

Please provide a detailed written statement including all pertinent information prior to, during and after the event. This would include weather conditions, condition of aircraft, sounds or noises, engine performance and anything that may seem insignificant but might help us in our investigation.

The Pilot

My name is Michael Kummer and I was the pilot during the emergency landing on May 22, 2024 at KVEL. I am a private pilot with a high performance endorsement. I completed my primary training during calendar year 2023. I began the process in January 2023 and took my private pilot checkride in December 2023. I currently have a total of 117.4 hours. All 117.4 of those hours were in the plane I was flying on May 22, 2024. All 117.4 hours have been logged in the last 12 months. And 17.4 of those hours have been logged in the last 90 days. I have logged 59.7 hours of cross country time.

The Plane

I was flying my 1960 Cessna 182C (N8580T). Prior to the flight, N8580T had a total time of 4857.5, engine time SMOH of 1,450.5 (TBO 1,500), last annual performed June 13, 2023. The engine was last overhauled in 1991. I purchased N8580T in June of 2023. During the purchase, I had a full annual performed. I had the engine bore scoped and an oil analysis performed. Engine condition was healthy. Prior to my ownership, N8580T was flown an average of 40 hours per year. In the past year, N8580T has flown 175 hours. N8580T is equipped with steam gauge instruments, basic nav/com radios, a digital tach and digital fuel flow computer, ADS-B in & out, and zero glass.

The Preflight

In advance of the trip, I had my mechanic change the oil. He cut open the oil filter for inspection and found no metal. I flew the plane a few times afterwards. On Tuesday evening (May 21), I performed a complete preflight of the aircraft. I weighed all our baggage on our home scale (food @32.6lbs, duffel @26.2lbs, stroller @34.2lbs = 94.2lbs total baggage) and loaded it to ensure that the plane with full fuel, passengers, and luggage was within envelope. I stood with the FBO line person when he filled the tanks. I checked fuel gauges to ensure they indicated full, visually inspected and dipped the tanks to ensure they were full, secured the caps, and sumped the four available sumps and inspected the fuel. That left me certain I had 55 gallons of good fuel. Oil was at +10 quarts. The plane is stored in a temperature controlled hangar. Watching the weather conditions indicated that Wednesday morning was the best time to depart as there was a large system moving into the Northwest. Wednesday was a day earlier than our original plan and provided plenty of extra time to leisurely make the trip. Wednesday morning I performed an additional condensed preflight of the aircraft. Nothing was out of the ordinary.

The Trip

We were taking a cross country trip from Bozeman, Montana (KBZN) to Carlsbad, California (KCRQ). There were three individuals on board – myself, my wife, and our son. I planned two route options: (1) departing KBZN to the south and (2) departing KBZN to the east. When I started the airplane on Wednesday, I reset my Shadin Microflo-L Fuel Flow Computer which calculates endurance based on 54 gallons of fuel just to give a small margin. Run up was normal with mags checking within tolerance, carb heat functioning, and propeller cycling correctly.

We departed KBZN at approximately 0700 on May 22, 2024 and headed east towards Billings to provide some geographic buffer against the low ceilings forecast in southwest Montana. East of the Beartooth Mountains and headed south, the ceilings continued to rise with skies becoming clear around Cody, Wyoming. A headwind and light intermittent turbulence were as expected throughout Wyoming.

Cruising at 9,500 MSL or 10,500 MSL dependent on direction, I switched between the right and left fuel tank every 30 min to maintain a balanced fuel load. As the fuel gauges for the tanks are on the right side of the panel, my wife assists with monitoring the gauges and reminding me of the time. On the left side of the panel is the fuel computer. The fuel computer is set to display endurance and fuel burn in gallons per hour. We were cruising at 19 inches of manifold pressure and 2,300 rpm and the fuel computer indicated a fuel burn of 11 gph. The POH operational data states that when cruising at 10,000 MSL with 19 inches of manifold pressure and 2,300 rpm the fuel burn should be 11.1. Thus, this was consistent and as expected. Regularly monitoring oil pressure, oil temp, cylinder head temp, and carb temp everything was operating in the normal range.

At Rock Springs, Wyoming (KRKS), I checked the fuel computer which indicated 1h30m endurance left, I measured the distance between KRKS and KVEL on ForeFlight which indicated it was 30m or 7gal, and I verified that the fuel gauges were consistent with the fuel computer. The right tank was indicating approximately 1/3 and the left tank was indicating approximately 1/2. I then switched the fuel selector from the right tank to the left tank and proceeded to KVEL with the intent of stopping for a bite to eat and fuel. At no point prior to the engine failure at KVEL did the fuel gauges indicate in the red (which is the line for 1/4 tank or less). My wife and I both recall this fact distinctly.

