Aviation Investigation Final Report

Location:	Clearwater, Florida	**Accident Number:**	ANC18LA010
Date & Time:	November 19, 2017, 10:30 Local	**Registration:**	N1401J
Aircraft:	ROCKWELL INTERNATIONAL 112A	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to the pilot, before departing on the personal flight, he added about 30 gallons of fuel to the airplane, which filled the left fuel tank completely and the right tank to about 7/8 full. He flew for about 20 minutes with the fuel selector on the left tank position. While preparing for landing, the pilot accomplished the before landing checklist, which included increasing the mixture to full rich, turning on the auxiliary fuel pump, and switching the fuel selector from the left tank position to the both position. He then reduced the throttle to slow the airplane and felt "slight resistance" on the throttle lever. About 10 seconds after switching the fuel selector, the airplane began to lose airspeed faster than anticipated. When he looked at the fuel flow indicator, the pilot saw it slowly transition from 8 gallons per hour to zero, and the engine subsequently lost all power. He moved the fuel selector back to the left fuel tank position, but the engine would not restart. During the forced landing, the airplane impacted a tree in the median of a 4-lane street before impacting and coming to rest in a stand of trees adjacent to the roadway.

Postaccident testing of the engine and fuel injection servo revealed no preimpact mechanical malfunctions or failures that would have precluded normal operation. Although some debris was noted during the examination of the fuel injection servo, it was likely not enough to cause the engine to lose total power. Thus, the reason for the total loss of engine power could not be determined.

Probable Cause and Findings

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

A total loss of engine power for reasons that could not be determined based on the available information.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Tree(s) - Contributed to outcome

Factual Information

History of Flight

Approach	Fuel related (Defining event)
Approach	Loss of engine power (total)
Landing	Collision with terr/obj (non-CFIT)

On November 19, 2017, about 1030 eastern standard time, a Rockwell International 112 airplane, N1401J, impacted trees during a forced landing on a city street about one mile northeast of Clearwater Air Park (KCLW), St. Petersburg, Florida, following a total loss of engine power. The private pilot and sole passenger sustained no injuries and the airplane was substantially damaged. The flight was being operated as a 14 *Code of Federal Regulations* (CFR) Part 91 visual flight rules personal flight. Visual meteorological conditions prevailed and no flight plan was filed. The flight departed Zephyrhills Airport (KZPH), Zephyrhills, Florida about 1008 for the roughly 35 nautical mile flight to KCLW.

According to the pilot, prior to departing KZPH, he added about 30 gallons of fuel to the airplane, which filled the left fuel tank completely and the right tank was about 7/8 full. He performed a walk-around inspection, but did not sump the fuel system for contaminants prior to departure. The roughly 20-minute flight was conducted with the fuel selector on the left tank. When descending through 1,200 ft msl, the pilot conducted the before landing checklist, which included increasing the mixture to full rich, turning on the auxiliary fuel pump and switching the fuel selector to the "BOTH" position. He then reduced the throttle to slow the aircraft and felt "slight resistance" on the throttle lever. About 10 seconds after switching the fuel selector, he began to lose airspeed faster than anticipated. When he looked at the fuel flow indicator, he saw it slowly transition from 8 gallons per hour to zero and the engine subsequently lost all power. He placed the fuel selector back to the left fuel tank, but the engine would not restart. During the forced landing, the airplane impacted a tree in the median of a 4-lane street prior to impacting and coming to rest in a stand of trees adjacent to the roadway.

Video footage captured the airplane as it approached the roadway as well as the final impact. The initial impact with the tree in the median was not captured. The video depicts the airplane in a controlled, level descent. Due to the quality of the video, propeller rotation could not be determined.

The engine was examined on December 6, 2017 at the facilities of Florida Air Recovery, Jacksonville, FL under the auspices of the National Transportation Safety Board, (NTSB). The engine remained attached to the airframe by the engine mount. The engine had sustained impact damage to the underside. The exhaust system had been displaced up and aft. The fuel injection servo sustained impact damage to the underside, which resulted in a cracked and displaced mounting flange. In addition, the throttle linkage was damaged and displaced.

The engine was prepped to be test run, which included replacing the propeller, and attempting to seal the induction leaks created by the cracked and displaced fuel injection servo with metal tape. In addition, the throttle linkage was secured with tie wraps and the damaged exhaust pipe tip was removed.

