National Transportation Safety Board
Aviation Accident Factual Report

Location:	Pflugerville, TX	**Accident Number:**	CEN19LA076
Date & Time:	01/27/2019, 1514 CST	**Registration:**	N39650
Aircraft:	Piper PA32RT	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

HISTORY OF FLIGHT

On January 27, 2019, at 1514 central daylight time, a Piper PA-32RT-300T airplane, N39650, suffered a partial loss of engine power resulting in an off-field landing near Pfugerville, Texas. The pilot received minor injuries and the airplane was substantially damaged. The airplane was registered to Stew Industries, LLC., and was operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Day visual meteorological conditions prevailed, and the flight was not operated on a flight plan. The flight originated from the Austin Executive Airport (EDC), Austin, Texas, with an intended destination of Taylor Municipal Airport (T74), Taylor, Texas.

The pilot reported he started the day with 40 gallons of fuel onboard and confirmed a pilot logbook entry for 1.3 flight hours on the day of the accident. The 1.3 hours included flights flown from T74 to EDC and from EDC to Lakeway Airpark (3R9). The logbook did not include an entry for a subsequent flight from 3R9 to EDC or the accident flight. The pilot departed EDC to fly to T74 and had flown only a few miles when the engine started running rough. He stated he moved the fuel selector handle alternatively between the left and right fuel tank positions, turned on the fuel pump, and advanced the mixture to full rich, but the engine roughness continued. He tried to return to EDC, but could not make it. He performed an off-field landing to a road, where the airplane hit a parked car. The right wing separated from the fuselage during impact and the airplane flipped upside down.

FlightAware captured the airplane's recorded flight track from 1355 to 1514 on the day of the accident. The data showed the airplane flying in the area between EDC and 3R9.

The airplane was equipped with a J.P. Instruments, Inc.(JPI) engine data monitor (EDM) 700 configured to record individual cylinder head temperatures (CHT), cylinder exhaust gas temperatures (EGT), EGT span, and battery voltage. The unit was undamaged National Transportation Safety Board (NTSB) investigators extracted data from the unit while it remained in the airplane wreckage. There were 5 distinct sessions on January 27, 2019, including the accident flight. The fourth session on the day of the accident recorded only 4

seconds of data and was not considered in the investigation. Ninety-four (94) minutes of data was recorded.

Data associated with the accident flight showed a consistent decrease in CHTs during the final 3 minutes of flight. EGT data showed a series of decreases and increases in temperatures during the same period. (Figure 1)

