Aviation Investigation Final Report

Location:	Burlington, Washington	**Accident Number:**	WPR10FA009
Date & Time:	October 8, 2009, 13:05 Local	**Registration:**	N2087C
Aircraft:	Piper PA-12	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was nearing the completion of a rebuild/restoration of the airplane, but it had not yet been inspected and signed off by a mechanic with an Inspection Authorization. On the day of the accident the pilot was planning on doing a test run of the recently overhauled engine. Witnesses reported that the pilot ran the engine for about five minutes and then shut it down. Then, about fifteen minutes later, he started the engine again and taxied out to the active runway. Without performing a magneto or carburetor heat check, the pilot pulled onto the runway and added what sounded to witnesses like full power. The airplane then made a "very short" takeoff roll before lifting off. Although the liftoff appeared normal to the witnesses, soon thereafter the nose of the airplane pitched up to a near-vertical attitude. It then climbed to an altitude of between 150 to 200 feet above ground level. Then, with the engine still at what sounded like full power, the airplane slowed, fell off on the right wing, and descended near vertically into the grass-covered terrain near the side of the runway. A postaccident teardown inspection found that the elevator control cables had been connected to the incorrect elevator control horns, resulting in a reversal of control inputs at the elevator. A mechanic who had signed off many of the pilot's previous rebuild projects stated that he had found reversed control cables on two other airplanes the pilot had completed. The mechanic also stated that the pilot had done "high speed taxi tests" on a number of other rebuilt airplanes prior to the time they were inspected and signed off. The mechanic had warned the pilot about the dangers of doing so, but the pilot had continued the practice.

Toxicology testing of specimens from the pilot was consistent with the recent use of a medication containing diphenhydramine, an over-the-counter impairing antihistamine. Family members described a 10-year history of a skin condition consistent with chronic urticaria (hives) that resulted in severe recurrent itching and which had frequently occurred while the pilot was working on aircraft. The pilot had not indicated any conditions or medication use at

the time of his last Application for Airman Medical Certificate, less than 5 months prior to the accident. Although the pilot likely would have had no opportunity to recover the aircraft once it became airborne, it is possible that impairment from the use of diphenhydramine or distraction from chronic urticaria contributed to the pilot's failure to correctly rig the elevator cables. However, the investigation could not determine whether impairment or distraction played a role in the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's in-flight loss of control due to his failure to correctly connect the elevator control cables during the restoration/rebuild of the airplane. Contributing to this accident was the pilot's decision to perform a high-speed taxi test prior to having the airplane inspected by a certificated mechanic, which resulted in inadvertent flight.

Findings

Aircraft	Elevator control system - Incorrect service/maintenance
Personnel issues	Installation - Pilot
Personnel issues	OTC medication - Not specified
Personnel issues	Predisposing condition - Not specified
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Takeoff	Flight control sys malf/fail
Takeoff	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On October 8, 2009, about 1305 Pacific daylight time, a Piper PA-12, N2087C, impacted the terrain after lifting off from Runway 28 at Skagit Regional Airport, Burlington, Washington. The private pilot, who was the sole occupant, was killed by the accident sequence, and the airplane, which was owned and operated by the pilot, sustained substantial damage. The local 14 Code of Federal Regulations Part 91 flight took place in visual meteorological conditions. No flight plan had been filed.

According to family members and friends of the pilot, he began a near total rebuild/restoration of the airplane about six months prior to the accident. Although most of the work was done at his home, since the project was nearly completed, he brought the airplane to Skagit Regional Airport on a trailer sometime within the two weeks prior to the accident (the exact date was not determined). Individuals who talked with the pilot after the airplane was brought to the airport said that his plan was to complete what remained of the rebuild there at the airport, and then to have it inspected and signed-off by an airframe and powerplant (A&P) mechanic with Inspection Authorization (IA) who had helped him with project sign-offs in the past. According to the aforementioned A&P/IA mechanic, the pilot talked to him about doing a pre-signoff inspection on a specific weekend near the end of September, but he was not available then, and suggested the subsequent weekend instead. Reportedly, the pilot indicated he did not want to wait that long, and that he would try to get another A&P/IA to do the inspection/signoff sooner. The pilot then told the mechanic that if it turned out he needed him to do the signoff he would get back in touch with him; which he had not done as of the day of the accident. There were no records indicating a sign-off inspection had been completed by some other A&P/IA.

