



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

AIRFRAME AND ENGINE EXAMINATION (Rev A)

WPR19LA017

Accident Date: October 30, 2018
Exam Date: December 6, 2018

This document contains 25 embedded images

A. ACCIDENT

Location: Cottonwood, California
Date: October 30, 2018
Aircraft: Cessna 180, N6414X, Serial # 18050914
NTSB IIC: Michael Huhn

B. EXAMINATION PARTICIPANTS:

Michael Huhn
Air Safety Investigator
NTSB
Western Pacific Region

Craig Miller
FAA Airworthiness Inspector
Sacramento, CA

C. ACCIDENT SUMMARY

On October 30, 2018, about 0924 Pacific Daylight time, a Cessna 180D airplane, N6414X, impacted terrain short of the runway during an approach for landing at Lake California Air Park (68CA), Cottonwood, California. The private pilot/owner sustained serious injuries, and the airplane was substantially damaged. The flight had originated from Palo Alto Airport (PAO), Palo Alto, California, earlier that morning. The pilot reported that when the airplane was on the final approach leg to 68CA, at an altitude of about 200 ft above ground level, the engine suddenly "quit." Given the low altitude, the pilot was only able to verify a few cockpit controls for proper settings before focusing on the landing.

D. INITIAL ON-SCENE and RECOVERY ACTIVITY INFORMATION

For multiple reasons, the recovery plans and personnel were changed after the initial recovery efforts had begun. The NTSB was not present on scene at any time. The net result was that the evidence chain did not retain absolute integrity. The relevant sequence of events is described in a separate document.

E. PLAIN PARTS EXAMINATION INFORMATION

1.0 General

- The wings and empennage had been removed (unbolted/disassembled) from the airframe for recovery and transport
- The front seats and left side of the instrument panel had been previously removed by the initial recovery mechanic, Mr. Eric Sawyer

- The engine mount was separated from the airframe, and remained attached to the engine
- The tachometer hour meter registered 2,514.38
- There was no evidence of any fuel or oil leaks, or of thermal or fire damage, anywhere on the wreckage



Figure 1 - Airplane as First Viewed at Plain Parts



Figure 2 - Instrument Panel



Figure 3 - Left Fuselage Wing Root



Figure 4 - Right Fuselage Wing Root

2.0 Wings

- Both wings had been unbolted and separated from the fuselage
- The right wing was intact
- The left wing was wrinkled at the outboard end, and the aft inboard end
- Both fuel tanks were intact and not breached
- Neither wing exhibited any fuel staining or other indications of leakage

- Maintenance records indicated that the bladders had been replaced in April 2018, and their condition was consistent with a young age
- Each fuel tank had a single fuel pickup port, located near the aft bottom inboard corner of the tank
 - A finger screen pickup would normally be installed in each of these ports; both were observed in the wreckage
- The fuel tank caps appeared relatively new
 - It could not be determined during the exam whether they were vented caps
 - The caps bore part numbers C-100084-1 on the cap, and (1?)00142-1 on the cap gasket
- The vent line in the left wing underside was undamaged and clear, and plumbed to the left bladder



Figure 5 - Left Wing Underside



Figure 6- Left Wing Root Rib



Figure 7 - Right Wing Root Rib



Figure 8 - Installed Fuel Cap



Figure 9 - Removed Fuel Cap



Figure 10 - Fuel Cap Underside

3.0 Fuselage Fuel Lines

- An aluminum fuel line was routed from each tank down each aft door post to the fuel selector valve
- The upper (vent) port in each fuel tank protruded as nipples through each root rib, and were normally interconnected via a 5/16" ID aluminum (vent) line
 - That line was removed for wing removal, but was present in the wreckage
 - The line was bent but clear of obstructions or significant dents
 - The bladder nipples were also intact and clear