Right before KVEL, the terrain rises and the maximum elevation figure on the sectional chart indicates 10,100 for that quad. As such, we performed a cruise climb up to 11,500 MSL (+1,000ft) to safely clear the mountains. Once over the mountains, I planned a straight in landing for Runway 17. The recent KVEL METAR via ADS-B IN indicated that runway 17 was the preferred. I also tuned in ASOS (118.125). The ASOS indicated that wind information was unavailable. Winds had been consistently out of the southwest so I felt comfortable that 17 was most appropriate runway.

The Engine Failure

Beginning at 20nm out, the descent was relatively steep and I slowly kept reducing power as to lose altitude while maintaining the airspeed indicator in the green arc. I was cognizant of shock cooling the engine and left some power in most of the descent and turned carb heat on once below 10 inches of manifold pressure. The mixture was still leaned out and there was no indication of the engine running rough. At 10nm out, I made a call on the CTAF announcing my intentions. At 5nm out, I made another call on the CTAF announcing my updated position. I performed a brief slip to lose some altitude. I then raised the nose as to reduce speed and set up to stabilize my approach for short final. I pulled power to idle to bleed off the last bit of airspeed to get to my flap operation range. At 100 IAS and approximately 3nm, I deployed full flaps (40 degrees) and continued slowing up and sinking into the glide path. I received an audible 500AGL message from ForeFlight over my headset.

At 80 IAS and on the glide path as indicated by the PAPI, I was just about to add power back when the engine stumbled and quit running. There was no discernable bang or violent metal impact sound. Nor did it sound like when you pull the mixture to shut down the engine after a flight. Just a stumble and it was gone. This was prior to being stabilized on short final so I had not yet completed my pre-landing

checklist. As such the airplane was currently configured, fuel left tank, mixture lean, prop out, carb heat on, and flaps full.

After a half second of disbelief, I attempted to restart the engine. I pushed mixture to full rich, prop full in, and throttle full in. The engine surged but never restarted. I then turned carb heat off and cycled the throttle again. No attempted restart. I failed to switch fuel tanks and attempt a restart. At that point I was out of time and needed to execute an emergency landing. It was clear I was not going to make the runway.

My best option was a field approximately 500ft in length that was in line with the approach. Immediately before the field was a courthouse building that was 3 or 4 stories tall. Then the field. Immediately after the field was an industrial pipe yard. At the rate I was currently descending it was clear that I was not going to clear the courthouse so I pitched the nose up to slow my descent and loft over the building. As I was over the top of the courthouse, the stall horn activated. I softened the pitch but remained in an attitude/airspeed that activated the stall horn. Once clear of the building, I attempted to get the stick forward slowly as to not gain additional speed and remain right on the edge of the stall all the way to the ground. My aiming point and descent indicated I might touch down 1/2 to 2/3 of the way across the field. Ultimately, I was unable to maintain sufficient speed/attitude and aerodynamically stalled while we were still 10-20 feet off the ground. The nose pitched down and the right wing dropped slightly before we were on the ground. From inside the cabin, there was no discernable skid across the ground. But looking at it after words, it appeared that the right main impacted the ground prior to where the aircraft came to rest. The plane was in the center of the field. The nose and right main gear legs collapsed and the right side of the engine compartment took the brunt of the impact. The time was approximately 1030 MDT.

Afterwards

My family and I exited the aircraft from the left side door immediately. We stepped away from the plane and made sure everyone was ok. My son sustained what would be described as minor injuries in the form of a good sized lump on his forehead.

We were approximately 1 mile (maybe less) from the airport and emergency personnel where there immediately. My wife was told by two of the responders (paramedics?) that they were standing outside their station nearby and had witnessed the entire event.

After some time, I returned to the plane with the firemen to shut off the fuel, master, and show them where to disconnect the battery. My family and I traveled to the paramedic's station while recovery efforts were beginning. There I contacted the NTSB and my insurance company. I returned to the aircraft later that afternoon and rejoined the responders.

The NTSB cleared us to move the aircraft to the airport and requested that fuel from each tank be drained and measured. The sheriff who had been assisting the NTBS with taking pictures for the investigation asked that I visually look in the tanks to check the fuel levels. As the aircraft was banked significantly to the right and pitched forward I was unable to get a useful sense of how much fuel was in either tank. The tanks hold a total of 65 gallons (32.5 gallons each side). 55 gallons of that is usable in all phases of flight (27.5 each side). Seven gallons is only usable in cruise (3.5 gallons per side). And 3 gallons is unusable (1.5 gallons per side). The sheriff thought the left tank was completely dry which

would be impossible since there were no signs of fuel leaking. At the very least, there would be the unusable fuel in the tank unless it somehow cross fed to the other tank due to the angle the plane was resting on the ground.