It could not be determined what time the pilot arrived at the airport on the day of the accident, but about 90 minutes before he taxied out to the runway, he stopped his truck in front of another hangar and asked the two pilots at that location, neither of which knew him personally, if they needed help with anything. They both responded that they did not need any help, and then the pilot of the PA-12 asked them if they would be willing to help him briefly with his airplane. They both said they would be glad to help him, and they then walked over to his hangar. Once there, he asked one of them to hold a piece of metal tubing (believed to be a fuel tank vent tube) while he went up on the top of the wing and connected it to the fuel tank. In

order to make the connection, the pilot removed the fuel tank cover panel from the top of the wing. Once the task was completed, the PA-12 pilot chatted for awhile with the other two pilots, telling them about the many other airplanes that he had restored, and a little bit about N2087C. He showed them his extended baggage compartment, and talked briefly about some of the other things he had been doing to the airplane. According to these two pilots, he said that his goal for that day was to do an engine run on the recently overhauled engine. He did not say anything about doing a taxi test or a test flight that day, and both of the pilots said that they were surprised when the pilot later taxied to the runway. Their surprise was based upon the fact that they had seen many unsecured panels and other items that they felt still needed to be completed prior to any IA signoff or flight.

About 15 minutes after the two pilots got back to their hangar; they heard the engine of the PA-12 start up and then run for about four to five minutes, at what sounded to them like a medium power setting. They said that during the engine run they did not hear any changes in the power setting, or any sound change that would be consistent with a carburetor heat or magneto check. After the engine stopped running, neither of the pilots heard it start again for about 15 minutes. Then, very soon after hearing the engine start up a second time, the two pilots saw the PA-12 pilot taxi the airplane out to the run-up area near the approach end of Runway 28. Although their view of the run-up area was partially blocked by a parked airplane, they said that once there, the PA-12 pilot either stopped very briefly, or did not stop at all prior to pulling onto the runway. Regardless of whether he stopped or not, they were sure they did not hear him do any kind of an engine run-up in that area before taking the runway.

Soon after the airplane pulled onto the runway, the engine was advanced to what witnesses thought sounded like full power, and then the airplane made a "very short" takeoff roll before lifting off. Most of the witnesses thought the initial liftoff looked normal, but soon thereafter the nose of the airplane pitched up to a near vertical attitude. It then climbed to an altitude of between 150 to 200 feet above ground level (agl). Then, with the engine still at what sounded like full power, the airplane slowed, fell off on the right wing, and descend near vertically into the grass-covered terrain near the side of the runway. According to the witnesses, at the moment of impact it still sounded like the engine was at full power. Reportedly, immediately after the impact, the airplane "bounced" about 20 feet to the north and fell over onto its back. Soon after the impact, a small fire started in the area of the carburetor, but it was quickly put out by two individuals from a nearby fixed-base operator (FBO) who ran to the scene with extinguishers.

PERSONNEL INFORMATION

The 69 year old private pilot held ratings for Airplane Single Engine Land (ASEL) and Airplane Single Engine SEA (ASES). His last FAA medical, a class 3, was completed on May 5, 2009. At the time of the medical he had accumulate about 3,500 hours of flying time, with about 20 of those hours being in the six months prior to the date of the medical. No records were found to indicate when he had completed his last flight review.

METEOROLOGICAL INFORMATION

The 1256 aviation surface weather observation (METAR) for Skagit Regional Airport recorded winds from 320 degrees at six knots; a visibility of eight statute miles; few clouds at 1,000 feet; a broken ceiling at 12,000 feet; a temperature of 12 degrees Celsius; a dew point of 08 degrees Celsius; and an altimeter setting of 30.17 inches or mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the level grassy terrain about 50 feet beyond the north edge of Runway 28, about 1,100 feet west of the Runway 28 approach threshold. All of the aircraft's structural components were present at that location. The engine and the engine compartment firewall had been forced directly aft into the forward part of the pilot compartment. The crankshaft propeller flange had fractured from the crankshaft, and the propeller, which was still attached to the flange, was located at the point of impact, which was about 15 feet south of the main wreckage. The leading edges of both wings were crushed almost directly aft along their entire span, with the outboard one-half of the right wing being crushed both aft and downward. Both of the left wing lift struts were bent near their midpoint, and right wing forward lift strut was bent near its midpoint. The top half of the rudder and vertical stabilizer were bent to the right, and the entire span of the horizontal stabilizer was twisted about ten degrees in the clockwise direction (looking from the rear). The remainder of the airplane's structure showed little damage.

