Aviation Investigation Final Report

Location:	Bethel, Alaska	**Accident Number:**	ANC07LA077
Date & Time:	August 8, 2007, 17:27 Local	**Registration:**	N720
Aircraft:	Cessna 185	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The commercial pilot was repositioning a float-equipped airplane to its mooring site after a 100-hour inspection. About 2 minutes after departure, the pilot reported a loss of engine power, and selected a small pond as a forced landing site. After touchdown on the pond, the airplane collided with the shoreline and nosed over. The airplane sustained substantial damage to the left wing, right wing lift strut, empennage, and fuselage. A postaccident inspection of the airplane revealed that the fuel selector handle had been inadvertently reinstalled incorrectly during the recent 100-hour inspection, and when the fuel tank selector handle was placed in the "Both" position, it actually turned the fuel supply off. Investigation revealed slight wear to the keyed cog of the fuel selector valve handle (female receptacle), as well as slight wear to the fuel selector valve connection point (male receptacle). The combined wear patterns of both the fuel selector valve handle and the fuel selector valve connection point allowed the installation of the fuel selector handle 180 degrees from its correct position. When a new fuel selector valve handle was fitted onto the valve connection point, it could only be installed in the correct position, and not 180 degrees from the correct installation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The improper [reversed] installation of the fuel selector handle by maintenance personnel.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: CRUISE

Findings
1. (C) FUEL SYSTEM,SELECTOR/VALVE - REVERSED
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - COMPANY MAINTENANCE PERSONNEL

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

Findings
3. TERRAIN CONDITION - WATER

Occurrence #3: NOSE OVER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. TERRAIN CONDITION - TUNDRA

Factual Information

On August 8, 2007, about 1727 Alaska daylight time, a float-equipped Cessna 185 airplane, N720, sustained substantial damage when it nosed over during a forced landing following a loss of engine power, about 2 miles north of Bethel, Alaska. The airplane was being operated as a visual flight rules (VFR) Title 14 CFR Part 91 positioning flight by the U.S. Department of Interior, Aviation Management Directorate, Anchorage, Alaska, when the accident occurred. The solo commercial pilot was not injured. Visual meteorological conditions prevailed, and company flight following procedures were in effect.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), on August 9, the pilot related that the accident flight was the first flight after a 100-hour inspection. He said that the purpose of the flight was to reposition the airplane to its mooring site, about 2 miles from the maintenance facility. He added that the repositioning flight would also serve as a postmaintenance operational check flight following the 100-hour inspection.

The pilot reported that after an uneventful takeoff, he climbed the airplane to about 500 feet agl, and began to configure the airplane for cruise flight. He said that soon after leveling at 400 feet agl, he noted a rough running engine, followed by a gradual reduction in engine rpm. He said that engine emergency procedures did not remedy the engine roughness, which was followed by a rapid loss of engine power, and subsequent loss of altitude. The pilot reported that he was unable to maintain level flight, and he selected a small pond as a forced landing site. After touchdown on the pond, the airplane's floats collided with the soft, tundra-covered shoreline, and the airplane nosed over, sustaining substantial damage to the left wing, right wing lift strut, empennage, and fuselage.

Two air safety investigators from the Aviation Management Directorate, in Boise, Idaho, traveled to the accident scene on August 11, 2007, and examined the airplane. The investigators reported that an inspection of the airplane revealed that the fuel selector handle had been inadvertently reinstalled incorrectly during the recent 100-hour inspection. The investigators said that when the fuel tank selector was placed in the "Both" position, it actually turned the fuel supply off.

The main fuel valve selector handle is located on the floor, between the two front seats. The three-position handle allows the pilot to select fuel to the engine from either the right or left fuel tanks, or both. The airplane's fuel selector valve assembly is located about 6-inches beneath the airplane's floor. A 6-inch long rigid cable assembly connects the fuel selector valve to the fuel selector handle. Both ends of the rigid cable assembly use a keyed cog, which is designed to prevent maintenance personnel from installing the fuel selector handle incorrectly. The fuel selector handle assembly, along with the rigid cable assembly, were

removed from the accident airplane and shipped to the NTSB IIC in Anchorage for inspection.

On September 20, 2007, in Wichita, Kansas, the NTSB IIC, along with a senior Cessna Aircraft Company engineering specialist, examined the fuel selector handle and cable assembly that was removed from the accident airplane. The inspection revealed wear marks, with minor rounding of the keyed (male) end of the cog on the rigid cable assembly. In addition, wear marks and a slight elongation of the (female) receptacle on the fuel valve handle was also noted. The combined wear on both the keyed cog on the rigid cable assembly, and wear of the keyed cog on the fuel selector valve handle, inadvertently allowed the installation of the fuel selector handle 180 degrees from the correct position. The Cessna engineer provided the NTSB IIC with a new fuel selector valve handle for comparison. When the new fuel selector handle was fitted on rigid cable assembly, it could only be installed in the correct position, and not 180 degrees from the correct installation.

Pilot Information

Certificate:	Commercial	**Age:**	56,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 1, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 1, 2007
Flight Time:	7168 hours (Total, all aircraft), 6747 hours (Pilot In Command, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N720
Model/Series:	185	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18504334
Landing Gear Type:	Float	**Seats:**	4
Date/Type of Last Inspection:	August 1, 2007 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	0.1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2754.2 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520D
Registered Owner:	U.S. Department of the Interior	**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:	BET,123 ft msl	**Distance from Accident Site:**	
Observation Time:	15:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 2100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.19 inches Hg	**Temperature/Dew Point:**	14°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bethel , AK (BET)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Bethel , AK (Z58)	**Type of Clearance:**	None
Departure Time:	17:25 Local	**Type of Airspace:**	

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	Johnson, Clinton
Additional Participating Persons:	Scott E Norman ; Federal Aviation Administration ; Anchorage, AK John Mills ; U.S. Department of Interior, Aviation Management ; Boise, ID
Original Publish Date:	April 30, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66411