



National Transportation Safety Board Aviation Accident Final Report

Location:	Banning, CA	Accident Number:	WPR17LA090
Date & Time:	04/24/2017, 1345 PDT	Registration:	N6218Y
Aircraft:	CESSNA T210N	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	1 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The private pilot was conducting a flight from New Mexico to California in the single engine airplane. About 35 miles short of his destination, in day visual meteorological conditions, the pilot reported that the engine experienced a power problem, and he then attempted to land at a nearby airport. The airport attendant reported hearing the pilot announce over the common traffic advisory frequency that the airplane had experienced a "massive power failure." He saw the airplane on the right downwind leg of the traffic pattern, and again on final, and both times he thought that it was positioned for a normal landing. Shortly thereafter, he saw a cloud of dust near the end of the runway. The airplane touched down about 180 ft short of the runway and sustained substantial damage.

The pilot was initially detained by law enforcement personnel, and subsequently incarcerated for reasons unrelated to the accident, which prevented him from being interviewed by investigation personnel. As a result, the exact nature of the engine power loss, the location and altitude of the airplane when the power loss occurred, and the pilot's actions subsequent to the power loss were all unable to be determined.

Examination of the wreckage did not reveal any evidence of preimpact mechanical malfunctions or failures that would have precluded continued flight. The right fuel tank contained sufficient fuel for continued flight, but the left fuel tank was empty. A lack of fuel in a segment of the airplane fuel system downstream of the fuel selector valve was consistent with fuel starvation. However, the fuel selector valve was found in the OFF position, and the investigation was unable to determine when, or by whom, the valve was placed in that position.

Despite the fact that the pilot experienced some degree of engine power loss, he opted to fly a normal traffic pattern, instead of a more direct approach that would better ensure a landing on the runway. As a result, the airplane touched down short of the runway. The short landing demonstrated that the approach was not conducted in accordance with FAA guidance to allow sufficient margin to enable corrections for errors on final approach during an emergency landing. Although the investigation was unable to determine the specific reasons for the short

landing, the underlying cause was improper energy management by the pilot during the approach; the pilot's execution of an apparently normal traffic pattern, in combination with the strong headwinds on the final approach leg, left the airplane with insufficient energy to reach the runway.

Probable Cause and Findings

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

The pilot's improper energy management during an emergency landing approach that was prompted by an engine power loss. The specific reason(s) for the power loss and the improper energy management could not be determined based on available evidence.

Findings

Aircraft

Engine (reciprocating) - Related operating info (Factor)

Personnel issues

Decision making/judgment - Pilot (Cause)

Not determined

Not determined - Unknown/Not determined (Factor)

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)
Approach	Off-field or emergency landing Collision with terr/obj (non-CFIT)

On April 24, 2017, about 1345 Pacific daylight time, a Cessna T-210N, N6218Y, was substantially damaged when it touched down short of the runway at Banning Municipal Airport (BNG), Banning, California, following an engine power loss. The private pilot received minor injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the flight.

According to the BNG airport attendant, he was in his office at BNG when he heard the pilot announce on the BNG common traffic advisory frequency (CTAF) that he had experienced a "massive power failure" and that he "was coming in hot for runway 26" via a right traffic pattern. The attendant looked out his office window and saw the airplane on a right downwind leg of the traffic pattern for runway 26; he thought the airplane was appropriately situated to make a normal landing. The attendant was aware that a helicopter was planning to depart BNG at that time, and radioed an advisory to the airplane, but did not hear any response from the airplane.

From his office, the attendant then watched the airplane descend on the final approach leg for runway 26. The airplane's approach appeared normal until the attendant observed a large "cloud of dust," and the attendant realized that there was a problem with the landing. The attendant exited his office, and drove out to the airplane. The pilot emerged from the airplane with some facial injuries, and the attendant suggested that he take the pilot to the hospital, to which the pilot agreed. Enroute to the hospital in the attendant's truck, the pilot requested that he be dropped at a rental car facility instead; the attendant then drove them to a local car rental facility, where the pilot obtained a rental car. The pilot told the attendant that he had left some personal items in the airplane, and needed to retrieve them prior to obtaining medical care. He then followed the attendant back to BNG.

