Aviation Investigation Final Report

Location:	Anchorage, Alaska	**Accident Number:**	ANC04LA057
Date & Time:	May 25, 2004, 18:15 Local	**Registration:**	N70233
Aircraft:	Cessna 185E	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot/owner and pilot-rated passenger were departing an airport in an amphibian-float equipped airplane for the pilot's first flight in the newly-purchased airplane. The pilot reported that during the takeoff and initial climb, the engine appeared to be producing full power, but that the airplane would not climb above 400 feet above the ground. The pilot was unable to maintain altitude, and he headed for a city street for an emergency landing. The airplane subsequently collided with a power line and an unoccupied residence, and came to rest inverted in the residence's driveway. Subsequent inspection of the airplane's fuel system disclosed significant contamination and resultant partial blockage of the fuel injection fuel controller screen, partial blockage of the fuel injection distributor screen, and rust and water in the fuel injector manifold and engine-driven fuel pump. Prior to an engine test run, the above items were cleaned, and a pair of excessively worn spark plugs replaced. The engine subsequently started and ran at various power settings, including a maximum of 2,500 rpm with a club test propeller, without any observed mechanical anomalies. The airplane's annual inspection was due six days after the accident flight, and the pilot/owner indicated that he had wanted to have the inspection accomplished prior to the accident flight, but that the aviation maintenance shop could not schedule it in time. The pilot noted that a prepurchase inspection of the airplane was not performed. A review of the maintenance logs disclosed that the airplane had accrued about 58 service hours in the previous 2.5 years. Federal Air Regulation section 91.7 states that the pilot in command is the person responsible for determining that the aircraft is in an airworthy condition prior to operation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot/owner's failure to ensure that the airplane was in an airworthy condition prior to flight,

which resulted in a partial loss of engine power and subsequent in-flight collision with a residence during an emergency landing after takeoff. Factors associated with the accident are a contaminated fuel pump, a flow-restricted fuel controller, a flow-restricted distributor valve, worn spark plugs, and inadequate servicing/maintenance of the airplane by other maintenance personnel.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (F) FUEL SYSTEM,PUMP - CONTAMINATION
2. (F) FUEL SYSTEM,FUEL FLOW DIVIDER/DISTRIBUTOR - FLOW RESTRICTED
3. (F) IGNITION SYSTEM,SPARK PLUG - WORN
4. (F) FUEL SYSTEM,FUEL CONTROL - FLOW RESTRICTED
5. (F) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - INADEQUATE - OTHER MAINTENANCE PERSONNEL
6. (C) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - INADEQUATE - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Findings
7. OBJECT - WIRE,TRANSMISSION
8. OBJECT - RESIDENCE

Factual Information

On May 25, 2004, about 1815 Alaska daylight time, an amphibian float equipped Cessna 185 airplane, N70233, sustained substantial damage when it collided with a power line and an unoccupied residence during an emergency landing after takeoff from Merrill Field Airport, Anchorage, Alaska. The accident site was located in a mix of residential and commercial buildings, about 1/2 mile west-southwest of Merrill Field. The private pilot/airplane owner and the airline transport pilot-rated passenger received minor injuries. No one on the ground was injured. The airplane was being operated as a local personal flight by the pilot/owner under Title 14, CFR Part 91. Visual meteorological conditions prevailed, and no flight plan was in effect.

An on-site investigation and interviews with the pilot and passenger were conducted by NTSB investigators commencing about 1900. Additional interviews were conducted with the pilot and the passenger at various times during the ensuing investigation. The pilot related that he had purchased the airplane April 20, 2004, and the purpose of the flight was to become familiar with the airplane's handling characteristics and performance. He intended to perform at least one touch and go landing, and then leave the traffic pattern and fly to the local practice area. He estimated that there was 70-80 gallons of fuel aboard, and that the airplane was slightly below its gross weight limitation. He noted he drained the fuel tank sumps for contaminates, and discovered none. The rest of the preflight inspection and engine run-up were normal. The pilot indicated he was familiar with other Cessna 180 and 185 series airplanes, but had never flown a Cessna 180 or 185 on amphibian floats. He said he selected 20 degrees of flap as recommended, and that the airplane accelerated and climbed slower than he had anticipated during the takeoff roll and initial climb. He said he confirmed that the engine was developing full power, but as the airplane reached an altitude of about 400 feet above the ground, he was unable to get the airplane to climb higher. He indicated that while it appeared the engine was producing full power, the airplane was extremely sluggish, and it started to descend gradually. He was unable to find any suitable landing area, and attempted to land on a city street. Prior to reaching the street, the airplane collided with a power line, a tree, and the roof of an unoccupied two-story residence. The airplane came to rest inverted, on the driveway in front of the residence at 727 East 15th Avenue.

