Aviation Investigation Final Report

Location:	Westley, California	**Accident Number:**	WPR09LA341
Date & Time:	July 14, 2009, 10:00 Local	**Registration:**	N330HT
Aircraft:	Piper PA-46-310P	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilots encountered smoke in the cockpit originating from the area of the copilot's rudder pedals. The pilots performed the emergency procedures for an electrical fire, which included shutting down the electrical systems. The smoke seemed to initially subside, but then gradually intensified before the engine lost power. The pilots were unable to restart the engine and decided to concentrate on making an off-airport landing. While landing in a plowed field, the nosewheel collapsed almost immediately. Postaccident examination revealed extensive fire damage to the rear of the engine and to the firewall. The nose gear hydraulic actuator flexible hose assembly also sustained extensive fire damage consistent with being near the source of the fire. Further inspection found that the nose gear hydraulic down line remained attached at both attachment fittings. The flexible hose assembly installed on the nose gear actuator uses an AN-style B-nut fitting. The internally threaded hose socket is screwed onto the end of the hose, and the B-nut is secured to the actuator fitting by an externally threaded nipple. Closer examination of the hydraulic line fitting where it attaches to the actuator revealed a crack running along the entire length of the socket. The hose remained inserted into the socket, but because of the crack, the socket fitting could be turned by hand on the hose. The nose gear actuator hydraulic line was then removed. The hose end was easily pulled out and separated from the socket. The manufacturer's identification band indicated that the hose assembly was manufactured in the third quarter of 1991. A review of the scheduled maintenance section of the PA-46-310P maintenance manual in the landing gear group section states in part, to "Replace flexible hoses as required, but no later than 1,000 hours of operation or eight years and at engine overhaul". Although the identification band on the hose assembly indicated that it was manufactured in 1991, no log book entry was located indicating that the hose assembly had ever been replaced.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the landing gear hydraulic line socket, which resulted in a hydraulic leak and in-flight fire. Contributing to the accident was the failure of the owner and/or maintenance facility to comply with the maintenance manual hose replacement schedule.

Findings

Aircraft	Scheduled maint checks - Not serviced/maintained
Aircraft	(general) - Failure

Factual Information

History of Flight

Approach	Sys/Comp malf/fail (non-power) (Defining event)
Approach	Fire/smoke (non-impact)

HISTORY OF FLIGHT

On July 14, 2009, about 1000 Pacific daylight time, a Piper PA-46-310P, N330HT, made a forced landing following an in-flight fire near Westley, California. The owner/pilot was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certificated commercial pilot with a certified flight instructor (CFI) certificate and the private pilot undergoing instruction (PUI) were not injured. The airplane sustained substantial damage. The local instructional flight departed Concord, California, about 0830. Visual meteorological conditions prevailed, and no flight plan had been filed.

The CFI reported that during a biennial review flight with the owner of the airplane they encountered smoke in the cockpit, which was originating in the area of the copilot's rudder pedals.

The pilots performed the emergency procedures for an electrical fire, which included shutting down the electrical systems. The CFI attempted to clear the smoke by opening the window vents. The smoke seemed to subside, but did not stop.

Without an electrical system, the landing gear would not lower, therefore, the pilots elected to momentarily energize the electrical system to lower the landing gear. After activating the gear handle, there was no indication of any response from the landing gear system. They then turned the electrical system back off.

Shortly thereafter, the pilots realized that the engine had lost power and they were descending. The pilots attempted to restart the engine, without success, but decided to concentrate on making an off airport landing.

The smoke became so intense that the CFI had to exit the copilot seat while attempting to find the source of the smoke. During this time, the pilot observed a flickering light at the base of the rudder pedals, which he thought might be flames.

When the flight was about 1,000 feet msl, the CFI climbed back into the copilot seat to help with the landing. The landing site was a plowed field and the touchdown was firm. During the landing, the airplane's nose wheel collapsed almost immediately. The pilots did not realize that the main landing gear was down and locked until they touched down.

The airplane was recovered from the field for further examination. During the recovery process, it was noted that there was extensive fire damage to the rear of the engine and to the firewall.

AIRCRAFT INFORMATION

The airplane was a Piper Malibu, PA-46-310P, serial number 46-8408010. A review of the airplane's logbooks revealed that the airplane had a total airframe time of 3,700 hours at the last annual inspection. The logbooks contained an entry for an annual inspection dated August 13, 2008. The total airframe time at the time of the accident was 3,733.9 hours.

