



NATIONAL TRANSPORTATION SAFETY BOARD

**Office of Aviation Safety
Western Pacific Region**

AIRFRAME and ENGINE EXAMINATION

**NTSB Accident: WPR17FA215
Accident Date: September 29, 2017**

Examination Date: November 9, 2017

This document contains 26 embedded images
(Photos courtesy Lycoming, NTSB, & Piper)

A. ACCIDENT

Location: Brinnon, Washington
Date: September 29, 2017
Aircraft: Piper PA28-140, N9549W, Serial # 28-22981
NTSB IIC: Michael Huhn

B. EXAMINATION PARTICIPANTS:

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C. ACCIDENT SUMMARY

On September 29, 2017, about 2213 Pacific daylight time, a Piper PA-28-140, N9549W, was destroyed when it impacted trees and terrain near Brinnon, Washington during a night cross-country flight. The student pilot received serious injuries, and the certificated flight instructor (CFI) received fatal injuries. The instructional flight was conducted in accordance with visual flight rules (VFR) under the provisions of Title 14 Code of Federal Regulations Part 91.

D. EXAMINATION SUMMARY

The aircraft was examined at the facilities of AvTech Services, LLC (Auburn, WA.) All components were accounted for on scene. No evidence consistent with in-flight fire or in-flight structural failure was observed. No evidence of any mechanical deficiencies or failures that would have prevented continued flight were observed.

E. AIRFRAME INFORMATION

The aircraft, registered as N9549W, is a 1967 PA-28-140 Cherokee, S/N 28-22981. The aircraft is a four seat low wing all metal semi-monocoque structure with fixed tricycle landing gear. A review of the aircraft maintenance records revealed that the aircraft at the time of the accident had accumulated a total flight time of 5495.38 hours.

1.0 Fuselage

The fuselage sustained impact damage but remained mostly intact. The upper cabin top skin around the door frame was crushed downward. The center and right windshield post were bent in a downward direction.

The lower left side of the fuselage in the area of the wing root going forward to the firewall sustained impact damage. The firewall sustained impact damage along its left side and bottom. The upper nose landing gear strut remained attached to the engine mount. The lower strut (with the nose wheel) separated from upper strut. The engine mount assembly had been cut off the firewall by recovery personnel.

The fuel selector handle was found in the right tank position. The selector valve was removed and examined. The valve was found the right tank position. The valve was free to rotate and found to function normally when air pressure was applied. The fuel bowl assembly mounted on the firewall in the engine compartment had partially separated from the gascolator assembly due to impact. No fuel was present in the bowl. The fuel screen remained clean and free of contamination.

The flap torque tube was found in the flaps up or retracted position. The flap push/pull rod remained attached to the tube assembly. The left side of the torque tube was broken inboard of the wing root, and the tube was bent in a rearward direction. The flap chain drive remained attached to the sprocket, and the cable end remained attached to the flap handle assembly.

The rudder cables remained attached at their respective arm assemblies on the pedal and bar assembly. Both horizontal stabilator cables remained attached to the control column tee bar assembly.

Both the left and right primary aileron cables remained attached to the aileron chain assembly. The aileron chain had a broken link and was separated. The turnbuckle assembly that connects the two chain segments together remained attached.

The control column tee bar assembly sustained impact damage and was broken at the weld joint that attaches the upper horizontal bar to the vertical bar. The right side control column tube was completely separated from the tee bar assembly. The left side remained attached to the tee bar assembly. The tee bar assembly was initially retained for metallurgical examination, but subsequent to receipt of flight charts and flight path data, the part was released without examination.



Figure 1 - Fuselage



Figure 2 - Cockpit Entrance



Figure 3 - Firewall



Figure 4 - Fuselage



Figure 5 - Aft Fuselage

2.0 Left Wing

The left wing sustained significant tree and ground impact damage. The wing had separated from the fuselage and was fragmented into several sections. The inboard section outboard of the fuel tank exhibited aft crushing signatures consistent with tree impact. The outboard wing section was highly fragmented. Most of the leading edge skins had separated from the wing. The landing gear remained attached to the wing. The wing tip assembly separated from the wing and was recovered at the accident site.