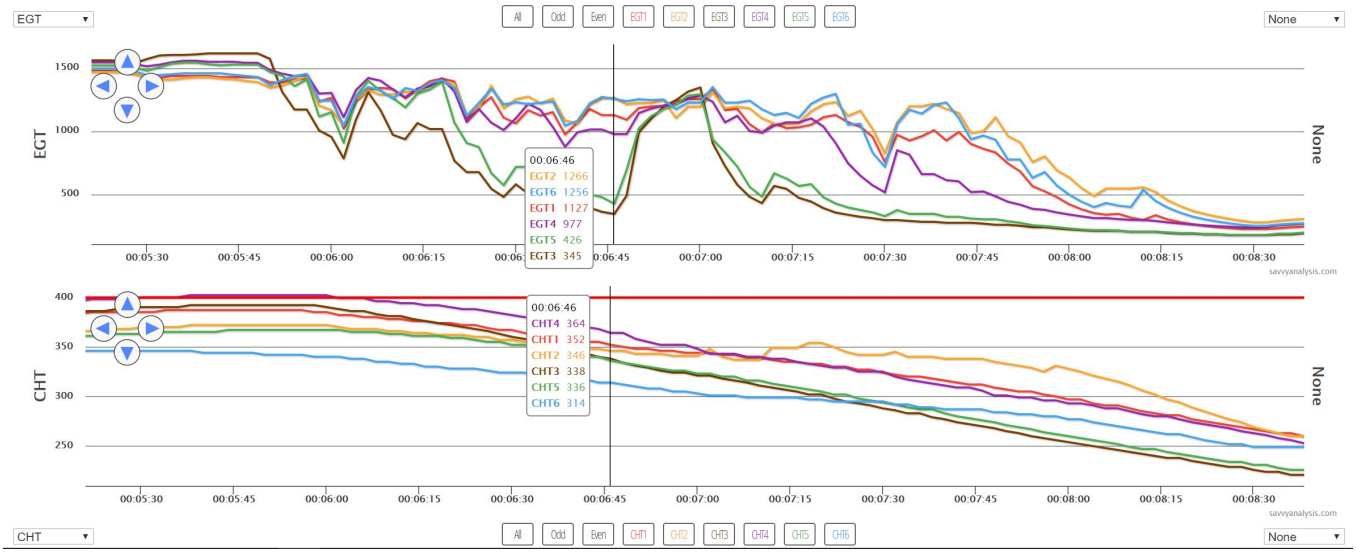

Figure 1 – Final Minutes of Accident Flight JPI Data

AIRCRAFT INFORMATION

The airplane had a total fuel capacity of 98 gallons. The usable fuel was 47.0 gallons in each wing tank (47.0 gallons is the total per side, each side having two interconnected tanks).

WRECKAGE AND IMPACT INFORMATION

The wreckage was initially moved to EDC, where it was stored outdoors with the left wing attached. It was later relocated to a secure storage facility in Lancaster, Texas. Recovery personnel retrieved 9 gallons of liquid consistent with aviation fuel from the left wing prior to removing it from the fuselage for transportation. The right wing tank did not contain any fuel and the right fuel cap was secure on the wing when viewed at the accident scene by Federal Aviation Administration (FAA) inspectors. The right tank fuel lines were compromised where the wing separated from the fuselage during the accident. Little evidence of fuel leakage from the right wing tank was evident at the accident scene and no fuel was found in the tank by recovery personnel. FAA inspectors documented the fuel selector handle in a position about 1 to 2 inches past center towards the right tank position (see figure 2).

Figure 2 - Fuel Selector Position

An examination of the wreckage and functional engine test runs were conducted by the NTSB Investigator in Charge (IIC) and parties to the investigation on August 13, 2019. The fuselage with the engine attached had been loaded on a trailer and secured in preparation for an attempted engine run. The following observations were made during the post-accident examination at the storage facility.

Fuselage

The fuselage was upright and secured with ratchet straps on a trailer. The wings were separated from the fuselage. The stabilator flight control cables were continuous from the cockpit to the stabilator bellcrank. The rudder cables were continuous from the rudder pedal assembly to the rudder sector at the empennage. The continuity of the aileron flight control cables in the cabin was not established. The fuel selector handle was in the "LEFT" position and the control rods were intact and continuous to fuel selector valve which was also in the left tank position. Low air pressure was applied to the left and right tank inlet ports on the fuel selector valve which allowed air to pass when placed in both the left and right detents. The valve rotated smoothly and the detents were noticeable.

In preparation for running the engine, the fuel line from the fuel selector valve to the electric fuel pump was disconnected and a flexible fuel line was connected to the inlet port of the electric fuel pump. This line continued outside the fuselage and was connected to a portable fuel container to facilitate running the engine.

Left Wing

The left wing was separated from the fuselage. The flap and aileron both remained attached to their hinges. The fuel filler cap was located in the fuel filler opening and was unremarkable. The fuel line fitting was disconnected from the outlet port of the inboard fuel tank and a borescope was used to look into the fitting and observe the fuel strainer. No debris was observed in the screen.

Right Wing

The right wing was separated from the fuselage. The flap was separated from the wing. The aileron remained attached to its hinges. The leading edge exhibited impact damage forward of the aileron and outboard of the outer fuel tank. The fuel filler cap was not accessible or examined due to the positioning of the right wing. The fuel line fitting was disconnected from the outlet port of the inboard fuel tank and a borescope was used to look into the fitting and observe the fuel strainer. No debris was observed in the screen.

