Aviation Investigation Final Report

Location:	West Linn, Oregon	**Accident Number:**	SEA07LA217
Date & Time:	July 28, 2007, 11:48 Local	**Registration:**	N13060
Aircraft:	Taylorcraft BF12	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The 67-year-old float equipped Taylorcraft crashed into a river following a wing lift strut separation. A witness reported that it appeared the airplane was going to land; however, just before touchdown it began to ascend and enter a left turn. The witness said that shortly after entering the turn, the airplane's left wing buckled and folded back against the fuselage. The airplane then entered an uncontrolled descent to impact with the water. Visual examination of the fractured wing strut attachment fitting showed substantial corrosion and pitting throughout the assembly. Further examination utilizing a scanning electron microscope (SEM) revealed that the left wing strut fitting fractured due to extensive corrosion followed by fatigue cracking. The lower side of the fitting had corrosion pitting that extended from the interior of the fitting completely through the thickness in some areas. The upper side of the fitting was also thinned due to corrosion. Several areas of the fracture surfaces showed oxidation consistent with progressive crack growth over an extended period of time, and fatigue features were found in areas not damaged by rubbing or corrosion. The most recent annual inspection was completed 2 months prior to the accident by the owner, who held an airframe and powerplant technician license. It was not determined which one of the two pilots, an airline transport pilot/certified flight instructor (also the owner of the airplane) seated in the left front seat or the airline transport pilot/certified flight instructor (CFI) seated in the right front seat, was manipulating the flight controls when the accident occurred.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The corrosion, fatigue fracture, and subsequent separation of the left wing lift strut attachment fitting. Also causal was the inadequate maintenance and annual inspection by the owner/pilot/mechanic.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: MANEUVERING

Findings
1. (C) WING,BRACING STRUT - CORRODED
2. (C) WING,BRACING STRUT - FATIGUE
3. (C) MAINTENANCE,ANNUAL INSPECTION - INADEQUATE - OWNER/PILOT MECHANIC
4. (C) WING,BRACING STRUT - FRACTURED
5. (C) WING,BRACING STRUT - SEPARATION

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. TERRAIN CONDITION - WATER

Factual Information

HISTORY OF FLIGHT

On July 28, 2007, about 1148 Pacific daylight time, a float equipped Taylorcraft BF-12, N13060, was substantially damaged following an uncontrolled descent into the Willamette River near West Linn, Oregon. The local flight was conducted under the provisions of Title 14 CFR Part 91. The two occupants, an airline transport pilot/certified flight instructor (owner and operator of the airplane) seated in the left front seat and an airline transport pilot/certified flight instructor (CFI) seated in the right front seat, were killed. Visual meteorological conditions prevailed and no flight plan was filed. The flight originated from Lake Oswego, Oregon, approximately 25 minutes prior to the accident. Visual meteorological conditions prevailed and no flight plan was filed.

Multiple witnesses reported that the airplane was observed doing water landings prior to the accident.

One witness reported the that the airplane was in a climbing left turn, approximately 100 feet above the water, when it abruptly pitched to a nose-low attitude and spiraled into the water.

A second witness, who was driving a boat on the river, described that it appeared the airplane was going to land, however, just before touchdown it began to ascend and enter a left turn. The witness reported that shortly after entering the turn, which he estimated to be 40-50 degrees, the airplane's left wing buckled and folded back against the fuselage.

PERSONNEL INFORMATION

First Pilot (seated in the left seat):

The First Pilot, age 80, held an airline transport pilot (ATP) certificate, commercial pilot certificate and flight instructor certificate. The pilot held a second-class airman medical certificate issued on April 27, 2007, and contained a provision that required the pilot to wear corrective lenses.

Second Pilot (seated in the right seat):

The Second Pilot, age 52, held an airline transport pilot (ATP) certificate, commercial pilot certificate, flight instructor certificate and multiple type ratings. The pilot held a first-class airman medical certificate issued on August 24, 2006, with no limitations.

Both pilots held airplane single-engine sea ratings.