The flap separated from the wing. The flap push/pull rod assembly remained attached to the flap but had separated from the flap torque tube assembly. The aileron separated from the wing and was fractured in two at about mid-span. Both aileron primary and balance cables remained attached to the aileron bellcrank assembly. The cables exhibited tension separation in the area of the wing root.



Figure 6 - Left Inboard Wing



Figure 7 - Left Wing



Figure 8 - Left Wingtip

3.0 Right Wing

The right wing sustained significant tree and ground impact damage. The wing had separated from the fuselage and was fragmented into several sections. The main spar was broken into several sections and separated from the wing. Most of the forward leading edge skins had separated from the wing. The landing gear assembly separated from the wing. The fuel tank was destroyed by impact.

The wing tip separated from the wing and was broken into several pieces. The right flap sustained impact damage but remained attached to the wing. The flap push/pull rod assembly separated from the flap, but remained attached to the flap torque tube assembly.

The aileron was found separated from the wing and exhibited impact damage. The aileron counterweight mounting plate remained attached to the aileron. The arm was broken and the counterweight had separated, and was not present during the exam. The aileron inboard hinge with the push/pull attach fitting separated from the aileron. The push/pull rod remained attached to both the fitting and the aileron bellcrank assembly. Both the aileron primary and balance cables remained attached to the aileron bellcrank assembly. The cables had been cut near the wing root by the retriever during the recovery process.



Figure 9 - Right Wing Fragments



Figure 10 - Right Wing Fragments



Figure 11 - Right Wing

4.0 Empennage

Both the vertical fin and the rudder remained attached at their respective attach points. Both surfaces sustained only minor impact damage and were intact. Both rudder cables remained attached to the rudder horn assembly.

The rear bulkhead assembly sustained extensive impact damage. Both stabilator cables remained attached to the tube assembly.

The horizontal stabilator is operated directly by the yokes, and its trim tab is operated by the pitch trim drum and jackscrew assembly. The stabilators had separated from the fuselage, and the trim drum had separated from the fuselage and stabilators. The left stabilator attach hinge assembly remained attached to the bulkhead but had separated from the stabilator. The right stabilator attach hinge assembly separated from the bulkhead but remained attached to the stabilator.

The stabilator trim drum (barrel) and jackscrew assembly separated from its supporting rib structure due to impact. Pitch trim setting is normally determined by the amount of trim screw exposure beyond the barrel, which is determined by measuring screw extension and also by counting threads. In Figure 13, 'A' denotes the extension distance, and 'B' denotes the threaded area; these values are compared to the chart (Figure 14) to determine stabilator setting. Based on the observed thread count (7 threads), the trim setting was neutral to slightly nose up. However, because the stabilator and trim assembly had both been torn from the aircraft, and the trim cable was absent, the setting could have been altered during impact and/or recovery, and therefore the actual stabilator trim setting could not be positively determined.



Figure 12 - Aft Fuselage Stabilator Attach Location



Figure 13 - Pitch Trim Drum Assembly

AIRCRAFT CONDITION	THREADS	DIM.	TAB DEG.
NOSE UP	16	1.75	12°
NEUTRAL	5	.9	0°
NOSE DOWN	0	.25	3°

Figure 14 - Pitch Trim Table



Figure 15 - Stabilators

5.0 Maintenance Information

A review of the aircraft maintenance records indicated that the aircraft had an Annual Inspection on 9/7/2017 at tach time and total time airframe of 5461.9 hours. At the time of the accident the aircraft had accumulated 33.48 flight hours since its last Annual, for a total time of 5495.38 hours. The engine had accumulated a total time engine of 6807.38 hours and 695.52 time since last major overhaul.

According to the engine logbook, the engine was disassembled on 10/21/1994, at tach time of 4791.0 hours. The engine logbook entry indicates that the engine was reworked and reassembled by an IA mechanic during an Annual Inspection. The logbook entry did not characterize the work as an overhaul or having been rebuilt, and was only signed off as an Annual Inspection. Some of the logbook pages after this entry refer to the engine with time since major overhaul (TSMOH). The calculated total time and TSMOH of the engine is 6807.38 hours and 695.52 since last overhaul at the time of the accident.

