NTSB Report - Appendix 1

The flight planned is the following: one-way VFR flight from Arlington KGKY to Fort Worth Spinks KFWS at 2000 ft and leave the aircraft at Spinks, then drive back to Arlington by car. There will be 2 people on board (Anna Helmich-Zgoda, the student, and myself Julien Sedlak, the instructor), and the aircraft will be Cessna 140 N140AB. The purpose of this flight is to bring the aircraft to CAM Aviation to change the tires, and at the same time, to train the Anna on the aircraft.

As it is a day VFR flight, we need to have enough fuel to go to the destination airport and then fly 30min at cruise speed.

18-JUL-2020 – Events

1. Flight Planning

In the morning, using ForeFlight, I looked at the different items that are related to this flight:

A. Weather

During my breakfast, around local 0620am (~1120Z), the weather (METAR) available is the following; and there is no forecast (TAF). I handwrote the following on my paper note pad:

- Departure KGKY 181053Z 150/5KT 10 CLR 26/23 3002
- Destination KFWS 181115Z 160/4KT 10 CLR 24/22 3004

There is no SIGMET that are present or planned for our route of flight. The surface analysis chart shows a high pressure system on the far East of Texas and the surface forecast shows wind blowing mainly from the South, between 5 and 10 kts. NOTAM

There is no NOTAM at KGKY or KFWS that would prevent the flight. We do not plan to use the grass runway in KFWS, as the runway is shorter than the concrete one and we don't know the grass surface condition.

B. TFR

Beside the permanent TFR near Addison that is not interfering with our planned route of flight, there is no TFR showing on the route.

C. Take Off and Landing Distance Available

Both Arlington and Spinks have 6000 ft length runways and the performance of the aircraft is compatible with the distance available. Arlington's runway is 16-34 and Spinks' is 17-35.

2. Aircraft preflight and performances

I arrived in Arlington and was at the aircraft around local 0650am. The aircraft is in the hangar. Taking care of not moving or rocking the aircraft, I started by draining the fuel on the 3 locations: one below the left wing, one below the right wind, and one at the lowest point, at the bottom of the engine compartment. For each of those 3 points, there is no presence of water or contaminants. The drained fuel is, each time, discarded and not put back into the tanks.

I then checked the quantity of fuel on both tanks, using a handmade graduated wooded dipstick and a small 2 steps ladder to reach the top of the wing (where the fuel tank caps are located). There is a total of 15Gal. Then I hand computed the weight and balance on my paper:

Left 7Gal + Right 8Gal = Total 15Gal

Total unusable fuel = -5Gal

Total usable fuel = 10Gal at 5GPH in cruise, it gives us 1h of flight + 1h of reserve

We have enough fuel to fly our route and have the 1/2h necessary reserve.

Total usable fuel 10Gal is 60 lbs Student is 150 lbs

Instructor is 210 lbs

We are at 420 lbs of load, which is conform to the aircraft limitation. The engine oil is visually checked (6 qt) and the walk around preflight of the aircraft is completed without any findings. All the pitot covers and chokes are removed and the windscreen is clean. Anna arrived around 7am and we pulled the aircraft out of the hangar.

I asked her to double check the fuel quantity and she confirmed the volume. I then explained out loud that we have 1h of fuel for the flight, plus 1h of fuel as reserve and that it is compatible with the flight planned and the regulation. Anna performed alone her own pre-flight walk around the aircraft, without any findings.

3. Engine start up

Around local 0715am (~1215Z), Anna started the engine up, the check list is followed; we have our headsets on, and each of us can hear the other clearly. We listened (twice) to Arlington ASOS, on 127.375. We get the following:

• 1153Z 150/6KT 10 CLR 26/23 30.03

Anna set the altimeter to 30.03 and I cross-checked it. While the engine was warming up, I mentioned out loud that the outside air temperature is close to the dew point and that we will have to be careful and cautious about carburetor icing, even if there is no visible moisture in the air. I then tell her that when I flew this very same aircraft for the first time with an instructor, it was a rainy day with almost 100% of relative humidity and that we kept the carb heat approximatively "10%" on (*the carb heat control was not fully cold, but pulled about 10% of its total stroke toward hot*) during the flight when we were in cruise power setting and we used full carb heat when the power setting was lower than cruise. However, we never encountered a rough engine or any sign of carb ice during that flight.

Anna then taxied well the aircraft to the intersection of taxiway A1 and A, and we called Arlington Ground, on 121.875. Once we got the clearance to taxi, she taxied to the run up area and put the nose of the aircraft into the wind; and, following the check list, did the run up. Everything performed as expected, and the engine temperature is in the green. I double cross-checked that fuel is open and on both tanks, that the Mags were on BOTH and that the carb heat was all the way cold.