It was not determined which one of the two pilots was manipulating the flight controls when the accident occurred.

AIRCRAFT INFORMATION

The float-equipped model BF-12 65, serial number 2786, was manufactured by Taylorcraft in 1941. The two-place airplane was powered by an 85-hp Teledyne Continental C-85 carbureted engine.

Review of copies of maintenance logbook records showed an annual inspection was completed by the First Pilot (a certificated airframe and powerplant mechanic) on May 26, 2007, at a recorded tachometer reading of 3,090 hours, airframe total time of 5,445 hours and engine total time of 2,535 hours.

WRECKAGE AND IMPACT INFORMATION

Representatives from the Portland, Oregon, Federal Aviation Administration Flight Standards District Office reported that the main wreckage was located in about 4 feet of water near the shoreline of the river. The left wing assembly was located in the water about .25 miles west of the main wreckage. The onsite Safety Inspector reported the left wing lift struts remained attached to the wing assembly. The Safety Inspector reported that the lower lift strut attach bracket had "severed" from the fuselage. The inspector reported that approximately 70 percent of the parting surface of the lift strut attach bracket appeared to have been severely corroded.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on both pilots. According to the autopsy reports, the cause of death for both pilots was attributed to traumatic injuries sustained in the accident.

Forensic toxicology was performed on specimens from both pilots by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology reports stated no ethanol, carbon monoxide, cyanide or listed drugs were detected. Refer to the toxicology report contained in the docket for specific test parameters.

TESTS AND RESEARCH

The NTSB Materials Laboratory, in Washington, D.C., examined the left wing strut attachment fitting (Materials Laboratory Report 07-109). Visual examination of the fractured attachment fitting showed substantial corrosion and pitting throughout the assembly. The fractures were located mostly in line with the inboard ends of the two strut attachment slots. Further examination utilizing a scanning electron microscope (SEM) revealed that the left wing strut fitting fractured due to extensive corrosion followed by fatigue cracking. The lower side of the fitting had corrosion pitting that extended from the interior of the fitting through the thickness

in some areas. The upper side of the fitting was also thinned due to corrosion. Several areas of the fracture surfaces showed oxidation consistent with progressive crack growth over time, and fatigue features were found in areas not damaged by rubbing or corrosion.

ADDITIONAL DATA / INFORMATION

On April 2, 2007, Taylorcraft Aviation, LLC issued Service Bulletin (SB) 2007-001; Wing Lift Strut Assembly Corrosion Inspection/Replacement. The actions specified by the SB outline procedures "...to inspect and detect any internal or external corrosion of the wing lift strut tube..." The SB was specific to the lower end of the forward and aft lift struts near the strut attachment fitting.

Review of maintenance logbook records for the accident airplane disclosed no record indicating that SB 2207-001 was completed.

On November 8, 2007, Taylorcraft Aviation, LLC issued Service Bulletin 2007-002; Inspection of wing strut attachment fitting part number A-A11 for cracks and corrosion. The actions specified by the SB outline procedures "...to inspect and detect any internal or external cracks or corrosion..." of the wing strut attachment fittings.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	80,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider; Gyroplane; Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Glider; Gyroplane; Helicopter; Instrument airplane; Instrument helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 1, 2007
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	8420 hours (Total, all aircraft)		

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	52,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:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 1, 2006
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	11000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Taylorcraft	**Registration:**	N13060
Model/Series:	BF12	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2786
Landing Gear Type:	Float	**Seats:**	2
Date/Type of Last Inspection:	May 1, 2007 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5445 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	C-85
Registered Owner:	David H. Wiley	**Rated Power:**	85 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:	KPDX,30 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 2000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	19°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LAKE OSWEGO, OR (3S1)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	11:23 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	45.359443,-122.611663

Administrative Information

Investigator In Charge (IIC):	Hogenson, Dennis
Additional Participating Persons:	Gordon Read; FAA FSDO; Hillsboro, OR
Original Publish Date:	March 31, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66323