6.0 Tabular Data

Last Inspection Completed Or Significant Maintenance		Annual Inspection on 9/7/2017 at tach and TTAF of 5461.9 hours.					
Accident History Of Aircraft		Yes	☐ *	No	☒	U/K	☐
* If Yes							

				Date	U/K
Last Transponder Check				10/06/2016	☐
Last Static Check					☒
Last Altimeter Calibration Check	Altitude	U/K	ft.		☒

	Overhauled	Overhaul Facility	TSMOH
Powerplant	Unknown	See narrative under Maintenance Information.	UK

	Yes	No	U/K
Aircraft Operation Manual / Pilot Operating Handbook On Board	☒	☐	☐
Aircraft Registration	☒	☐	☐
Airworthiness Certificate	☒	☐	☐

Aircraft Max. Gross Weight	2150	lbs.	Aircraft C.G. Range	+84.0	to	+95.9
Calculated Gross Weight	UK	lbs.	Calculated Aircraft C.G.	UK		
Source Of Weight And Balance	Insufficient data for computation.					

	Yes	No	U/K
Did The Pilot Perform A Weight And Balance Check	☐	☐	☒

Aircraft Documentation & Component Condition Codes

B-Broken	F-Fire Damaged	NA- Not Applicable	S-Separated
D- Destroyed	I-Impact Damaged	NO-Not Obtainable	UK-Unknown
DG-Digital	N-No Damage	NL- Not Located	W-Water Damaged
IRS-Impact and or recovery separation			

Were any anomalies noted to the Airframe during the investigation that would have precluded normal operation?	No
Were any anomalies noted to the Engine during the investigation that would have precluded normal operation?	No
Were any anomalies noted to the Propeller during the investigation that would have precluded normal operation?	No
If (yes)	

Aircraft Component	Condition Code(s)	Aircraft Component	Condition Code(s)
Fuselage	I, IRS	Nose Gear / Position	S, D, I / Fixed
Fwd. Cabin Door	I	Fwd. Baggage Door	NA
Aft Cabin Door	NA	Aft Baggage Door	NA
Emergency Exit	NA	Baggage Tie Downs	NA

Left Wing	D, S, I, IRS	Right Wing	D, S, I, IRS
Lt Aileron/Bellcrank/Stops	D, S, B, I / I / N	Lt Aileron/Bellcrank/Stops	D, S, I / I / NL
Lt Flap / Position	D, S, I / NO	Rt Flap / Position	D, I / NO
Lt Gear / Position	I / Fixed	Rt Gear / Position	D, S, I / Fixed
Pitot Tube	N		

Horizontal Stab / Stops	D, S, I, IRS / N	Vertical Stab.	I
Pitch Trim Tab	D, S, B, I	Rudder/Stops	I / N

Throttle / Position	I, S / Extended towards idle.	Propeller / Position	NA
Mixture / Position	N / ½" towards lean.	Miscellaneous	None.

Flight Control Cable Continuity

Lt Aileron	Established	Stabilator/Elevator	Established
Rt Aileron	Established	Trim Tab	Established
Rudder	Established	Flap	Established

Surface	Shaft Extension	Threads	L.E. Or T.E.	Aircraft Trim Setting (Approximate)
Pitch Trim	--	NO	--	Undetermined
Rudder Trim	--	NA	--	NA

Flap Jackscrew Position	NA	NA	
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Cockpit Remote ELT Switch				On	☐	Arm	☐	Code(s)	NL		
ELT		Off	☐	On	☐	Arm	☐	Code(s)	UK,IRS		
	Model / Type		S/N		ELT		Yes	No	U/K	N/A	
ELT		Pointer		336316		Activated At Impact		☐	☐	☒	☐
ELT Battery Date		05/2018		Did it assist in locating the aircraft?			☐	☐	☒	☐	

Single Engine Fuel System

Fuel Selector Handle Position	Right tank.	Electric Fuel Pump Switch	B, I
Fuel Selector Valve Position	Right tank.	Selector Valve Condition	N
Fuel Gascolator Screen	Clear	Fuel Strainer Bowl	I, Clean
Fuel Found	No	Engine Primer Position	In and locked.
Fuel Tested	No		

	Manufacturer	Model / S/N	Code(s)
Autopilot	Not installed.	Not installed.	NA
Misc.			
Misc.			