Empennage

The vertical stabilizer remained attached to the tailcone and the rudder remained attached to the vertical stabilizer. The rudder stops were intact and unremarkable. The stabilator had been removed from the vertical stabilizer.

Engine

The engine remained attached to the truss mount and the truss mount remained attached to the firewall. A visual examination of the engine did not reveal any impact damage to the engine crankcase, cylinders, components, or accessories. The oil dipstick was intact and indicated an oil quantity of 8 qts when removed and examined. No evidence of fuel or oil leakage were observed.

Propeller

The three-blade Hartzell propeller had been removed from the crankshaft propeller flange. The blades remained captured in the hub and the spinner remained attached to the spinner bulkhead. The blades were marked with "A", "B", and "C" to assist with the examination. Blade "A" exhibited aft bending, curling of the blade tip, and abrasion on the trailing edge near the blade tip. Blade "B" exhibited curling of the blade tip and abrasion on the leading edge and cambered face near the blade tip. Blade "C" exhibited aft bending, curling of the blade tip, and abrasion on the leading edge, cambered face, and trailing edge.

A two-blade, variable pitch propeller was installed to facilitate running the engine.

TESTS AND RESEARCH

Prior to the first engine run attempt the fuel line was disconnected from the main fuel servo at the engine and reconnected. No liquid/fuel was present in the fuel line. The fuel filter/screen was removed from the main fuel servo and no liquid/fuel was present. No debris or obstructions were noted within the fuel filter screen. The fuel line was disconnected and reconnected at the engine firewall on the engine side of the firewall. No liquid or fuel was noted at that location.

Examination inside the cockpit revealed the Pitch Trim, Fuel Pump, Loran, Audio Panel, Com 1, GPS/RNAV 1, Com 2, Nav 2, Transponder, MFD, WSI, AC/Air Blower circuit breakers were in the "popped"/out position. The fuel pump circuit breaker was reset prior to attempting to turn on the electric fuel pump. The circuit breaker remained in (did not pop out) during all subsequent fuel pump switch actuations and engine runs. No attempts were made to reset or troubleshoot the remaining circuit breakers.

Engine Run 1

The electric fuel pump was primed 15 to 20 seconds after electrical power was applied to the pump. The engine subsequently started within 10 seconds utilizing the engine starter. The engine was allowed warm up and engine RPM was advanced to accommodate a magneto and propeller check. Both magnetos operated normally and the propeller cycled correctly when commanded. The engine power was advanced to 2,650 RPM and 34 inches of manifold pressure for 4 minutes before the engine run was terminated. Fuel flow indicated 31 gallons per hour (gph) and remained steady during the engine run. No anomalies were noted with the engine during the run. Additionally, the engine ran without interruption at idle and high power settings when the electric fuel pump was turned on and off, verifying the operability of the engine driven fuel pump.

Engine Run 2

Prior to the second engine run the fuel supply was rerouted to feed to both the left and right fuel inlets on the fuel selector valve concurrently. The engine started normally and the engine power was advanced to 2650 RPM, 34 inches of manifold pressure, and 31 gph fuel flow. After the engine stabilized at the set power setting the fuel selector handle was manipulated from left and right tank settings and back. The fuel selector handle was then moved to multiple intermediate settings between the left and right tank settings. The engine ran without interruption or changes in power or fuel flow during the entire engine run. The fuel selector handle was placed to the "Off" position. The engine continued to operate at the set power setting about 10 seconds before the engine stopped running altogether.

