Aviation Investigation Final Report

Location:	Seligman, Arizona	**Accident Number:**	LAX05LA168
Date & Time:	May 14, 2005, 12:00 Local	**Registration:**	N30YC
Aircraft:	Piper PA-23-250	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The left engine lost power during cruise, and the pilot made a forced landing in an open field with rough uneven terrain. About 45 minutes into the flight, the left engine started to sputter. The pilot attempted to restart the engine. When the engine did not restart, he secured it and then flew towards an alternate airport. Prior to reaching the airport, he attempted to lower the landing gear by placing the landing gear handle in the DOWN position. The landing gear did not extend, so he tried to lower the landing gear via the primary emergency landing gear system (hand pump). When that did not work, he activated the secondary emergency extension system (CO2 blow down tank) by pulling the emergency gear extension ring. The CO2 tank discharged; however, only the right main landing gear extended. The pilot said that with the drag from the partially extended gear they were not going to make the airport, and he made a forced landing in a rough open field. The pilot reported that he believed he had 30 gallons of fuel in each fuel tank. Recovery personnel indicated that the fuel cells had not been breached during the accident, the fuel lines were intact, and they did not see any fuel on the ground surrounding the airplane. They recovered 15 gallons of fuel from right outboard fuel tank, and 15 gallons of fuel from the right inboard fuel tank. Thirty gallons of fuel were drained from the left wing outboard fuel tank. No fuel was found in the left wing inboard fuel tank. The manufacturer's owner's manual for the airplane indicates that if the left engine fails the hydraulic pump will not function (the single system pump is on the left engine), and the emergency landing gear extension system has to be used. The pilot also has to place the landing gear lever in the DOWN position, fully extend the hand pump handle, and then pump the emergency gear handle up and down 30-40 strokes in order to get the landing gear to lower. The pilot can also utilize the CO2 tank for emergency landing gear extension; however, the landing gear selector has to be in the DOWN position for the gas to be correctly ported to the down side of the hydraulic actuators. The airframe, left engine, and landing gear were inspected. The fuel injector manifold was removed and disassembled, with no fuel observed. No fuel was found in the fuel lines from the left wing to the left engine. No discrepancies were found with the left engine's internal mechanical continuity. Investigators noted that the

emergency gear handle was pulled out about 2 inches and not fully extended, and the emergency gear extender ring for the CO2 system appeared to be pulled out. The hydraulic system lines were intact. Clean hydraulic fluid was found in the power pack and the hydraulic system filter was clean.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's fuel system mismanagement that led to a fuel starvation induced loss of power in the left engine. Also causal was the pilot's improper use of the emergency landing gear extension system.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CRUISE - NORMAL

Findings
1. 1 ENGINE
2. (C) FLUID,FUEL - STARVATION
3. (C) FUEL MANAGEMENT - IMPROPER - PILOT IN COMMAND

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
4. HYDRAULIC SYSTEM,PUMP - INOPERATIVE
5. (C) EMERGENCY PROCEDURE - IMPROPER USE OF - PILOT IN COMMAND
6. LANDING GEAR - OTHER

Occurrence #3: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
7. AIRCRAFT PERFORMANCE,ENGINE OUT CAPABILITY - EXCEEDED

Occurrence #4: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
8. TERRAIN CONDITION - ROUGH/UNEVEN
9. TERRAIN CONDITION - NONE SUITABLE

Factual Information

HISTORY OF FLIGHT

On May 14, 2005, at 1200 mountain standard time, a Piper PA-23-250, N30YC, lost power in the left engine and made a forced landing in an open field near Seligman, Arizona. The pilot/owner operated the airplane under the provisions of 14 CFR Part 91. The airplane sustained substantial damage. The private pilot and two passengers were not injured. Visual meteorological conditions prevailed for the cross-country flight that departed Tuba City Airport (T03), Tuba City, Arizona, at 1115. The flight was destined for Lake Havasu City Airport (HII), Lake Havasu, Arizona. No flight plan had been filed.

The National Transportation Safety Board investigator-in-charge (IIC) interviewed the pilot. The pilot reported that they were about 45 minutes into the flight when the left engine started to sputter. He turned on the electric boost pump, but the engine died. When he couldn't identify the problem, he secured the left engine. The pilot stated that he tried to make it Seligman Airport (P23). While en route, the pilot activated the landing gear handle to lower the landing gear. The landing gear did not extend, so he attempted to manually extend the landing gear with the emergency landing gear mechanism. When that didn't work, he activated the CO2 tank, heard it engage, and the right main landing gear extended. The pilot reported that the nose and left main landing gear did not extend. The pilot stated that with the right main landing gear dragging, he was unable to make it to Seligman Airport, and made a forced landing in an open field. He reported that once they landed he shut the airplane down and turned the fuel selectors to the OFF position. The pilot further stated that he did not recall which fuel tank was selected at the time of the loss of engine power, or what position it was in when he turned them off after landing.

The pilot reported that there were about 30 gallons of fuel in each tank at the time of the accident. He further stated that 2 weeks prior to the accident, maintenance personnel had replaced the hydraulic seals for the left main landing gear. The airplane had flown 4.5 hours since maintenance personnel had returned it to service.

According to recovery personnel, they defueled the airplane prior to transporting it to the retrieval facility. They recovered 30 gallons of fuel from the left wing outboard fuel tank, and found no fuel in the left wing inboard fuel tank. The right wing fuel tanks (inboard and outboard) held a total of 30 gallons of fuel (15 gallons in the inboard fuel tank and 15 gallons in the outboard fuel tank). Recovery personnel reported that there was no visible damage to any of the fuel tanks or the fuel lines. They also reported that there was no visible fuel on the ground surrounding the airplane.