The two vehicles arrived back at BNG about 1420, where they were stopped by Banning Police Department officers. The officers prevented the airport attendant from returning to the airplane, but allowed the pilot to drive to the airplane. Shortly after that, the pilot was detained by personnel from other law enforcement agencies who had responded to the scene, for reasons unrelated to the accident.

Sometime thereafter, a Federal Aviation Administration (FAA) inspector from the Riverside Flight Standards District Office arrived on scene. He was allowed a brief opportunity by the law enforcement personnel to question the pilot, and to examine the airplane. The airplane was moved to a hangar, and examined in more detail a few weeks later.

Pilot Information

Certificate:	Private	Age:	24, Male
Airplane Rating(s):	Single-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:	No
Medical Certification:	Class 1 With Waivers/Limitations	Last FAA Medical Exam:	09/01/2015
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	1458 hours (Total, all aircraft), 185 hours (Total, this make and model)		

FAA records indicated that the pilot obtained his private pilot certificate in July 2011, and that his most recent FAA first-class medical certificate was issued in September 2015. FAA records indicated that the pilot had purchased the airplane in March 2017, and that he also owned a Mooney M20 series airplane, N231GV.

A partially-completed "Pilot Logbook" was recovered from the airplane. Although it did not bear any ownership or identification information, the airplane registration numbers in the entries matched the two airplanes registered to the pilot. No endorsements were present in the logbook.

The first logbook entry was dated 12/14/16, and the first page of the logbook indicated that the pilot had 1,183 hours of flight experience. The final, partially completed page of the logbook indicated that the pilot had about 1,458 hours of flight experience.

The first 39 logbook entries were for the pilot's Mooney. The accident Cessna was first noted in this logbook on 1/25/17. With the exception of two flights in the Mooney, the remaining 76 flights were in the Cessna, for a total flight time in the Cessna of about 185 hours.

The logbook contained two entries for 4/23/17, the day prior to the accident. The first entry indicated a flight from ALN (St. Louis Regional Airport, Alton/St Louis, Illinois) to HQZ (Mesquite Metro Airport, Mesquite, Texas), with a flight duration of 2.5 hours. The second flight was from HQZ to SGR (Sugar Land Regional Airport, Houston, Texas), with a duration of 1.2 hours.

The final entries in the logbook were dated 4/24/17, the day of the accident. The first leg for that day was listed as being from SGR (to DMN, with a duration of 4.3 hours. The second and final entry indicated a departure airport of DMN, but no destination or flight duration.

Within a few hours of the accident, for reasons unrelated to the accident, the pilot was

incarcerated by law enforcement agents, and thereby rendered unavailable for any further NTSB or FAA communications regarding this accident investigation.

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	Registration:	N6218Y
Model/Series:	T210N N	Aircraft Category:	Airplane
Year of Manufacture:	1981	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	21064299
Landing Gear Type:	Retractable - Tricycle	Seats:	
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	4000 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	2635 Hours at time of accident	Engine Manufacturer:	Continental
ELT:		Engine Model/Series:	TSIO 520
Registered Owner:	On file	Rated Power:	310 hp
Operator:	On file	Operating Certificate(s) Held:	None

The airplane was manufactured in 1981, and was equipped with a Continental Motors TSIO-520 series engine. According to the FAA inspector, the airplane hour meter indicated that it had a total time in service of about 2,635 hours. No maintenance records were able to be obtained for the investigation.

Fuel System

The airplane was equipped with two wing (main) fuel tanks, for a total usable fuel capacity of 89 gallons. Two small reservoir tanks, one per side, were situated between their respective main fuel tanks and the fuel selector valve (FSV). Each of the four tanks was equipped with its own sump drain valve. The FSV had three settings, LEFT, OFF, and RIGHT.

An electric auxiliary fuel pump was located just downstream of the FSV. Beyond the auxiliary fuel pump, in the direction of fuel flow, were the fuel strainer and then the engine driven fuel pump (EDP). The EDP fed fuel to the fuel/air control unit, which in turn provided metered, pressurized fuel to the fuel manifold valve.

