (annotated "Done"), one of the right engine's cylinders below a compression of 45 psi, all right engine's spark plugs needing replacement, the right engine's oil and oil filter needing replacement, the right engine's fuel filter needing replacement, the right engine's and oil and fuel lines needing replacement (due to time in service and date).

The airplane had not been signed off for an annual or 100-hr inspection after the April 11, 2024, inspection. According to the mechanic who wrote the list, the majority of the items had not been corrected. This mechanic advised the pilot that he needed to apply for a ferry permit from the FAA in order to complete the flight to SJU. No documentation was available showing that the pilot had ferry permit had been obtained prior to the accident flight.

From November 2020 to April 2024, the maintenance records showed that the airplane had flown 1.4 hours. The most recent annual/100-hr inspection endorsement that found the airplane in an airworthy condition was dated June 6, 2019. The maintenance records indicated that the left engine was overhauled on December 14, 2011, and the right engine was field overhauled on October 24, 2008. According to the current revision of Continental Motors Service Information Letter SIL98-9, the recommended engine time between overhaul for the TSIO-520-E engine was 1,400 hours or 12 years, whichever occurred first. As of November 2020, the left engine had accumulated 400.3 hours since overhaul. As of June 2019, the right engine had accumulated 1,400.0 hours since overhaul.

According to FAA records, the airplane was purchased by the registered owner in August 2016.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	TJBQ,237 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	09:50 Local	Direction from Accident Site:	235°
Lowest Cloud Condition:	Scattered / 2800 ft AGL	Visibility	10 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	13 knots / None	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	70°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.01 inches Hg	Temperature/Dew Point:	31°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Aguadilla, PR (BQN)	Type of Flight Plan Filed:	None
Destination:	San Juan, PR (SJU)	Type of Clearance:	VFR
Departure Time:	09:19 Local	Type of Airspace:	Class D

Airport Information

Airport:	RAFAEL HERNANDEZ BQN	Runway Surface Type:	Asphalt;Concrete
Airport Elevation:	237 ft msl	Runway Surface Condition:	Dry
Runway Used:	08/26	IFR Approach:	None
Runway Length/Width:	11702 ft / 200 ft	VFR Approach/Landing:	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-ground
Ground Injuries:	1 Minor	Aircraft Explosion:	None
Total Injuries:	1 Fatal, 1 Minor	Latitude, Longitude:	18.505987,-67.112265

The airplane impacted a residential area front yard including trees, powerlines, and propane fuel tanks. The wreckage remained in a compact area and was oriented on a magnetic heading of 330°. A postaccident fire consumed a majority of the cockpit, fuselage, and portions of both wings.

Flight control cable continuity was established from the elevator, rudder, and elevator and rudder trim tabs to the fire damaged cockpit. The elevator trim was found about 1.5°- 2.5° down. The aileron control cables from the cockpit to the center sector were continuous. The right aileron was attached to the remaining wing section and cable continuity was established to the center sector. The left aileron was completely thermally destroyed and unobserved. The left aileron main cables were found attached to the wing sector and continuous to the center sector. Left aileron trim cable continuity was established from the actuator to the control wheel. The chain at both ends was disconnected from their respective sprocket. The flap panels were thermally destroyed and not observed. The measurement of the chain on the actuator corresponded to a flap position of about 10°. The flap cables were continuous to the drive bellcranks and outboard pushrods. The landing gear were found retracted. The flap actuator was measured and corresponded to about a 10° position. The majority of the fuel tanks were thermally damaged. The fuel selector panel was thermally destroyed and the selector valves did not reveal reliable indications. The cockpit, switches, levers, and flight instruments were all severely damaged by fire.

Both engines had separated from the airframe and were found a few feet forward of the wings. The engines exhibited impact and post-impact fire damage. The engine casings did not have any large cracks or holes. The spark plugs and magnetos for each engine remained securely installed. Each engine was equipped with a three-blade propeller.

