

Fox Todd

From: Fox Todd
Sent: Wednesday, January 22, 2014 5:29 PM
To: 'Rick Tallini'
Cc: Fox Todd
Subject: RE: FW: CEN14LA112 -- Flight Planning

Mr. Tallini,

Here is another way to look at the same issue...

As an alternative method of estimating the average fuel consumption rate, one can assume that the entire usable fuel supply (16.875 gallons usable) had been consumed during the accident flight. The accident occurred about 8 miles from the destination airport, or about 150 miles from UUV. If the airplane had maintained a ground speed of 71 mph for the 150 mile flight, it would have taken 2 hours 7 minutes to reach the accident site and the average fuel consumption rate would have been about 8.0 gallons per hour. If the airplane had maintained a ground speed of 63 mph, it would have taken 2 hours 23 minutes to reach the accident site and the average fuel consumption rate would have been about 7.1 gallons per hour. Coincidentally, these estimated fuel consumption rates are very close to the book values for 65-percent and 75-percent engine power that I discussed previously.

When I had performed a similar calculation method in my previous email, I mistakenly used the entire distance of the planned flight (158.6 miles) instead of the distance between UUV and the accident site (150 miles). Interestingly, that mere 8 mile difference really does affect the overall fuel consumption rate. For example, if you assume that all of the usable fuel (16.875 gallons) was consumed during the 158.6 mile planned flight that was completed at an average ground speed of 63 mph... then the flight would have taken 2 hours 31 minutes and the estimated fuel burn rate would have been 6.7 gallons per hour. (Amazingly, that extra 8 minutes resulted in nearly a 0.4 gallon per hour difference in the estimated fuel consumption rate!)

Sincerely,
Andrew Todd Fox
NTSB, Air Safety Investigator

From: Fox Todd
Sent: Wednesday, January 22, 2014 11:30 AM
To: Rick Tallini
Cc: Fox Todd
Subject: RE: FW: CEN14LA112 -- Flight Planning

Mr. Tallini,

Thank you for your response... I have a couple closing thoughts concerning everything.

The official flight manual (attached) for the airplane make/model listed the amount of unusable in the fuel system as being 2.25 gallons. However, this is believed to be for airplanes equipped with two 18 gallon fuel tanks. Your airplane was equipped with a single 18 gallon fuel tank, so the unusable fuel would have been 1.125 gallons, leaving 16.875 gallons useable for the accident flight (assuming that the fuel tank was completely full at departure).

According to video surveillance at the Ava Bill Martin Memorial Airport (AOV), the location of your unplanned ground stop, a light-colored tailwheel airplane was observed taxiing onto the ramp at 1845 central standard time. The same airplane was then observed leaving the ramp area at 1908 central standard time.

According to Taney County Sheriff Dispatch records, the accident was reported at 1949 central standard time.

The straight-line distance between AOV and the accident site was about 31 miles.

Assuming 12 minutes for taxi and an engine run-up, and a departure time of 1920, the final leg of the accident flight was about 29 minutes, at a calculated ground speed of 64 mph.

As per my previous email, the available upper wind models indicated that the wind was 195 degrees at 45 mph at the cruise altitudes you reported flying at.

When I incorporated this wind model data to the flight planning, the ground speed would have been 63 mph according to my calculations made at 65-percent engine power for the entire flight between UUV and PLK.

--- This is virtually the same ground speed that was calculated for the final portion of the accident flight, as discussed above ---

At 3,000 feet and 65-percent power, the performance charts indicated that the fuel consumption would have been around 7.2 gallons per hour at a fuel-rich mixture setting.

The fuel required for the 2 hours 31 minute direct non-stop flight, at a ground speed of 63 mph, would have been 18.125 gallons.