4.0 Fuel Strainer (Gascolator)

- The glass-bowl fuel strainer remained attached to the firewall, but its mount was deformed and the strainer was displaced from its normal position (consistent with accident impact)
- The glass bowl was intact, but contained no fuel
- The interior and screen appeared clean
- The fuel line from the strainer fuel outlet (to feed the engine) had been removed/unscrewed
- The drain valve assembly at the bottom was bent (consistent with accident impact) and inoperative



Figure 11 - Fuel Strainer

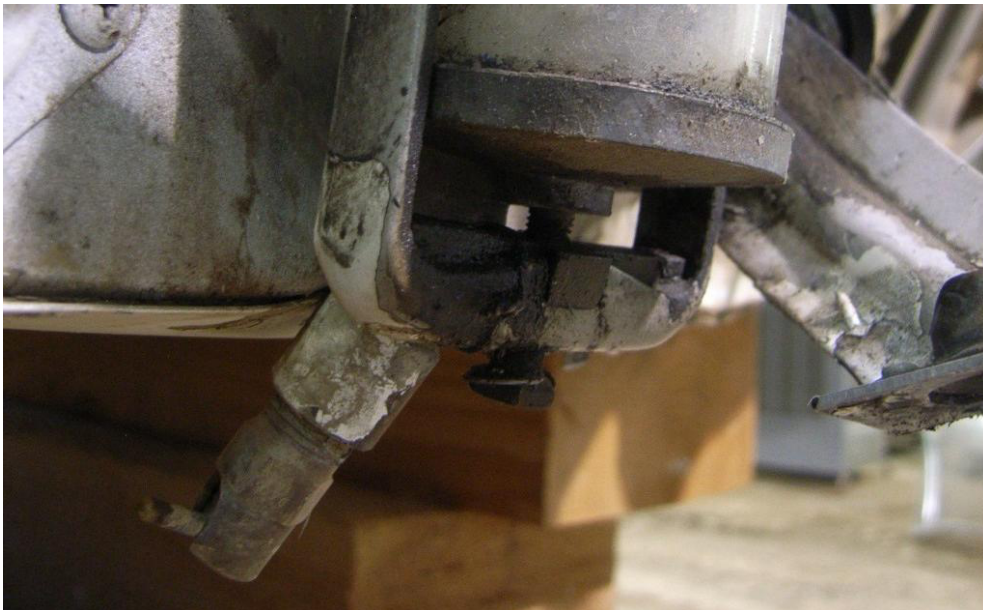


Figure 12 - Deformed Fuel Strainer Drain Valve

5.0 Fuel Selector Valve

- A four-position cockpit fuel selector valve was situated in the center forward cabin floor
- It appeared undamaged, but its placard was worn to the point where some wording was illegible or absent
- The handle rotated freely in both directions through all four detented positions
 - The detented positions were 90° apart, such that when in the detents, the handle pointer pointed forward, right, aft, or left
- Clockwise from handle pointer forward, the positions were BOTH ON, RIGHT TANK, BOTH OFF, LEFT TANK
- In order to test the lines and fuel selector valve function, low pressure air was initially introduced into the LEFT tank line
 - With the handle set to BOTH OFF, no results were observed
 - With the handle set to LEFT and then BOTH ON, Avgas began to fill the fuel strainer and leak out the damaged drain valve
 - With the handle set to RIGHT, no results were observed
- The test was repeated using water, introduced first through the left fuel tank line, and then repeated with water introduced through the right fuel tank line. In all eight tests (four each per right and left side), the selector valve functioned as expected, as follows:

Water Introduced	Selector Valve Setting	Results From Fuel Strainer
Left	BOTH OFF	No flow
Left	LEFT	Free flow
Left	BOTH ON	Free flow
Left	RIGHT	No flow
Right	BOTH OFF	No flow
Right	LEFT	No flow
Right	BOTH ON	Free flow
Right	RIGHT	Free flow