The fuel manifold valve was mounted on top of the engine, and its installation included one inlet line and six outlet lines, one per cylinder. Normal valve function closes off flow to the cylinders when the inlet fuel pressure falls below a value of about 4 pounds per square inch (psi). When the valve closes, fuel will typically be retained in the valve body.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 2155 ft msl	Distance from Accident Site:	2 Nautical Miles
Observation Time:	1314 PDT	Direction from Accident Site:	90°
Lowest Cloud Condition:	Clear	Visibility	
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	17 knots / 28 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	270°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	15° C / 9° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Deming, NM (DMN)	Type of Flight Plan Filed:	None
Destination:	Corona, CA (AJO)	Type of Clearance:	None
Departure Time:	MDT	Type of Airspace:	

The airport was equipped with an automated weather observation system (AWOS), but the AWOS data was not obtained by the investigation. The National Weather Service weather observations for the city of Cabazon, located about 2 miles east of BNG, indicated that the winds were from the west to west-northwest at 17 mph, with gusts to 28 mph. Sky condition was clear, and the temperature was about 15° C, with a dew point of 9° C.

Airport Information

Airport:	Banning Municipal (KBNG)	Runway Surface Type:	Dirt
Airport Elevation:	2222 ft	Runway Surface Condition:	Dry; Rough; Vegetation
Runway Used:	26	IFR Approach:	None
Runway Length/Width:	4995 ft / 100 ft	VFR Approach/Landing:	Forced Landing; Precautionary Landing; Traffic Pattern

The airport was equipped with a single paved runway, designated 8/26. The runway measured 4,955 feet by 100 feet, and airport elevation was 2,222 feet msl. Runway 26 had a displaced threshold of about 300 feet, and was equipped with a two-light pulsating precision approach path indicator (PAPI). It was not equipped with an air traffic control tower; BNG air traffic communications and coordination were accomplished via the CTAF. The CTAF

communications were not recorded.

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor	Latitude, Longitude:	33.922500, -116.850833 (est)

Ground scars indicated that the airplane touched down about 180 feet short of the paved beginning of runway 26. The airplane came to rest a few feet beyond the beginning of the pavement, after it penetrated a wire fence just east of the runway. The nose gear had collapsed sometime during the event, and the tailcone, right wing, right horizontal stabilizer, and right elevator exhibited crumpling, crush, and tearing damage.

As a result of his examination on the day of the accident, the FAA inspector reported that the left fuel tank was devoid of fuel, and that the right fuel tank was between one-eighth and one-quarter full. Neither wing fuel tank was breached. The FAA inspector found the fuel selector valve in the "OFF" position, but was unable to determine when it was placed in that position, or by whom. The airplane was placed in a secure hangar for further, examination at a later date.

The airplane was examined in greater detail about a month after the accident by an NTSB investigator and a certificated mechanic with an Inspection Authorization rating. The examination and results are described in the sequence that the examination was conducted. The airplane was resting on its main gear, in an approximately level pitch attitude, its nose supported by hangar equipment. The engine remained attached to the airframe, and the propeller remained attached to the engine. The three propeller blades displayed limited but varying amounts of aft bending.

The FSV handle was found in the OFF position. Actuation of the fuel strainer drain handle in the engine compartment did not result in any liquid being drained from the fuel strainer. The fuel line from the fuel/air control unit to the fuel manifold valve was then disconnected at the fuel manifold valve; no fuel was present in that line.

The left fuel tank was visually observed to be empty, and no fuel was obtained from the left wing sump drain when it was activated. The FSV handle was placed in the LEFT wing tank position, and less than an ounce of clear fuel was obtained from the open end of the line that was previously disconnected at the fuel manifold valve. The auxiliary fuel pump was then turned on, and about 12 ounces of fuel were collected from that disconnected line end before the flow ceased.

The right tank fuel depth measured about 4.5 inches. The tank was then drained, which yielded

a total of about 27 gallons of fuel. Fuel was obtained from the left and right reservoir tank sump drains.

The fuel manifold valve was partly disassembled, and fuel was present in the valve body. The diaphragm was pliable and intact, and the screen was clean. The spark plug electrodes appeared normal, and the engine was able to be rotated easily by hand. Thumb compressions and magneto-produced sparks were observed at all cylinders, in proper firing order sequence.

No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

Additional Information

Previous Fuel Purchases

According to an airport attendant at Deming Municipal Airport (DMN), Deming, New Mexico, the airplane was fueled with 74.9 gallons about 1000 local time on the morning of the accident. No records of any other fuel purchases were obtained.