An examination of the airplane's flight controls and structure was completed on May 27 by the NTSB investigator-in-charge (IIC), two FAA aviation safety airworthiness inspectors, and another NTSB investigator. No evidence of any preimpact mechanical irregularities were discovered. The accident airplane's engine and propeller assembly were removed for further inspection and testing.

A propeller disassembly and inspection was performed under the direction of the NTSB IIC on June 7, at a propeller overhaul facility in Anchorage. Present at the inspection was a party

representative from the airplane's engine manufacturer, Teledyne Continental Motors (TCM). Prior to the disassembly, it was noted that one of the two propeller blades had approximately 9 inches missing from its tip. The propeller's fracture surface was parallel to the chord, and was evenly colored and granular in appearance. Both blades displayed chord-wise scratching and leading edge gouges. The inspection disclosed no evidence of any preimpact mechanical anomalies with the propeller or propeller assembly.

On June 8, the engine was placed on a test stand at an engine overhaul facility in Anchorage. In addition to the NTSB IIC, the TCM party representative was there, as was an aviation safety inspector from the Anchorage FAA Flight Standards District Office. Prior to the attempt to run the engine, the fuel injection distributor manifold valve was opened and examined. Water, estimated to be about a teaspoon, was present in the manifold cavity, as was rust and other particulate matter in the manifold screen. Approximately 75 per cent of the screen was occluded by the particulate matter/rust. The screen was cleaned and replaced. The engine driven fuel pump was also disassembled, and signs of rust and residual amounts of water were found. The pump was cleaned, reassembled, and placed on the engine. The fuel controller's inlet finger screen was about 90 per cent occluded with a white, viscous substance. The screen was cleaned, and the unit returned to its housing.

The engine started normally on two occasions with a club test propeller installed, but would not accelerate beyond 2,100 rpm. The number 4 cylinder was cool to the touch, and a differential pressure test was accomplished on all six cylinders, with the following results: Number 1, 71/80; Number 2, 68/80; Number 3, 69/80; Number 4, 76/80; Number 5, 69/80; Number 6, 68/80. The number 4 cylinder's spark plugs were examined, and appeared to be worn excessively. The spark plugs were replaced with new spark plugs, and the engine was started again. All six cylinders became hot to the touch, and the engine readily accelerated to 2,500 rpm, with an indicated fuel flow of 28 gallons per hour.

The airplane had accrued approximately 14 service hours since the last annual inspection on May 1, 2003. In the preceding 2.5 years, the airplane had accrued about 58 total service hours. Federal aviation regulations specify that an annual inspection is valid until the last day of the month in which it was issued, thus the annual inspection was still valid at the time of the accident. The pilot/owner of the airplane stated that he had intended to have an annual inspection performed prior to the accident flight, but the shop he wished to use was unable to schedule it until May 31. He stated that the airplane did not have a prepurchase inspection.

Federal air regulation section 91.7, Civil Aircraft Airworthiness, states, in part: "(A) No person may operate a civil aircraft unless it is in an airworthy condition. (B) The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for a safe flight. The pilot in command shall discontinue flight when unairworthy...conditions occur. "

Pilot Information

Certificate:	Private	**Age:**	55,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	January 10, 2003
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 30, 2004
Flight Time:	2105 hours (Total, all aircraft), 1500 hours (Total, this make and model), 2099 hours (Pilot In Command, all aircraft), 13 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Information

Certificate:	Airline transport; Commercial; Flight engineer; Flight instructor	**Age:**	54,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; 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 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	December 10, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N70233
Model/Series:	185E	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18502075
Landing Gear Type:	Amphibian	**Seats:**	2
Date/Type of Last Inspection:	May 1, 2003 Annual	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:	14 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2296 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520D-23
Registered Owner:	William H. McDonald	**Rated Power:**	300 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:	PAMR,137 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	18:30 Local	**Direction from Accident Site:**	60°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 5000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.45 inches Hg	**Temperature/Dew Point:**	12°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Anchorage, AK (MRI)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:		**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	61.213611,-149.844451

Administrative Information

Investigator In Charge (IIC):	LaBelle, James
Additional Participating Persons:	Ed Kornfield; Anchorage Flight Standards District Office; Anchorage, AK Michael J Grimes; Teledyne Continental Motors; Lancaster, CA
Original Publish Date:	January 24, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=59323