Figure 13 - Cockpit Fuel Selector

6.0 Engine

- The engine had been separated from the airframe, and the propeller had been unbolted from the engine
- The engine dataplate indicated the following
 - Continental Motors model O-470-K
 - Serial Number 900430-OH
 - Timing: 22°
- The engine stamped case number was 539488
- The engine was relatively undamaged
 - Both exhaust pipes leading to the muffler were bent
 - The muffler was displaced up and aft
 - The forward oil sump pan was pushed in/up and aft, but it was not cracked or otherwise breached
- The carburetor appeared undamaged, but the cowling airbox was crushed
- The throttle and mixture cables had been cut forward of the firewall
 - These cuts had been made by the first recovery person
- The throttle and mixture cockpit controls moved freely, and the motion was evident to the respective cable cuts
- The throttle and mixture cable ends remained attached to the carburetor

- The carburetor heat control cable was uncut, and continuous from the cockpit control to the actuated door forward of the firewall
 - The control and door appeared undamaged, but were extremely difficult to move/actuate
- The magnetos and all other engine accessories remained securely attached
- The ignition leads all appeared undamaged/undisturbed
- The upper 6 spark plugs were removed as part of the examination
 - All leads and spark plugs were found to be securely and properly installed
 - All 6 upper spark plugs exhibited clean, normal-appearance electrodes
- With the upper spark plugs still removed, the engine crankshaft was able to easily be rotated via the propeller flange
 - Thumb compressions were able to be achieved on all 6 cylinders
- The spark plugs were loosely re-installed in their original cylinders, and their respective leads loosely reattached
- The engine was crated for shipment to Continental Motors in Mobile AL for possible test run and detailed examination
 - The muffler and engine mounts were unbolted from the engine for crating