Electrical and Controls

Master Switch Position	On	Strobe Lights	On
Alternator Switch Position	NA	Landing Lights	S, D, I
Magneto Switch Position	Both	Navigation Lights	B, I
		Instrument Lights	B, I
		Miscellanies	NA

Environmental Controls Position	Heat, On; Defrost, off	Tach Reading / Hours	5495.38 hours.
Carburetor Heat / Alternate Air	½" out.	Hobbs Reading	NL
Emergency Gear Extension	NA	Flap Handle / Position	N / Zero detent.

Aircraft Seat Documentation

	Seat Occupied	Lap Belt Used	Shoulder Harness Used	Seats and Restraints, Condition / Description	Code(s)
1	Yes	Yes	Not Installed	The seat assembly remained intact. The bottom seat frame was partially separated from the floor tracks due to the spreading of its attachment feet. The outboard seat belt remained attached to it's attach fitting. The attach fitting separated from the hat section structure due to impact. The belts were found fastened together. No shoulder harness was installed.	I
2	Yes	Yes	Not Installed	The seat assembly remained intact. The bottom seat frame was partially separated from the floor tracks due to the spreading of its attachment feet. The outboard seat belt remained attached to it's attach fitting. The attach fitting remained attached to the hat section although the hat section separated from structure. The belts were not fastened together. No shoulder harness was installed.	I
3	No	No	Not Installed	Seat not occupied.	N
4	No	No	Not Installed	Seat not occupied.	N

F. ENGINE INFORMATION

The engine had separated from the firewall during the accident and recovery, and was hanging from a hoist when examined. The propeller remained attached to the crankshaft. Both blades were bent aft slightly. Twisting and chordwise scarring was observed. The exhaust was crushed aft, and the No. 1 exhaust pushrod was impact damaged.

The valve covers, accessories and top spark plugs were removed for the examination. The spark plugs appeared normal as compared to the Champion Aviation Check-a-Plug Chart AV-27. Except for the No. 2 bottom spark plug which was impact damaged and the bottom No. 1 and No. 3 plugs were oil wetted.

The cylinders were borescope inspected and no anomalies were noted. The crankshaft was rotated via the propeller, and thumb compression was obtained at all cylinders. Engine drive train continuity was established throughout. The oil pickup screen was found free of debris.

Both magnetos were found intact with no damage visible. Both magnetos produced spark at all leads when rotated by hand.

The carburetor was found broken apart and hanging below its mounting position. Both the throttle and mixture controls remained attached. The carburetor was disassembled, and the metal floats exhibited hydraulic crushing on their outboard sides. The fuel inlet screen was found free of debris. The engine driven fuel pump produced pressure when operated by hand. The vacuum pump was disassembled, the rotor and vanes were found intact. No evidence of pre-impact mechanical anomalies or malfunction was observed with the engine.