The plane was transported to the airport using a sling system of tow straps and a tele handler. The plane was put in a back field behind the airport terminal building. When setting the plane on the ground, the recovery crew tried to set it so the wings would be level and fuel samples could be taken but were unable to do so. The A&P who was supervising the recovery offered his contact information to the NTSB to discuss the fuel samples with him further. The fuel cap on the right tank was left open from the sheriff's inspection and may still be open as it was when I left that evening. I should have closed it but was a bit unsure what details to concern myself with at that time.

Why?

I've spent a significant amount of time trying to determine what caused the engine failure and am unable to settle on a convincing answer. Below I will summarize my thoughts as to hopefully assist with figuring out what actually happened.

1. Fuel Exhaustion.

The engine was running, it stumbled, and quit. When I attempted a restart, I did not switch the fuel selector and when I pushed the throttle all the way in the engine surged momentarily and did not start. Additionally, the phase of flight was prior to my approach being stabilized so I had not completed my pre-landing checklist and the fuel selector was on the left tank, instead of both. Maybe that switch prevents or corrects the emergency and this was purely pilot error.

But then I think of how much fuel I had. I watched the tanks get filled and physically confirmed they were full. Our fuel burn as displayed by the fuel computer, as predicted by the POH for those altitudes and power settings, and as indicated by the fuel gauges and wrist watch were all as expected. Planning and flying a 3h-3.5h trip was not unusual for N8580T. At Rock Springs, the fuel computer, fuel gauges, time, and experience all suggested that 1h30m of endurance remaining was accurate. I measured the distance between Rock Springs and Vernal on ForeFlight which is set up with a profile for that specific plane and it was predicted that it was a 30min leg. That left me with 1h of fuel reserves at Vernal. On the flight into Vernal, at no point did either the right or left fuel tank gauge indicate in the red (1/4 tank or less). A quarter tank equates to 6.875 gallons of usable fuel. During the descent, power was significantly reduced and in fact was at idle when the engine quit, suggesting that little fuel was being drawn during that time period. Finally, although not intentionally, I have landed this plane before with the fuel selector on a single tank without issue.

In conclusion, this theory makes the most sense but I just cannot reconcile it with the amount of fuel I should have had at the time.

2. Mechanical Failure.

Engine

As specified by Continental Motors, the time between overall intervals for the O-470-R engine (older serial number) is 1,500 operating hours or 12 years after being placed in service,

whichever occurs first. By operating hours, N8580T is approximately 50 hours short of TBO. By time in service, N8580T is well beyond TBO. As such, it is possible that a haphazard mechanical failure occurred.

But then I think of how closely I have monitored the engine. At last annual, I had it bore scoped. I sat with the mechanic and asked him to walk me through exactly what he was seeing in the images and asked many questions to understand how to visually discern what I was looking at and what it meant. I had an oil sample sent off for analysis and a follow up discussion with the lab technician to understand what the report was indicating. Both of those inspections indicated the engine was healthy. I also verified those conversations with multiple pilots I know with substantially more experience than me. At every oil change the filter has been cut open and inspected for metal. Every inspection has been considered healthy. This includes the oil change on 5/10/2024. Further, N8580T has flown many more hours this past year than in years prior. I have flown it. I have flown it with my instructor. Other pilots have sat right seat as passengers. Two other pilots have flown it regularly. The engine has performed reliably and without hesitation. Finally, on this trip all gauges monitoring engine functions were indicating squarely within the green arc.

In conclusion, this theory is possible but there is not a strong indicator to me that it is probable.

Fuel System

I reviewed the logs and identified the following fuel system related entries: (1) 1968 - repaired fuel vent line on left tank; (2) 1989 – repaired fuel cells; (3) 1989 – replaced fuel caps; (4) 1994 – fuel odor in cabin, traced, replaced left fuel cell; (5) 1995 – replaced left fuel tank sending unit; (6) 2020 – rebuilt fuel selector valve; (6) 2021 – new RH fuel sender gasket; and (7) 2022 – new RH fuel transmitter gasket. Many components of the fuel system are quite old so it is possible that there was a haphazard mechanical failure with this system. Also, there has always been a fuel odor in the cabin but I have assumed it was due to the fact that my fuel tester and fuel dipstick were stored in the cabin. None of the other pilots I have had around the plane have commented on it being unusual and there were no visual signs of a fuel leak.

In conclusion, this theory makes sense to me but I am unsure how probable it is.