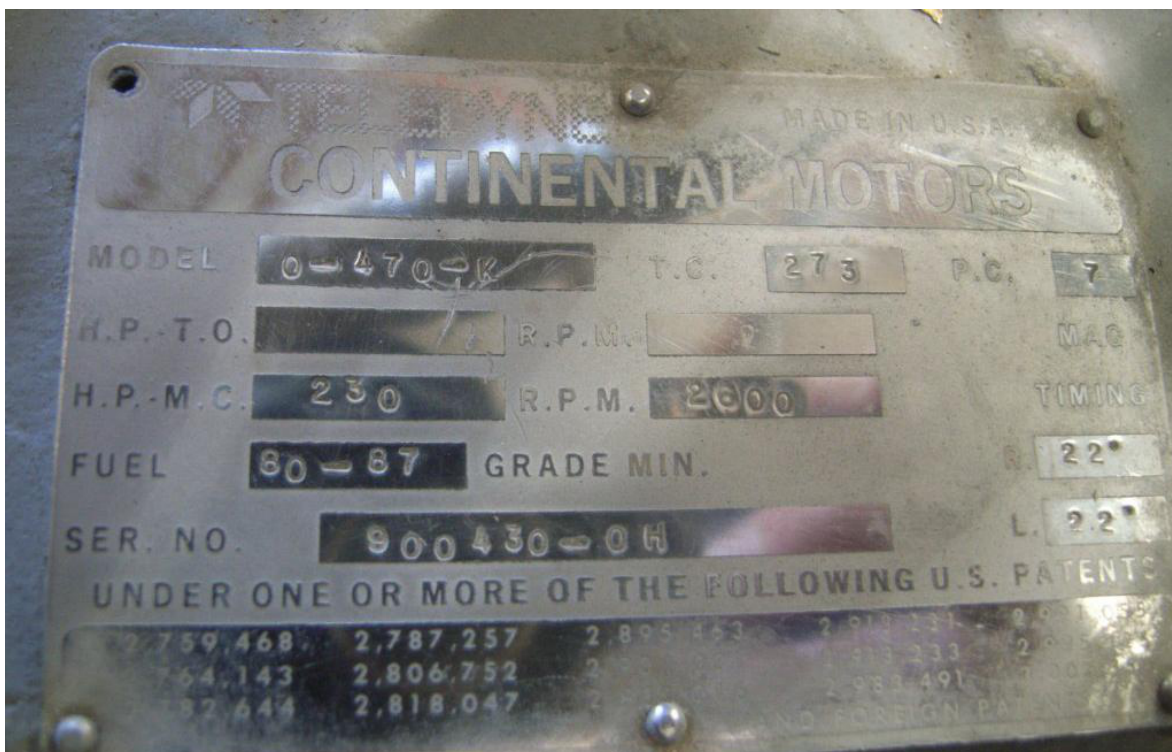


Figure 14 - Engine Dataplate



Figure 15 - Engine (top)

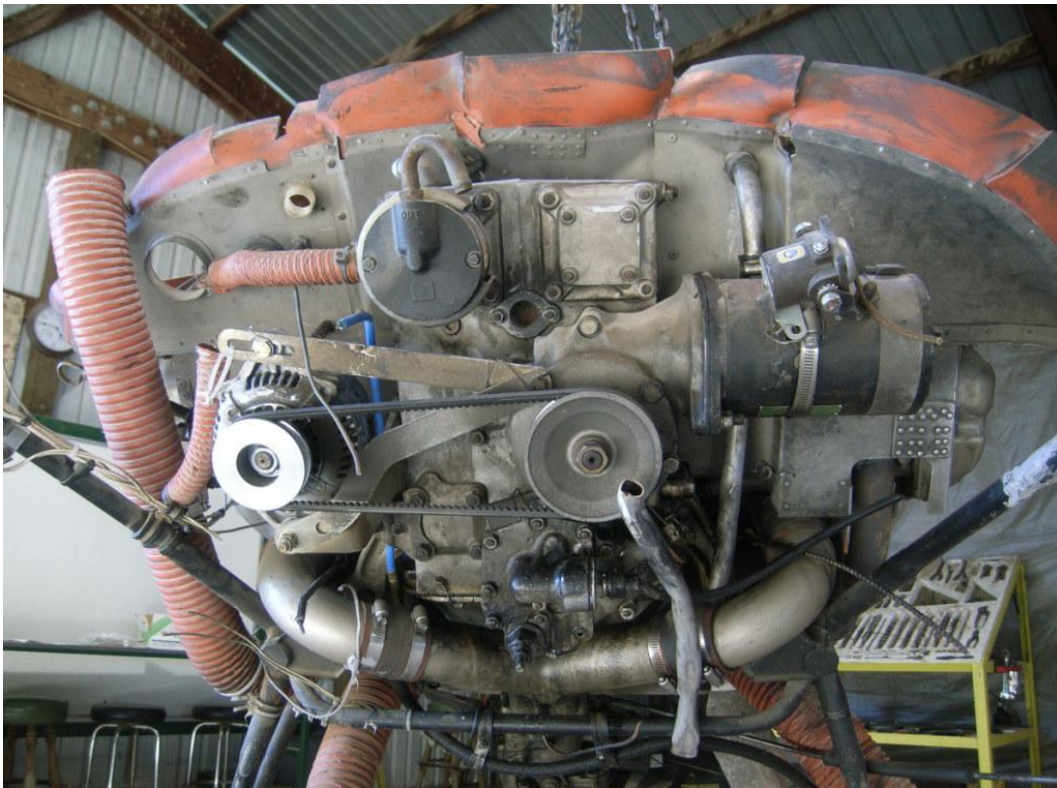


Figure 16 - Engine (accessory face)



Figure 17 - Engine (front)



Figure 18 - Engine (front underside)