Figure 16 - Engine



Figure 17 - Propeller Blade



Figure 18 - Other Propeller Blade



Figure 19 - Oil Pickup Screen



Figure 20 - Left Magneto

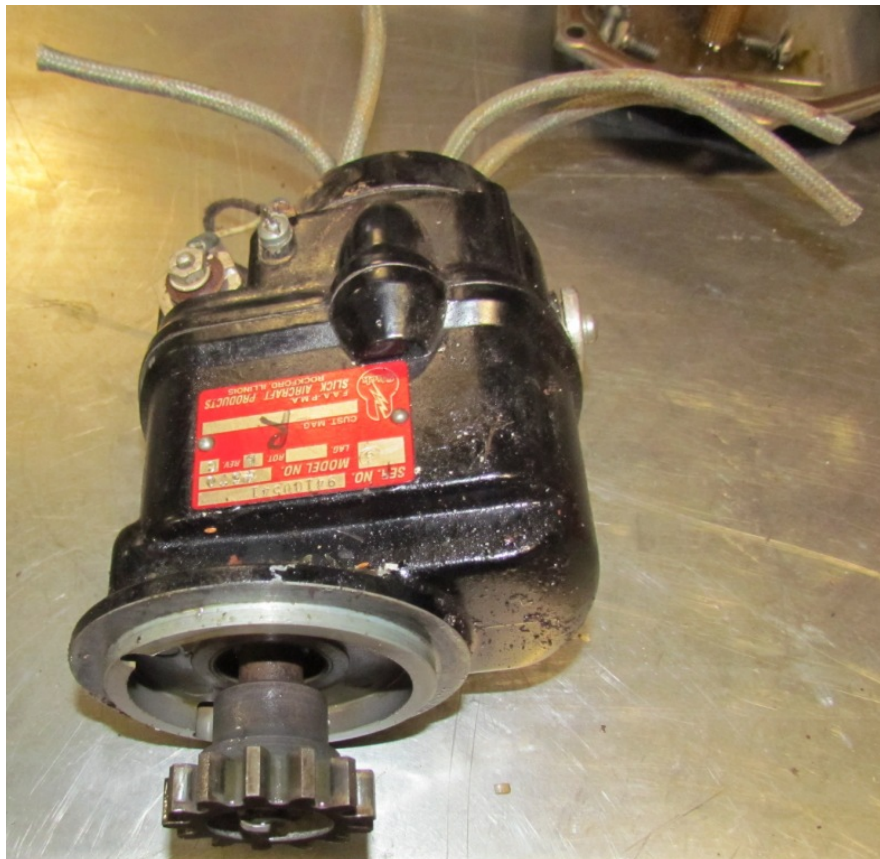


Figure 21 - Right Magneto



Figure 22 -- Spark Plugs



Figure 23 - Carburetor



Figure 24 - Carburetor Fuel Inlet Screen

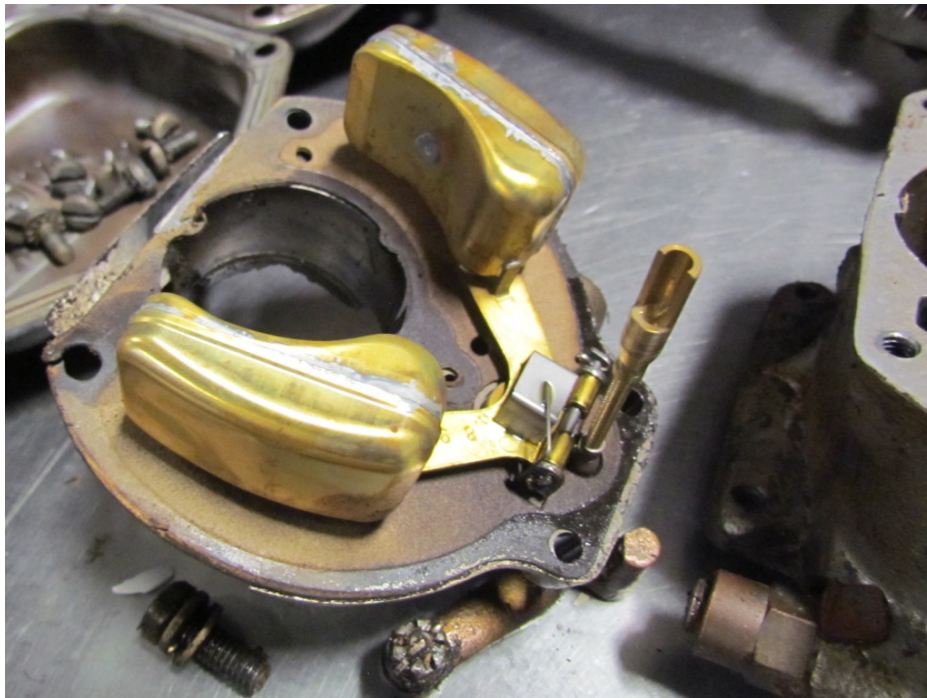


Figure 25 - Carburetor Floats

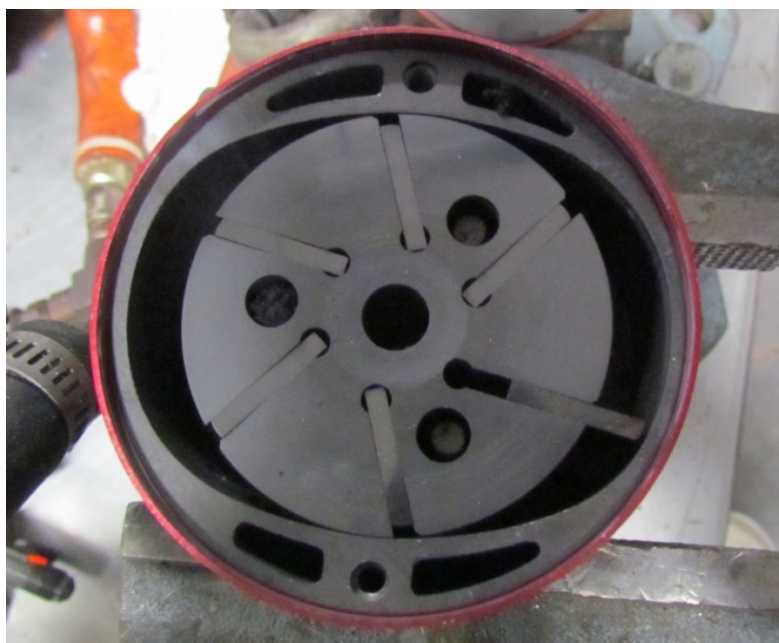


Figure 26 - Vacuum Pump

	Manufacturer	Model	S/N	Code(s)
Powerplant	Textron Lycoming	O-320-E2A	L-18824-27A	I, IRS
Carburetor / Servo	Facet	4SPA	A 6 3653	I
Propeller Governor	N/A	N/A	N/A	N/A
Vacuum Pump	Rapco	RAP215CC	A44045	N
Engine Fuel Pump	AC	UK	4121C189	N

	Yes	No	Code(s)
Fuel Present In Carburetor / Servo?	☐	☒	
Any Noticeable Fuel Leaks?	☐	☒	
Fuel Screen Free Of Blockage?	☒	☐	
Air Inlet Hose/ Filter Free Of Blockage	☒	☐	

	Attached	Position	Not Attached	Code(s)
Throttle Cable Position At Carb. / Servo	☒	UK	☐	IRS
Mixture Cable Position At Carb. / Servo	☒	UK	☐	IRS