The PA-46-310P Malibu was originally manufactured with a Teledyne Continental Motors (TCM) TSIO-520-BE engine. In October 2002, the aircraft was modified per STC SA00280AT by the installation of a TCM TSIO-550-C1B engine, serial number 802584.

The engine logbook indicated that the engine was installed in the airplane on October 11, 2002, with a total time of 434.0 hours. Total time recorded on the engine at the last annual inspection was 1,360 hours, and time since major overhaul was 1,360 hours.

TESTS AND RESEARCH

The aircraft was recovered and transported to the facilities of Plain Parts, Pleasant Grove, California. On July 30, 2009, investigators conducted an examination of the airplane and engine.

The engine was examined with no mechanical anomalies identified that would have precluded normal operation.

Visual examination of the engine compartment revealed a dark sooty appearance aft of the rear engine cylinder baffles. The discoloration was observed on the rear engine accessories, firewall and firewall components, top aft engine cowling, and in the nose landing gear wheel well area. A closer visual examination in the engine compartment revealed fire damage to fluid and air hoses, electrical wires, and nose gear hydraulic lines. Fire damage was also noted to the forward baggage compartment floor and carpet. Fire damage was observed on the nose landing gear tire, steering boots, and fluid lines in the wheel well area.

Upon examination of the firewall area and engine exhaust system, it was noted that the lower duct assembly, attached to the bleed and ram air selector valve assembly, had sustained heat and impact damage. The TCM 550 series engine installed in this aircraft utilizes an exhaust crossover pipe with a stainless heat shield permanently attached to it. In this installation the crossover pipe was found to run directly forward of and in line with the lower bleed air ducting. The TCM 520 series engine originally installed in the aircraft utilizes the same crossover tube as the TCM 550 series engine. Attached to the crossover tube was an aluminum heat shield assembly, Piper P/N 84104-14 that was part of the original TCM 520 engine installation. The

shield sustained heat damage and was partially melted. One of the two attaching clamps that are riveted to the shield assembly had sheared allowing the clamp to move inwards out of its normal position.

The upper end housing of the nose landing gear actuator is attached to the lower engine mount assembly. The attachment area is directly below the bleed air valve ducting that had been damaged by the engine exhaust crossover tube. The hydraulic down line is attached to the top side of the upper housing, and is also positioned under the bleed air valve ducting. Hydraulic fluid residue was present on the actuator housing.

Visual examination of the nose gear actuator flexible hose assembly revealed that it had sustained extensive fire damage. The nose gear hydraulic down line remained attached at both attach fittings, the flexible hose assembly installed on the nose gear actuator uses an AN style B-nut fittings. The internally threaded hose socket is screwed onto the end of the hose, and the B-nut is secured by an externally threaded nipple. Closer examination of the hydraulic line fitting where it attaches to the actuator revealed a cracked socket. The hose remained inserted into the socket, but the socket fitting could be turned by hand on the hose.

The nose gear actuator hydraulic line was removed from the airplane. Examination of the socket revealed a crack running along its entire length. The hose end was easily pulled out and separated from the socket. The manufacturer's identification band indicated that the hose assembly was manufactured in the third quarter of 1991.

A review of the scheduled maintenance section of the PA-46-310P maintenance manual in the landing gear group section states in part to "Replace flexible hoses as required, but no later than 1,000 hours of operation or eight years and at engine overhaul." Although the identification band on the hose assembly indicated that it was manufactured in 1991, no log book entry was located indicating that the hose assembly had ever been replaced.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	59,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 10, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 6, 2009
Flight Time:	14214 hours (Total, all aircraft), 3111 hours (Total, this make and model), 14000 hours (Pilot In Command, all aircraft), 165 hours (Last 90 days, all aircraft), 38 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	64,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 20, 2008
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N330HT
Model/Series:	PA-46-310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	468408010
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 13, 2008 Annual	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:	33 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3700 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental Motors
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-550-C1B
Registered Owner:	On file	**Rated Power:**	310 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:	MOD,97 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.86 inches Hg	**Temperature/Dew Point:**	28°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Concord, CA (CCR)	**Type of Flight Plan Filed:**	None
Destination:	Concord, CA (CCR)	**Type of Clearance:**	None
Departure Time:	08:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	37.594165,-121.265556(est)

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Gene Sweet; Federal Aviation Adminstration; Fresno, CA Charles Little; Piper Aircraft Company; Vero Beach, FL Andrew Swick; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	January 7, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74271