Engine Run 3

Prior to the third engine run the fuel supply was rerouted to feed to the left fuel inlet on the fuel selector valve. About 12 inches of fuel line was attached to the right fuel inlet port on the fuel valve and placed in a vertical position. The fuel selector handle was placed on the left fuel tank position and the fuel system was primed using the electric fuel pump. The engine subsequently started and the engine power was advanced to 2650 RPM, 34 inches of manifold pressure, and

31 gph flow. The fuel selector handle was then manipulated from left tank setting to a position about halfway between the left and the right fuel tank positions. The engine continued to run at the set power setting for about 10 seconds and the fuel selector handle was moved to a position about ¼ way from center towards the right tank position. The engine continued to run at the set power setting for an additional 10 seconds. The fuel selector handle was then moved about ½ inch towards the right fuel tank. Fuel flow almost immediately decreased and the engine quit about 5 seconds later.

The fuel pump was primed again using the electric fuel pump and the engine was restarted again with the fuel selector handle on the left tank position. The tachometer did not operate during this engine run for an undetermined reason. The engine power was again increased to 34 inches of manifold pressure and the fuel flow set at 31 gallon per hour. The fuel selector handle was moved to a position about 1 inch past center towards the right tank position. About eight seconds later the fuel flow began dropping and the engine manifold pressure dropped until the fuel flow reached about 20 gph. The fuel flow then fluctuated between 19 and 23 gph for about 25 seconds before the engine quit running altogether. The fuel pump switch was activated during the fluctuations. A momentary increase in fuel flow was noted whenever the switch was activated.

ADDITIONAL INFORMATION

Piper PA-32RT-30 Lance II Service Manual Excerpt:

FUEL SELECTOR VALVE OPERATION. When the fuel selector handle is not in a positive selector detent position, more than one fuel port will be open at the same time. It should be ascertained the fuel selector is positioned in a detent, which can be easily felt when moving the handle through its various positions.

Piper PA-32RT-30 Lance II Pilot Operating Handbook (POH) Excerpts:

"In order to keep the airplane in best lateral trim during cruise flight, the fuel should be used alternately from each tank at one hour intervals.

Always remember that the electric fuel pump should be turned "ON" before switching tanks, and should be left on for a short period thereafter. To preclude making a hasty selection, and to provide continuity of flow, the selector should be changed to another tank before fuel is exhausted from the tank in use. The electric fuel pump should be normally "OFF" so that any malfunction of the engine driven fuel pump is immediately apparent. If signs of fuel starvation should occur at any time during flight, fuel exhaustion should be suspected, at which time the fuel selector should be immediately positioned to a full tank and the electric fuel pump switched to the "ON" position."

The Piper Turbo Lance II performance manual provided fuel planning rates for cruise flight. The highest rate provided was 24 gph at best power, and the lowest rate provided was 13.8 GPH at best economy. Twenty-four GPH equates to about 0.4 gallons per minute (GPM) and 13.8 GPH equates to about 0.23 GPM.

Pilot Information

Certificate:	Private	**Age:**	47, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With Waivers/Limitations	**Last FAA Medical Exam:**	05/17/2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1741 hours (Total, all aircraft), 120 hours (Total, this make and model), 70 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N39650
Model/Series:	PA32RT 300T	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	No
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	32R-7887132
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:	12/20/2018, Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	Reciprocating
Airframe Total Time:	6000 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	TIO-540
Registered Owner:	Stew Industries LLC	**Rated Power:**	310 hp
Operator:	Stew Industries LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	edc	**Distance from Accident Site:**	
Observation Time:	1515 CST	**Direction from Accident Site:**	
Lowest Cloud Condition:	Unknown	**Visibility**	10 Miles
Lowest Ceiling:	Unknown	**Visibility (RVR):**	
Wind Speed/Gusts:	Calm /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	18°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Austin, TX (EDC)	**Type of Flight Plan Filed:**	None
Destination:	Taylor, TX (T74)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Airport Information

Airport:	Austin Executive (EDC)	**Runway Surface Type:**	
Airport Elevation:	620 ft	**Runway Surface Condition:**	Unknown
Runway Used:	N/A	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced Landing

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:**	30.424167, -97.568611 (est)

Administrative Information

Investigator In Charge (IIC):	Daniel Baker
Additional Participating Persons:	Jason Dunn; FAA; San Antonio, TX Jonathan Hirsch; Piper
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=98929