Propeller Cable Position At Governor	☐		☐	NA

	Manufacturer	Model	S/N	Rotation			Code(s)
Turbocharger #1 Lt				☐	☐	☐	N/A
Turbocharger #2 Rt				☐	☐	☐	N/A

	Manufacturer	Model	Condition / Code(s)
Spark Plugs	Tempest	UREM40E	Normal electrode wear.

	Manufacturer	Model	S/N	Code(s)
Magneto Lt	Slick	4373	94070145	N
Magneto Rt	Slick	4370	94100541	N

Magneto Test	Yes	No	U/K	Results
Magneto Lt	☒	☐	☐	Sparked at all leads.
Magneto Rt	☒	☐	☐	Sparked at all leads.

	Yes	No	U/K		Yes	No	U/K
Crankshaft Rotation	☒	☐	☐	Piston Movement	☒	☐	☐
Accessory Gear Rotation	☒	☐	☐	Valve Train Continuity	☒	☐	☐

Propeller

	Manufacturer	Model	Hub S/N	Code(s)
Propeller	Sensenich	74DM6-0-58	UK	I

Fueling

Last Known Fueling Location: Sanderson Field airport (SHN), Shelton, Washington (WA)	
Fuel on Board at Departure: Full Gallons ☐ Actual ☐ Estimated ☐ Unknown	
Fuel Added Prior to Departure? ☒ Yes Amount: 7.6 ☐ No ☐ Unknown	
Type of Fuel: 100LL	Was Fuel Found at Site? ☐ Yes Color: ☒ No
Automotive Fuel STC? ☐ Yes ☒ No	STC No.