Investigation Uncertainties or Unknowns

Several details of the flight and accident events were unable to be determined with certainty, as noted below.

The pilot's recounts of the sequence of events varied, but most information indicated that he had departed DMN earlier that day, and was destined for Corona Municipal Airport (AJO), Corona, California. However, it was unclear whether he made any interim stops after he departed DMN.

According to verbal reports from the US Customs and Border Patrol Air and Marine Operations Center (AMOC), shortly before the accident, the AMOC radar tracked the airplane departing from Jacquelin Cochran Airport (TRM), Thermal, California. However, multiple NTSB requests to the AMOC for more specific or comprehensive tracking or flight data did not result in the provision of any additional information. For reference and orientation purposes, TRM is situated between the pilot's stated departure and destination airports (DMN and AJO), and also between the departure airport and the accident airport (DMN and BNG). TRM is about 433 nm west of DMN, and about 39 nm east of BNG. AJO is about 34 nm west of BNG.

The pilot did not specify his altitude or location when he experienced the power loss, or any details regarding his flight path, altitude, or configuration as he maneuvered towards BNG. The pilot provided unclear and conflicting reports about whether the power loss was partial, complete, or initially a partial power loss that subsequently degraded to a complete power loss. Finally, he did not provide any information regarding his post power loss or post accident

actions. Investigation attempts to communicate with the pilot after the day of the accident were unsuccessful.

The investigation was unable to determine when, or by whom, the fuel selector valve was placed in the OFF position. The investigation was unable to determine whether that occurred inadvertently in flight, intentionally in flight in preparation for the emergency landing, or after the accident by either the pilot or first responders.

No air traffic control communications or radar tracking data regarding the flight were able to be obtained, and no airport communications were recorded.

Precautionary & Forced Landings

Due to the lack of information provided by the pilot, the investigation was unable to determine the pilot's options, or his decisions and actions, after he detected the engine problem. According to the Airplane Flying Handbook ("AFH", FAA-H-8083), two types of emergency landings are 'Forced landings' and 'Precautionary landings.' A forced landing is defined as an "immediate landing, on or off an airport, necessitated by the inability to continue further flight," and the typical initiator is a complete loss of engine power in a single engine airplane. A precautionary landing is a "premeditated landing, on or off an airport, when further flight is possible but inadvisable." The AFH continued with "A precautionary landing, generally, is less hazardous than a forced landing because the pilot has more time for terrain selection and the planning of the approach. In addition, the pilot can use power to compensate for errors in judgment or technique."

The AFH then stated that "When the pilot has time to maneuver, the planning of the approach should be governed by" wind direction and velocity, dimensions and slope of the selected landing area, and obstacles in the final approach path. The AFH continued with "when compromises have to be made, the pilot should aim for a wind/obstacle/terrain combination that permits a final approach with some margin for error in judgment or technique."

Neither the AFH nor any other FAA guidance elaborated on principles or techniques to provide the "margin" advocated above. However, an internet search yielded multiple relevant articles from sources including AOPA (Aircraft Owners and Pilots Association), Aviation Safety magazine, and Skybrary. These articles concerned the topic of "energy management" as it related to powered and unpowered flight.

Energy is a primary parameter for the alteration of a flight path. With limited or no engine power, the primary energy sources are airplane speed and altitude; a pilot's manipulation of these will determine the rate of energy loss. The control of energy dissipation, referred to as "energy management," determines the range capability of the unpowered (gliding) airplane. During a low-powered or unpowered approach, selection of the ground track towards the intended landing location is a key component of energy management. Appropriate track selection and energy management will help ensure that sufficient altitude and/or airspeed is available to provide the corrective-action "margin" advocated above by the AFH. Generally, the most direct path to a point close to the landing area threshold, conducted at best glide speed, and combined with delayed deployment of flaps and landing gear, will be the most conservative energy management strategy.

Finally, the AFH noted that "experience shows that a collision with obstacles at the end of a ground roll...is much less hazardous than striking an obstacle at flying speed before the touchdown point is reached."

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	Report Date:	07/05/2018
Additional Participating Persons:	Gabriel Serrano; FAA; Riverside, CA		
Publish Date:	07/05/2018		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=95057		

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