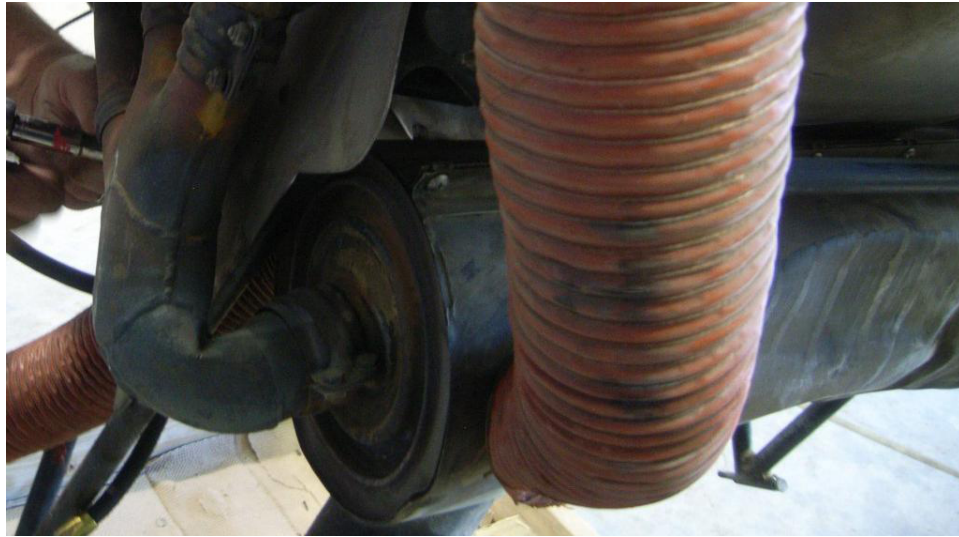


Figure 19 - Deformed Exhaust Pipe



Figure 20 - Upper Spark Plugs

7.0 Propeller

- The propeller was a 2-blade, all-metal, constant speed design
- The hub was intact, and both blades remained attached to the hub
- One blade was essentially undamaged
- The other blade was bent about 45° aft at about the 3/4 span point
 - The bent section displayed some leading edge gouging and chordwise scratching



Figure 21 - Propeller

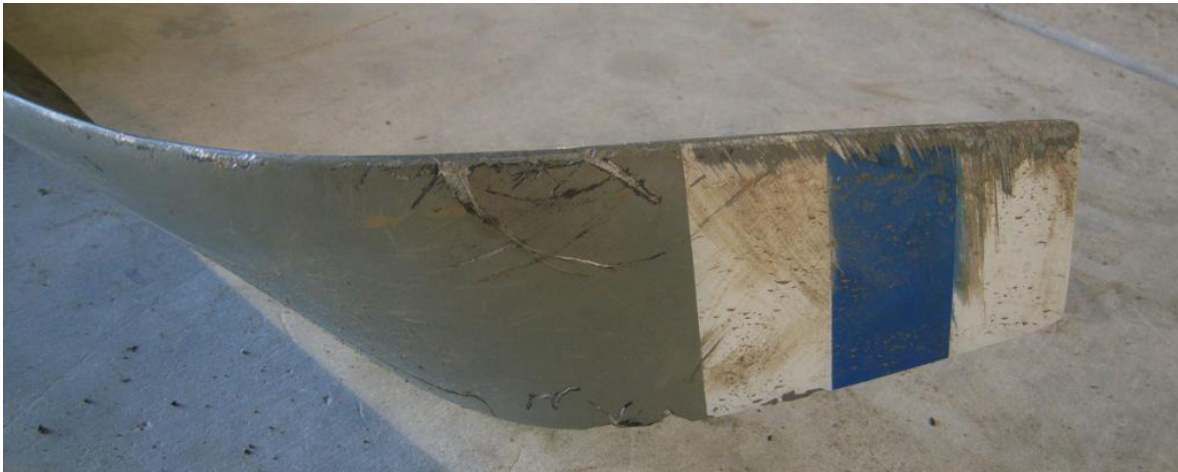


Figure 22 - Bent End of Propeller

F. MAINTENANCE RECORDS INFORMATION

1.0 General

At the request of the NTSB, the owner had shipped the maintenance records to Plain Parts for examination in conjunction with the airplane examination