Remarks:

Both fuel tanks were breached, and no fuel was observed at the time of the site examination.

Engine Instruments and Controls

Legend: D – Destroyed F – Fire Damage OSL – Off Scale Left N/A – Not Applicable
 B – Broken I – Impact Damage OSR – Off Scale Right SR – See Remarks
 N – No Damage S – Separated E – Electronic/ Digital
 Unk – Unknown N/L – Not Located N/O – Not Obtainable

Engine Instruments ☐ All Destroyed		Engine Controls (Cockpit) ☐ All Destroyed	
Hourmeter	UNK	Throttle	closed
Tachometer - RPM	0	Mixture Control	Lean
Tachometer - Hours	5495.38	Propeller Control	N/A
Cylinder Head Temp	UNK	Carburetor Heat	Off
Oil Pressure	0	Alternate Air	Undetermined
Fuel Pressure	0	Fuel Management ☐ All Destroyed	
Exhaust Gas Temperature	UNK	Selector Handle	Right
Turbine Inlet Temperature	N/A	Selector Valve	Right
Ammeter	0	Firewall Fuel Shutoff	N/A
Voltmeter	UNK	L Main Tank Quantity	8
Vacuum Pressure	0	L Aux Tank Quantity	N/A
Fuel Flow	N/A	R Main Tank Quantity	0
Primer Locked?	Locked	R Aux Tank Quantity	N/A

Electrical Switch Positions ☐ All Destroyed		
Master Battery: On	Master Alternator: Undt	Avionics 1: Undt
Stand-By Battery: N/A	Alternator 2: Undt	Avionics 2: N/A
Fuel Boost Pump: Undt	Ignition Switch: Both	
Navigation Lights: Undt	Rotating Beacon(s): Undt	Landing Light(s): Undt
Taxi Light(s): Undt	Strobe Light(s): On	Instrument Lights: Undt

Engine Data

Model	Serial Number	Total Time
O-320-E2A	L-18824-27A	695.52 Hours Since Field O/H
Above engine Information taken from: ☒ Dataplate ☒ Maintenance Records ☐ Other		
Dataplate Attached/Found? ☒ Yes ☐ No		Experimental Engine? ☐ Yes ☒ No
Case Match # 7858	Engine S/N on Case: L-18824-27A	Crankshaft S/N: UNK

Maintenance Records Attached?	☒ Yes ☐ No	On-Scene Exam?	☐ Yes ☒ No
Post Recovery Exam?	☒ Yes ☐ No	Propeller Attached?	☒ Yes ☐ No
Engine Disturbed Prior to Your Arrival?	☒ Yes ☐ No	Engine Appear to be runnable?	☐ Yes ☒ No
Does Crankshaft Rotate?	☒ Yes ☐ No	Evidence of pre-impact fire?	☐ Yes ☒ No

Last Annual Inspection by:	Mike Harmon IA	Date: 9/7/2017
Last Overhaul by:	1513489AI	Date: 10/21/1994

Remarks:

Service Instruction 1009BC Recommends engine overhaul every 12 Years. (23 Years since last overhaul)

Engine Data

Propeller ☐ Rotorcraft

Manufacturer	Part Number	Serial Number
Senenich	M74DM58	K-10459
Propeller Type: ☒ Metal ☐ Wood ☐ Composite ☐ Unknown		
Propeller Blade Serial Numbers:	Blade 1	Blade 2
	Blade 3	Blade 4

Propeller Governor ☐ Rotorcraft ☒ N/A

Manufacturer	Part Number	Serial Number
Governor Control Position:		Gasket Screen Condition:
Governor Oil Line:	Properly Secured?	☐ Yes ☐ No ☐ Unknown ☐ N/A
	Correct Line Nuts?	☐ Yes ☐ No ☐ Unknown ☐ N/A
	Correct Fittings?	☐ Yes ☐ No ☐ Unknown ☐ N/A