Fuel was introduced upstream of the engine driven fuel pump but downstream of the electric driven fuel pump. A fuel can with 100LL Avgas was placed below the engine and the engine was primed with a separate auxiliary electric driven fuel pump. The engine was not run at full power due to impact damage to the airframe and engine, but it was operated at various idle power settings while cycling through both magnetos. At about 1600 rpm, a drop of about 50 rpm was noted for the left and right magnetos.

On May 9, 2018, a representative of the NTSB traveled to AVStar Fuel Systems, Inc. to witness operational testing of the fuel injection servo.

The fuel inlet strainer was removed and when tapped on white paper some debris was noted (figure 1). Some debris was also noted inside the strainer. Oil/dirt was noted on the exterior of the fuel servo. The mixture screw assembly was centered.

Fuel Servo Debris

The fuel servo was placed on the test bench as received. The throttle valve was set at 0.007 inch (production units are set to 0.006 inch). The fuel servo was subjected to bench testing at calibration and service limits consisting of 4 Test Points. The fuel servo was flowed onto white paper; no contaminants or water was noted during the first fluid coming from the unit. During testing at Test Point 1, the regulator was "hanging up" at 80 pounds-per-hour (PPH), when it should have been between 22.0 and 28.0 PPH. This was likely due to air trapped inside the fuel servo. The fuel servo was then manipulated on the test bench in an effort to remove trapped air. The fuel servo was then subjected to Test Point 4,

and flowed within limits. Additionally, the travel and hysteresis checks were satisfactory. The unit was then subjected to Test Point 1 and tested satisfactory. At Test Point 2 which is the idle cutoff check, 2 drops were noted in 1 minute (maximum leakage is 5 CC's in 1 minute. At Test Points 3 and 4, the unit flowed within limits and the pressure sensitivity checks at each of those test points were satisfactory. The idle fuel flow with the throttle valve where found (0.007 inch) flowed 11.0 PPH. The throttle valve was adjusted to 0.006 inch and the fuel flow was 6.5 PPH (the idle fuel flow specification is 6.0 to 7.0 PPH). The pressure sensitivity test at idle fuel flow was satisfactory.

Disassembly examination of the fuel servo revealed the regulator self-locking nut was in-place. When attempting to remove only the regulator cover, the air diaphragm, center body, fuel diaphragm and regulator cover separated from the fuel servo body. The air diaphragm and air side of the regulator were clean. A slight amount of fine residue (dust) was noted on the fuel diaphragm, but that did not affect the operation of the fuel servo. Slight contamination was noted on the fuel side of the center body, and also in the servo body regulator section. The fuel diaphragm stem was intact. The passages of the air venturi were clean but slight oily residue was noted on areas of the exterior surface.

The closest official weather observation station is St. Petersburg Airport (KPIE), St. Petersburg, Florida, which is located about 6 miles southeast of the accident site. At 0953, a METAR was reporting, in part, wind 230° at 11 knots; visibility 10 statute miles; clouds and ceiling clear; temperature 79° F; dew point 64° F; altimeter 29.95 inches of Mercury.

Pilot Information

Certificate:	Private	**Age:**	61,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
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:**	June 1, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 15, 2017
Flight Time:	450 hours (Total, all aircraft), 245 hours (Total, this make and model), 450 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROCKWELL INTERNATIONAL	**Registration:**	N1401J
Model/Series:	112A	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	401
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 4, 2017 Annual	**Certified Max Gross Wt.:**	2950 lbs
Time Since Last Inspection:	30 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2176 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	IO360 SER
Registered Owner:	On file	**Rated Power:**	200 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KPIE,11 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	137°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	26°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ZEPHYRHILLS, FL (ZPH)	**Type of Flight Plan Filed:**	None
Destination:	Clearwater, FL (CLW)	**Type of Clearance:**	None
Departure Time:	10:08 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	CLEARWATER AIR PARK CLW	**Runway Surface Type:**	Asphalt
Airport Elevation:	71 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	4108 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

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
Total Injuries:	2 None	**Latitude, Longitude:**	27.983055,-82.763053(est)

Administrative Information

Investigator In Charge (IIC):	Williams, David
Additional Participating Persons:	Roy Hardie; FAA; Tampa, FL
Original Publish Date:	May 28, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96356