SAFETY GRAM 4.0

December 2018

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Case:

Reference NTSB Aviation Accident Report (3 Pages)

Questions (No right or wrong):

- What do the FAR's say about fuel requirements?

- What does AFI 34-117 say about fuel requirements?

- What SOP's does your club have regarding fuel planning?

- Do you use the gauge value or fuel burn rate/time for estimating endurance and why?

- During a loss of power event why should you reference the emergency checklist?

Discussion:

Proper fuel planning is a critical element in pre-flight preparations. No pilot ever intends to conduct a flight and plan on loosing engine power due to fuel starvation and subsequently execute an off-airport landing. So why does general aviation still have such events?

NTSB data indicates most fuel exhaustion events are the result of "improper fuel planning". I find this verbiage too vague to distill actionable learning points. Having said that I humbly offer some thoughts on fuel exhaustion causes and possible remedies.

I think some pilots approach fuel planning in an aircraft the same way they do in an automobile. Some people refuel a car when the gauge shows "low". In other cases they may refuel only at convenient times and yet other times they may

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simply wait until the car is almost out of gas. The consequences of running out of gas during flight are far more substantial than the same event in a car!

A remedy for this approach to fuel planning in aviation is the use of dispatch protocols. The simple need to explain, to another pilot, how long you will be airborne and the fuel needed to accomplish the flight provokes the thinking and analysis required for successful fuel planning. This strategy also provides a second set of eyes to verify the fuel required.

Another reason I think pilots in general aviation continue to run of fuel is because they place too much faith in the accuracy of the fuel gauge or engine operating time. General aviation fuel gauges are notoriously inaccurate and should therefore only be used as general estimates of fuel volume. Timing engine operation since the last fuel top-off is a better option but carries inaccuracies as well. Operating time depends on type of flying (pattern operations vs cruise), altitude, temperature, leaning procedures and variations in the engine itself.

A remedy for the gauge error and timing issues is to plan flights using the highest fuel burn rates published, or known, for the given aircraft. A dipstick is the most accurate way of determining fuel onboard. Some aircraft have other features, such as marks on the fuel tab, to make accurate fuel determination possible without a dipstick. Accurate fuel quantity plus conservative fuel planning will greatly reduce the risk of flying an aircraft into a fuel starvation scenario. Furthermore it is essential to ensure appropriate reserves are always calculated.

The discussions above are based on my experience. They are, as I mention above, my opinion. I therefore welcome any and all discussion on the causes and remedies for the too often occurrence of fuel starvation in general aviation. A professional and frank discussion goes a long way to finding solutions for problems.

CONTINUE TO FLY SAFE!

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National Transportation Safety Board
Aviation Accident Data Summary

Location:	El Dorado, KS	**Accident Number:**	GAA18CA124
Date & Time:	02/03/2018, 1830 CST	**Registration:**	N61024
Aircraft:	CESSNA 150	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot reported that, en route, he noticed a drop in the engine's rpm. He noted that the fuel shutoff valve was open, and the gas gauges showed half full in the right tank and quarter full in the left tank. He added that the carburetor heat was off, the mixture was full rich, and then the engine quit running. During the third attempt to restart the engine, it briefly started and then quit again. Subsequently, during an off-airport landing in a field, the airplane nosed over.

The airplane sustained substantial damage to the empennage and fuselage.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation. He added that he had filled the gas "to the top" (22.5 gallons) before departure and had flown for 3.7 hours. The 1969 Cessna 150 owner's manual states that the airplane's maximum range was 4.1 hours with no reserve at 75% power at 7,000 ft.

The pilot further reported in a telephone conversation with the National Transportation Safety Board investigator-in-charge that he did not consult the emergency checklist because it was placed in the glovebox.

Federal Aviation Administration (FAA) inspectors drained the fuel tanks about 5 days after the accident and reported that there was no evidence of fuel leakage around the fuel caps or on the ground. They drained about 8 to 12 ounces from the left wing tank and about 3/4 of a gallon from the right wing tank. The FAA inspectors added that the engine showed proper continuity, and the magnetos were operational. The engine was not run due to a fractured intake manifold just above the carburetor base flange. The fracture damage to the intake manifold was consistent with impact damage.

Flight Events

Enroute - Fuel exhaustion
Enroute - Loss of engine power (total)
Enroute - Attempted remediation/recovery
Enroute - Off-field or emergency landing

Probable Cause

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

The pilot's improper fuel planning, which resulted in a total loss of engine power due to fuel exhaustion and a subsequent off-airport landing and nose-over.

Findings

Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C
Personnel issues-Task performance-Planning/preparation-Fuel planning-Pilot - C
Personnel issues-Task performance-Use of equip/info-Use of checklist-Pilot

Pilot Information

Certificate:	Private	**Age:**	31
Airplane Rating(s):	Single-engine Land	**Instrument Rating(s):**	None
Other Aircraft Rating(s):	None	**Instructor Rating(s):**	None
Flight Time:	(Estimated) 95 hours (Total, all aircraft), 95 hours (Total, this make and model), 33 hours (Pilot In Command, all aircraft), 4 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N61024
Model/Series:	150 J	**Engines:**	1 Reciprocating
Operator:	On file	**Engine Manufacturer:**	CONT MOTOR
Operating Certificate(s) Held:	None	**Engine Model/Series:**	O-200 SERIES
Flight Conducted Under:	Part 91: General Aviation - Personal		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	KAAO, 1421 ft msl	**Weather Information Source:**	Weather Observation Facility
Lowest Ceiling:	None	**Wind Speed/Gusts, Direction:**	9 knots / , 210°
Temperature:	8°C	**Visibility**	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LAWRENCE, KS (LWC)	**Destination:**	WICHITA, KS (71K)

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Latitude, Longitude:	37.870000, -96.690000 (est)		

Administrative Information

Investigator In Charge (IIC):	Eric A Swenson	**Adopted Date:**	06/14/2018
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=96730		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.