Then, Anna prepared the aircraft for takeoff, especially: controls are free and correct, fuel is open and on both, fuel quantity is checked, trim is set for takeoff, flap 1 notch, carb heat cold, mags on BOTH.

I self-briefed myself with the takeoff and departure procedure: if we have an issue before rotation speed: idle, cut off, breaks and straight ahead; if we have an issue after rotation speed and we still have some runway available, we land back, then idle, cut off, breaks and straight ahead; if we have an issue after rotation speed and we do not have any more runway available, we are committed to climb and we look for a landing spot plus or minus 10 degree of our runway heading.

4. Departure

Anna taxied the aircraft to the holding point A of runway 16, and switched the radio to Arlington Tower 128.625. The call was made that we are ready for departure for a flight to Spinks and the tower gave us clearance to take off runway 16 and that we can turn on course. Anna read back the tower and she aligned the aircraft with the runway and progressively added the power while maintaining directional control. I checked that the engine power was here, and that the speed was alive and rising up. The aircraft took off without issues and we started to climb toward our target altitude of 2000 ft indicated, as planned.

Following the procedure on this aircraft, as we passed about 100ft above ground, we retracted the flaps to let the aircraft accelerate toward 77 MPH (best climb speed) and continue the climb. The rate of climb was about 250FPM, engine running at full power.

5. Engine roughness

We were airborne for about 2 min when the engine started to be a little bit rough and shaky, so in accordance with what I was taught on this aircraft, I pulled the carb heat about 10% toward hot and let it in this position. The engine roughness disappeared and we kept climbing at the same rate.

Approximatively 1 min after this event, the roughness came back, but really more severe this time; I pulled the carb heat all the way to full hot and waited, the roughness was still there but the power available was not allowing the aircraft to keep climbing at the same rate. I therefore immediately checked that we had full throttle forward to get maximum power; the throttle was already in this position. So we had to progressively lower the nose a little bit to keep the speed, and a little bit more until we had the nose on the horizon; however, we were lacking power to keep the level flight attitude, even with full power.

I know the Arlington airport area well, and once we passed Green Oaks Boulevard, on the very south end of the airport (just after the south fence), south of Green Oaks Boulevard: there is only habitations and no suitable places to perform any off field emergency landing for about the next 8 to 10 miles, if ever needed. It was out of question to continue to Spinks in this condition and Grand Prairie was further away than Arlington. Moreover, we did not know if the engine would stay with this roughness and not delivering enough power, or if it would become worth and quite. Our indicated altitude was about 1200 ft, we were not able to climb or to keep level flight.

6. Heading back

As we had no other viable option, and just waiting longer would potentially increase the risk of the engine to quite or the aircraft to be too low to reach a safe landing spot; I took the decision to turn back toward Arlington airport. I grab the controls and said something like "I take it". I did a 180 degree turn to the left at about 20 degree bank, and we immediately saw the runway.

(I estimate that we were about 2-3 miles from the south end of the runway when we say runway 34, because I vividly remember that the sight picture of the runway was approximatively matching what I would be expecting for a normal approach. I do not have any recollection of the PAPI visual indication.)

As we were still in contact with Arlington Tower, we shared the worked load. Anna talked to the radio telling them "Arlington Tower Cessna 140AB, we have carb ice and we would like to come back". The tower told us that we can join downwind right or left runway 16, unless we want runway 34. I stepped on the radio and said that we want 34. The tower asked confirmation "do you want runway 34?", I said "affirm, runway 34" and the tower told us that we are clear to land runway 34.

7. Landing

I aligned the aircraft on the approach for runway 34 and prepared it in the landing configuration, then aimed for the threshold 34. The engine was still running very rough. I was expecting a long landing, with ground speed at touchdown greater than usual and a float tendency. The actual landing went very well and I had a good directional control of the aircraft, the aircraft was slowing down and I retracted the flaps to remove any residual lift; I also kept the yoke slightly diving away from the wind, which I estimated was about quartering tailwind from the right. I don't recall the exact indicated speed, but the aircraft was still moving forward at low speed, when suddenly the nose yawed very quickly and strongly to the right and the tail to lift. I tried to correct with the ailerons, elevators, and full left rudder and full left brake, but it didn't do anything. I fought all the way until the end to keep the aircraft on the runway. The aircraft grounded loop and ended up in the grass. I don't believe the wing touched the ground at any time. The tower asked us if we needed help and I answered yes; the tower told us to standby.

I asked Anna if this was ok, and she answered yes. More or less at the same time, we pulled the mixture out and shut down the mags, turned off all electricals and exited by ourselves, without any outside help, and without any injuries. We walked away from the aircraft.

The City of Arlington truck was already there to help us.