3. Carburetor Ice.

N8580T is equipped with a carb temp gauge. During the flight, I continually scan the instruments and the carb temp gauge was indicating squarely in the green arc. This gauge is on the far right of the panel and my wife too was monitoring it and recalls it in the green arc. During run-up, the carb heat was working correctly. On descent into Vernal, I reduced power and brought on carb heat as appropriate. This fact is distinctly clear in my memory because when the engine quit and I attempted to restart it for the second time, I thought maybe the mixture was too rich due to carb heat and turned the carb heat off to attempt the second restart.

In conclusion, I feel confident ruling this theory out.

4. Mixture too lean on Descent.

On descent from 11,500 down to 5,700 I did not enrich the mixture. At no point during the descent did the engine begin to run rough. Also, when I attempted a restart I did set the mixture to full rich and the engine did not restart. It is a carbureted engine so I don't think vapor lock would have been an issue.

In conclusion, I feel confident ruling this theory out.

5. Shock Cooling.

My descent from 11,500 down to 5,700 was steeper than the descent into my home airport. I reduced power more than a typical descent into my home airport. Further, I pulled power to idle briefly during descent (and shortly before the engine failed) which I typically would not do until I have the runway made. But my understanding of shock cooling is it is hard to cool at quick enough rate to actually do damage. The damage that could be done is hard on the cylinder case but is unlikely to result in immediate engine failure.

In conclusion, I feel confident ruling this theory out.

Please provide the following information.

1. *Current Mailing Address:*

[REDACTED]

2. *Pilot Certificate Number:*

[REDACTED]

3. *List of all pilot ratings:*

Private Pilot; Airplane Single Engine Land

4. *Date of Birth:*

[REDACTED]

5. *Total Flight Hours in this Make and Model:*

117.4

6. *Total of all Flight Hours Flown in the Last 90 Days:*

17.4

7. *Total of all Flight Hours Flown in the Last 12 Months:*

117.4

8. *Total of all Flight Hours (Total Pilot Time):*

117.4

9. *Date and Class of current Medical Certificate:*

05/10/2023 and 3rd Class

10. *Date of last Flight Review:*

12/12/2023; Private Pilot Checkride

11. *Did you attend any Safety Seminars or Clinics within the last 2 Years (If Yes the Dates of attendance):*

No

12. *Did you participate in the Wings Program in the past 2 Years (If Yes the Dates of attendance):*

No

13. *If applicable, did you attend any AIR Carrier Initial Training within the past 2 Years (If Yes the Dates of attendance):*

N/A

14. *If applicable, did you attend any AIR Carrier Recurrent Training within the past 2 Years (if Yes the Dates of attendance):*

N/A

15. *If applicable, did you attend any AIR Carrier Requalification Training within the past 2 years (If Yes the Dates of attendance):*

N/A

16. *Did you attend any transition training within the past 2 Years (If Yes the Dates of Attendance):*

No

17. *Did you attend any Simulator Training within the past 2 Years (If Yes the Dates of attendance):*

Yes. I have a Redbird home simulator running Microsoft Flight Simulator 2020. On the simulator, I fly the Cessna 182RG II as it is the most similar option to N8580T. I fly it regularly for training and in preparation for cross country trips. I flew it multiple times in preparation for this specific trip. I have logged approximately 75 hours on my simulator in the last 12 months.

18. *Did you attend any Commercial/Third Party Training or new ratings within the past 2 Years (If Yes the Dates of attendance):*

Yes. Private Pilot training. Sporty's ground training (March 14, 2023 - June 12, 2023). Ridgeline Aviation flight training (June 17, 2023 – December 12, 2023).

19. *Did you attend any Other Training within the past 2 years (If Yes the Dates of attendance):*

Yes. Montana Aviation Conference information session on backcountry safety (March 4, 2023). EAA AirVenture information session on Continental engine care (July 24, 2023).

20. *Did you receive a Weather Briefing (if so what was the source):*

Yes. Standard briefing via ForeFlight (briefed May 22, 2024 @5:47am MDT).

21. *Current Aircraft Total Time in Service and (Cycles if applicable):*

Total time (prior to departure May 22, 2024) = 4857.47.

22. *Date and aircraft total time of last annual, or 100 or condition inspection:*

June 13, 2023 and 4682.2.

23. *Present location where the aircraft may be inspected:*

KVEL

24. *Present location where the aircraft records may be reviewed:*

[REDACTED]

25. *Name and contact number for the mechanic/IA you talked to when this happened (if applicable):*

[REDACTED]

26. *Aircraft registered owners contact Information (if not the same as the pilot):*

The aircraft is registered to me.

[REDACTED]