--- This does not account for any additional fuel consumed during taxi, engine run-up, takeoff, and climb to cruise altitude ---

Assuming the same flight time and average ground speed used above, and 16.875 gallons of useable fuel, the average fuel consumption rate at a full-rich mixture setting would have been 6.7 gallons per hour. ($16.875 \text{ gallons} / 2.517 \text{ hours} = 6.7 \text{ gallons per hour}$)

--- Again, this does not account for any additional fuel consumed during taxi, engine run-up, takeoff, and climb to cruise altitude ---

So, I agree that the actual fuel consumption rate could have been less than 7.2 gallons per hour... however, it would have been at least 6.7 gallons per hour (assuming 16.875 gallons usable fuel)

Although, if one assumes that the fuel tank was not completely full before the flight, say leaving 1/2 gallon of airspace in the tank, that would decrease the available amount of useable fuel to 16.375 gallons.

Assuming the same flight time and average ground speed used above, and 16.375 gallons of useable fuel, the average fuel consumption rate at a full-rich mixture setting would have been 6.5 gallons per hour.

--- Again, this does not account for any additional fuel consumed during taxi, engine run-up, takeoff, and climb to cruise altitude ---

I think we have both established, to the extent possible with the available data, that there was a probability of experiencing fuel exhaustion during the accident flight.

Unfortunately, the additional fuel consumed during the unplanned ground stop (taxi, engine run-up, takeoff, and climb to cruise altitude) likely usurped the fuel necessary to complete the accident flight.

I know that this whole process must have been very frustrating for you ... however, I really did appreciate your assistance throughout the investigation.

Sincerely,
Andrew Todd Fox
NTSB, Air Safety Investigator

From: Rick Tallini [REDACTED]
Sent: Tuesday, January 21, 2014 10:45 PM
To: Fox Todd
Subject: Re: FW: CEN14LA112 -- Flight Planning

Mr. Fox,

I reviewed the information that you sent me together with the PA-22-108 Owner's Handbook (POH). The first issue is that the POH is written for the Colt as manufactured with tricycle gear. 4505Z is a tail wheel aircraft and based on my experience in it, it performed significantly better than the tricycle gear version. Notwithstanding the performance differences, it is difficult to correlate the two versions without actual test data.

With regard to fuel consumption, and based on 65% engine power and 75% engine power, I seem to be reading the chart a little differently. From page 38 of the POH, Fuel consumption is 6GPH at 2250 RPM and below 6.5GPH at 2300 RPM. I find it interesting that at 2250 to 2300 RPM the Colt will cruise at approximately 102 to 106 MPH. The higher speed that I reported could be the result of several possible variables. The first, of course, is the difference between a tail and nose wheel aircraft where the nose wheel adds significant drag, the tail wheel version will achieve faster speeds in flight with lower RPM. The other, is that the tach was not reading correctly and although it read 2250 RPM, there is a possibility that it was reading low and that the true RPM was significantly higher. The same could hold true for the air speed indicator. The possibility that more than one factor caused false readings as reported such as a higher than accurate indicated airspeed together with a lower than accurate RPM. The tail wheel conversion, however, is a factor that does make a difference.

During the flight from UUV to KPG, weather and wind conditions were checked prior to and during flight. As you know, the surface winds were from the south at approximately 15 to 28 MPH. I don't have access to a METAR from that time, but it was about that. Winds aloft on the other hand were also from the south with greater velocity.

You provided wind information based on information you were able to obtain from a weather data model. There were significant winds that night, but they didn't seem to be as strong as suggested by your model.

Considering the above, If from UUV to PLK is 159 SM (137.9 NM) heading of 224, and the aircraft is traveling at 105 mph (Even though 110 was indicated) with wind correction at 180/40mph (using a rough average of your data) my ground speed should have been close to 72 MPH. With slightly higher winds, ground speed could have been as low as 65 MPH. With that in mind, a 159 mile trip @ 72 MPH would take approximately 02:13 and

used between 13.3 and 14.4 gallons of fuel. The same trip at 65 MPH would take 02:27 and would have used between 14.7 and 15.93.

It is agreed that fuel is limited to 18 gallons, and considering unusable fuel, taxi, run-up and takeoff, I agree that there is a possibility that fuel exhaustion was the cause. However, my preflight calculations, and this review of the flight, albeit without the benefit of my notes, lead me to believe that there was fuel remaining at the time that the engine failed.

Thanks for being patient with me in connection with my response. I had to clear my thoughts as the event together with the inquiry into the event was becoming quite stressful.

Best regards,

Rick Tallini