Engine Data

Fuel System ☐ Injection ☒ Carburetor ☐ Electronic ☐ Destroyed

Manufacturer: Facet	Model: 4SPA	Setting: 10-3678-32
Serial No: A 6 3653	Floats: ☒ Metal ☐ Composite ☐ Plastic ☐ N/A	

Fuel Screens	Carburetor/Injector Inlet: ☒ Clean ☐ Contaminated ☐ Destroyed ☐ Unknown
	Aircraft Main Fuel Strainer: ☒ Clean ☐ Contaminated ☐ Destroyed ☐ Unknown

Control Positions	
Throttle: UNK	Carburetor Heat: UNK
Mixture Control: UNK	Alternate Air: N/A

Flow Divider ☒ N/A ☐ Destroyed

Manufacturer:	Part No:	Serial No:
Evidence of Fuel Found? ☐ Yes ☐ No	Contamination Observed?	
Diaphragm Condition? ☐ Intact ☐ Compromised ☐ Destroyed ☐ Unknown	☐ See Remarks	

Injector Nozzles ☒ N/A ☐ Destroyed

GAMIjectors ☐ Yes ☐ No ☐ Unknown	Type:	Condition:
Lines secure: ☐ Yes ☐ No ☐ Compromised ☐ Destroyed ☐ Unknown	☐ See Remarks	

Fuel Pump ☐ N/A ☐ Destroyed

☒ Diaphragm ☐ Geared ☐ Electric ☐ Gravity Fed ☐ See Remarks ☐ Unknown		
Manufacturer: AC	Part No.: 41271	Serial # / Date Code: 41271C189

Fuel System Remarks:

Floats had hydraulic crushing.
Pressure felt when pump operated by hand.

Engine Data

Magnetos:

☒ **Left** ☐ **Dual Magneto** ☐ Electronic ☐ Destroyed

Manufacturer: Slick	Model: 4373	P/N:	S/N: 94070145
Impulse Coupling? ☒ Yes ☐ No	Functioning? ☒ Yes ☐ No ☐ Unknown		
Timing Checked? ☐ Yes ☒ No	Results:		
Drive Secure? ☒ Yes ☐ No ☐ Unknown	Sparks at all leads ☒ Yes ☐ No ☐ Unknown		
Damage: No visual damage, sparked at all leads.			

Right Magneto ☐ Electronic ☐ Destroyed

Manufacturer: Slick	Model: 4370	P/N:	S/N: 94100541
Impulse Coupling? ☐ Yes ☒ No	Functioning? ☐ Yes ☐ No ☐ Unknown		
Timing Checked? ☐ Yes ☒ No	Results:		
Drive Secure? ☐ Yes ☐ No ☐ Unknown	Sparks at all leads ☒ Yes ☐ No ☐ Unknown		
Damage: No visual damage, sparked at all leads.			

Spark Plugs

Manufacturer: Tempest		Type: UREM40E	SI 1042 Approved? ☒ Yes ☐ No
Spark Plug Condition (per Champion Aviation Check-A-Plug Card AV-27)			
1 Top	Undamaged Electrode/Normal	1 Bottom	Oil Fouled
2 Top	Undamaged Electrode/Normal	2 Bottom	Undt
3 Top	Undamaged Electrode/Normal	3 Bottom	Oil Fouled
4 Top	Undamaged Electrode/Normal	4 Bottom	Undamaged Electrode/Normal
5 Top		5 Bottom	
6 Top		6 Bottom	
7 Top		7 Bottom	
8 Top		8 Bottom	

Ignition Harness

Tested:	☐ Yes ☒ No	Condition:	Minor Impact Energy Damage
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Vacuum Pump:

Manufacturer: Rapco	☐ Destroyed ☐ Unknown ☐ N/A
Part No: RAP215CC	Serial No.: A44045

Remarks:

Disassembled no visual damage, carbon dust and fuss found

NOTE: "fuzz", not "fuss"

Lubrication System:

Oil Suction Screen: Clean	Oil Pressure Screen: N/A
Oil Filter: Undetermined	Oil Cooler Integrity: Undetermined
Oil Cooler Hoses: Undetermined	