- Multiple airframe, engine, and propeller logbooks were observed
- Additional documents included miscellaneous work orders, FAA 337 forms, and FAA 8130 parts tags
- A full accounting of the documents was not attempted or accomplished

2.0 Selected Maintenance Items

The following relevant entries were noted:

Log Book	Date	Tach Time	Total Time	Entry Information
E	3/25/94	1243.30	AC: 1549.60 SMOH: 0	Engine SN 900430 overhauled and installed in N6414X
E	2/18/05			Nos 1 & 2 cylinders overhauled
E	9/21/17	2403.23	--	100 hour (in conjunction with Annual) (E. Sawyer)
A	4/18/18	2451	--	Two new fuel bladders. (E. Sawyer, mechanic)
A	5/9/18	2441.89	--	Installed fuel transducer & new line. Owner installed gauge and wiring (E. Sawyer)
A	8/8/18			Entire airplane painted
A	9/21/18	2489	"81905"	Most recent Annual (E. Sawyer)
E	9/21/18	2489	--	100 hour, in conjunction with Annual (E. Sawyer)
A	10/17/18	--	--	Replaced throttle cable w new McFarland pn MCS1222-15 (Nervino Aero Service)

YEAR: 2018	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)
DATE May 9	2441.89			Replaced Rt + Lt Door windows + Rt + Lt Passenger Windows P/Ns W-100-250 + W-100-7 Great Lakes Aero Install Fuel Transducer at Firewall New hose P/N 111-8 with old Fendles. Over Installed Gauge + wiring to Nav Lite C.B. Negligible wt change. See 337 [Redacted] AIT [Redacted] IA

Figure 23 - Maintenance Entry re Fuel Transducer

Nervino Aero Service, Inc.
82405 State Route 70
Beckwourth, California

Airframe Log 10-17-2018
Cessna 180D N6414X s/n 18050914
Tach Time: Total Time:

Installed new McFarlane throttle cable p/n MCS1222-15

Total Time: _____ Date 10-17-2018

Herbert O. Bishop A&P [Redacted] IA

Signed: [Signature]

Figure 24 - Maintenance Entry re Throttle Cable

CERTIFIED OVERHAUL TO
NEW ENGINE TOLERANCES
ZERO-TIME EQUIVALENT

PACIFIC CONTINENTAL ENGINES, INC.
FAA APPROVED REPAIR STATION #TZ3R885L
16041 ARMINTA ST. • VAN NUYS, CA.

Make CONTINENTAL

Model O-470-K

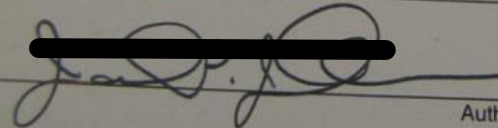
S/N 900430

HRS. SMOH 0.00

This engine was repaired and inspected in accordance with current
Federal Aviation Regulations and is approved for return to service.
Pertinent details of the repair are on file at this Repair Station under

Work Order NO. 96529

Date: 03-16-94


Authorized Signature

Total time on engine before overhaul 1546.60

ALL ENGINE ACCESSORIES ARE GUARANTEED FOR SIX
MONTHS OR 240 HOURS, WHICHEVER OCCURS FIRST. NO
EXCEPTIONS! ENGINE ACCESSORIES DEFINED AS: CONTI-
NENTAL AND LYCOMING FUEL INJECTION SYSTEMS
(FUEL SERVOS, FUEL PUMPS, MANIFOLD VALVES, LINES,
NOZZLES), CARBURETOR, MAGNETOES, STARTER, ALTER-
NATOR OR GENERATOR, AND TURBO.

Figure 25 - Engine Overhaul Tag