Two of the left engine propeller blades exhibited little to no torsional twisting or bending. One blade exhibited aft bending near its tip, and also had chordwise scratches near the blade root.

The right engine propeller blades exhibited varying degrees of chordwise scratching and blade polishing. One blade displayed aft bending, and one blade exhibited forward bending near its tip. The remaining blade exhibited little forward or aft bending.

During an examination at the engine manufacturer's facility, the right engine crankshaft rotated 720° when force was applied to the crankshaft flange. Cylinder compression and valve action movement were observed on all cylinders. Both magneto condensers were damaged by thermal forces and each of the magnetos produced blue spark when a replacement condenser was supplied. The fuel manifold was damaged by thermal forces and was opened for further investigation. Visible corrosion and remains of diaphragm material were present. Below the fuel screen at the fuel inlet within the manifold was a large quantity of debris and foreign material.

The left engine crankshaft rotated 720° when force was applied to the crankshaft flange. Cylinder compression was observed on cylinder Nos. 2 through 6. Compression could not be obtained on cylinder No. 1 and when compressed air was applied it leaked past the piston rings. Valve action movement was observed on all cylinders.

Injuries to Persons

One person on the ground, who was riding his bicycle near the road the airplane impacted, sustained minor injuries when he was struck with small debris and fell off his bicycle.

Medical and Pathological Information

According to the autopsy report issued by the Instituto de Ciencias Forenses, Gobierno de Puerto Rico, the cause of death was thermal injuries, and the manner of death was an accident.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot. No tested-for substances were detected.

Additional Information

According to the Cessna Model 402B Pilot's Operating Handbook (POH), section 3, "Emergency Procedures," the recommended safe single-engine speed was 91 knots indicated air speed (KIAS). The minimum controllable airspeed was listed as 82 KIAS.

Furthermore, the POH procedure Engine Failure After Takeoff (Speed Above 91 KIAS with Gear Up or In Transit) listed the following as "immediate action items" that "should be committed to memory":

1. Mixtures – FULL RICH
2. Propellers – FULL FORWARD
3. Throttles – FULL FORWARD (34.5 Inches Hg.)
4. Landing gear – CHECK UP
5. Inoperative engine:
 - a. Throttle – CLOSE
 - b. Mixture – IDLE CUT-OFF
 - c. Propeller – FEATHER.

It then stated to establish a bank of 5° toward the operative engine.

Preventing Similar Accidents

Manage Risk: Good Decision-making and Risk Management Practices are Critical (SA-023)

The Problem

Although few pilots knowingly accept severe risks, accidents can also result when several risks of marginal severity are not identified or are ineffectively managed by the pilot and compound into a dangerous situation. Accidents also result when the pilot does not accurately perceive situations that involve high levels of risk. Ineffective risk management or poor

aeronautical decision-making can be associated with almost any type of fatal general aviation accident.

What can you do?

- Develop good decision-making practices that will allow you to identify personal attitudes that are hazardous to safe flying, apply behavior modification techniques, recognize and cope with stress, and effectively use all resources. Understand the safety hazards associated with human fatigue and strive to eliminate fatigue contributors in your life.
- Understand that effective risk management takes practice. It is a decision-making process by which you can systematically identify hazards, assess the degree of risk, and determine the best course of action.
- Be honest with yourself and your passengers about your skill level and proficiency. Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself and the FAA about your medical condition. If you have a medical condition or are taking any medication, do not fly until your fitness for flight has been thoroughly evaluated.
- Plan ahead with flight diversion or cancellation alternatives, and brief your passengers about the alternatives before the flight.

See <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-023.pdf> for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Enders, Ryan
Additional Participating Persons:	Raymond M González-Otero; FAA/FSDO; San Juan, PR PJ Beavers; Textron Aviation; Wichita, KS J. Ferrell; Continental Aerospace Technologies; Mobile, AL
Original Publish Date:	May 13, 2026
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=194672

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).