Recovery personnel noted that while removing the wings for transport, the B-nuts that attached

the air lines to the landing gear CO2 bottle emergency extension system were loose and turned easily by hand.

AIRFRAME

The airplane was a 1964 Piper PA-23-250, serial number 27-2526. A review of the airplane's logbook revealed a total airframe time of 11,531.9 hours at the last annual inspection. An annual inspection was completed on May 13, 2004.

On May 10, 2005, the left main landing gear strut was sealed and hydraulic fluid was added. On March 3, 2005, the left-hand "up pressure main gear hydraulic line" was replaced, and the landing gear was cycled six times with no further leaks noted.

A Lycoming IO-540-C4B5 engine, serial number L-9955-48, was installed on the left side. According to the engine logbook, a 100-hour inspection was completed on May 13, 2004. Tropic Airpower, Inc., Lantana, Florida, completed a field engine overhaul on December 11, 1999. The left engine tachometer read 5,223.48 hours.

A Lycoming IO-540-C4B5 engine, serial number L-7036-48, was installed on the right side. According to the engine logbook, a 100-hour inspection was completed on May 13, 2004. The right engine tachometer read 5,257.62 hours.

The hour meter read 1,284.3 hours.

According to the manufacturer's service manual, the landing gear is hydraulically operated with a powerpak unit located in the control pedestal below the instrument panel. The hydraulic landing gear is lowered via a selector lever in the cockpit; once selected the hydraulic fluid travels through the selected port into the actuating cylinders. If the landing gear fails to extend normally, or the engine-driven pumps fail, the pilot can utilize the emergency pump (hand pump) to extend the landing gear. To utilize the system, the pilot has to extend the handle to its full length by pulling aft on the handle and positioning the handle as desired. The airplane manufacturer indicates that 30 to 40 "up and down pump strokes are required to raise or lower the landing gear." The accident airplane was also equipped with an independent CO2 emergency landing gear extension system that is utilized in case of a hydraulic system failure.

In section III titled Operating Instructions of the Owner's manual under Emergency procedures subsection 1 titled Engine Failure, a CAUTION note states, "If the left engine has failed, the hydraulic pump will not be functioning. If it is necessary to lower the landing gear or flaps with the left engine dead, the hydraulic hand pump location in the pedestal is used. (see 5, this section)."

A NOTE in subsection 2 titled Feathering that states: "if the left engine is inoperative the gear and flaps must be pumped down by hand."

Subsection 5 titled Emergency Landing Gear Extension also states that if the left engine or engine-driven hydraulic pump fails, the extension (lowering) of the landing gear is done by manually activating the hydraulic pump. In order to lower the landing gear, the pilot must place the landing gear lever in the DOWN position, and then "30-40 strokes of the pump handle will...lower the landing gear...."

In order to activate the CO2 tank, the pilot has to place the landing gear lever in the DOWN position, and then pull the Emergency Gear Extender mechanism.

TEST AND RESEARCH

The airframe and left engine were examined at Air Transport, Phoenix, Arizona, on June 23, 2005. The New Piper Aircraft was a party to the investigation.

According to the airplane manufacturer, the left-hand landing gear doors were partially opened and sustained impact damage. The left landing gear was also partially extended; however, the down lock linkage was not broken. The landing gear was manually extended and mechanically locked in the down position. According to the manufacturer, the actuator cylinder assembly was dry and clean. He also noted that the hydraulic lines appeared old and stiff, but dry and intact. The airplane manufacturer further noted that there was no sign of hydraulic fluid in the left main landing gear wheel well.

A visual examination of the landing gear hydraulic powerpak revealed that the hydraulic lines remained attached in the nose section, and were dry and in good condition. The left engine driven hydraulic pump and filter assembly were unremarkable and the filter was free of contamination. According to the manufacturer, a clean bright red colored hydraulic fluid was in the filter housing. Investigators documented the cockpit. The fuel selectors were in the OFF position. The fuel crossfeed lever was also in the OFF position.

Investigators noted that the emergency gear handle was pulled out about 2 inches and not fully extended, and the emergency gear extender ring for the CO2 appeared pulled out.

The left engine was visually examined with no obvious mechanical defects noted. A Safety Board investigator removed the top spark plugs. When compared with the Champion Aviation Check-a-Plug chart AV-27, the spark plugs displayed coloration consistent with normal operation. Mechanical continuity was obtained via manual rotation of the crankshaft, which produced thumb compression in all cylinders in firing order. The fuel injector manifold was removed with no fuel observed or damage noted to the diaphragm. No fuel was found in the engine to fuel tank fuel line.

Pilot Information

Certificate:	Private	**Age:**	21,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1	**Last FAA Medical Exam:**	January 1, 2004
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	February 1, 2005
Flight Time:	168 hours (Total, all aircraft), 55 hours (Total, this make and model), 96 hours (Pilot In Command, all aircraft), 26 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N30YC
Model/Series:	PA-23-250	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	27-2526
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	May 1, 2004 Annual	**Certified Max Gross Wt.:**	4800 lbs
Time Since Last Inspection:	55.2 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	11531.9 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-C4B5
Registered Owner:	Dillon Shepley	**Rated Power:**	250 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PRC,5045 ft msl	**Distance from Accident Site:**	47 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	150°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	24°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tuba City, AZ (T03)	**Type of Flight Plan Filed:**	None
Destination:	Lake Havasu, AZ (HII)	**Type of Clearance:**	None
Departure Time:	11:15 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	35.336112,-112.889724

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Ronald Williams; Federal Aviation Administration; Las Vegas, NV Charles Little; New Piper Aircraft; Vero Beach, FL
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Investigation Class:	Class
Note:	
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