The Investigator-In-Charge conducted a flight control continuity check, and determined that there was connective continuity and correct function within the aileron system, the rudder system, and the variable–pitch trimable horizontal stabilizer. The stabilizer trim indicator on the left side of the pilot compartment was found in a position about half way between the midpoint of the indicator slot and the indicator slot forward (nose down) end. The continuation of the continuity check revealed that although there was mechanical continuity from the control stick to the elevator, the aft ends of the elevator control cables had been connected to the incorrect elevator control horns, resulting in a reversal of control inputs at the elevator. In order to confirm that finding, the control stick, the movement of which was restricted by deformation of the pilot's seat, was pulled as far aft as it would go. The result of that movement was that the trailing edge of the elevator moved toward its downward limit (with correct rigging the trailing edge should move up). For further confirmation the control stick was pushed forward as far as it would go, and its trailing edge moved toward its upward limit (with proper rigging the trailing edge should move down).

No other structural or mechanical anomalies were noted.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed under the authority of the Skagit County Coroner's Office, and the cause of death was noted as “visceral trauma and multiple long bone fractures due to blunt

force injury of torso and lower extremities."

The FAA's Civil Aeromedical Institute (CAMI) performed a forensic toxicological examination on specimens taken from the pilot. The findings of that examination were negative for cyanide, carbon monoxide, and ethanol in the blood. The test for prescription and non-prescription drugs revealed the following:

Diphenhydramine detected in the liver.
0.135 (ug/ml, ug/g) Diphenhydramine detected in the blood.

On the pilot’s most recent Application for 3rd Class FAA Airman Medical Certificate dated May 29, 2009, there were no medical conditions or medications noted.

The Investigator-In-Charge (IIC) talked with family members of the pilot, and those discussions revealed that the pilot had been experiencing problems with a skin condition over about the last ten years. Reportedly, when pressure was applied to the pilot's skin it would often result in a reaction that manifested itself in skin inflammation, redness, and painful welts. According to the family member, this reaction had occurred a number of times when the pilot was working on the airplanes he was rebuilding and flying. In an attempt to address the issue, the pilot had tried a number of creams and oral medications over the years. One family member reported that every night for the last year she had applied Dermazinc/clobetasol cream to his back, shoulder, and spine area before he went to bed. The cream was applied in order to help relieve some of the symptoms of his condition so that he could get some degree of sleep, as laying on his back in the bed caused welts and soreness.

Although family members were aware that the pilot had tried to get relief by taking different oral medications in the past, they were not aware of any oral medication that he was taking at the time of the accident.

ADDITIONAL DATA AND INFORMATION

In a written statement to the FAA, the A&P/IA who the pilot contacted about doing the final inspection and signoff, stated that he had inspected numerous airplanes that the pilot had rebuilt over about the last 40 years. He said that on two other occasions he found flight controls hooked up backwards (ailerons on a Cessna 170B, and the elevator on a Piper Cub).

He also stated that his normal approach when working with this pilot was to do a semi-final inspection, during which he generally found many things wrong that needed to be corrected (the semi-final inspection of this airplane had not yet taken place). He would then leave the pilot a list of the items that needed correction, and then would return for the final inspection after the pilot advised him that all the shortcomings had been corrected. He further stated that the pilot would often complete all the outstanding items, and then before calling him (the A&P/IA) for the final inspection, he would take the airplane out to the runway for a "fast taxi test." Reportedly, that test consisted of powering up on the runway, rolling a few feet, raising

the tail and rolling a few more feet, and then lifting off to a height of two or three feet above the runway surface, and then flying most of the length of the runway before landing again. The A&P/IA had scolded the pilot a number of times for doing this "taxi test/low flight" before the final inspection, but the pilot's response was reportedly always a shrug of the shoulders and "…a big smile." In further correspondence with the FAA, the A&P/IA stated that he had warned the pilot that doing the "high speed taxi test" prior to the final signoff was dangerous, and that he should not do it. Reportedly the pilot's response was the he had done it that way "numerous times' and that it had, "…not killed him yet."

The A&P/IA further stated that the pilot had shown him photos of this project, and had asked for assistance with some related FAA paperwork, and with acquiring some components, but that he had never seen the actual airplane either as a project or as it was being completed.

Neither the FAA nor the NTSB IIC was able to locate logbooks with entrees tracking the airplane's restoration process, and the A&P/IA stated that the investigative team would not find any such documentation, as the pilot was. "…sort of anti towards the FAA and FAA regulations." The investigative team also was not able to locate any current pilot flight logs.

AIRCRAFT DISPOSITION

After completing the on-scene investigation, the NTSB IIC elected not to take possession of the airplane, and soon thereafter employees of Skagit Regional Airport, assisted by employees of a nearby FBO, returned the airplane to the pilot's hangar by securing its tail wheel to a vehicle and towing it backwards on its main wheels.

Pilot Information

Certificate:	Private	**Age:**	69,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 29, 2009
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3500 hours (Total, all aircraft), 20 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N2087C
Model/Series:	PA-12	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	12-3497
Landing Gear Type:	Tailwheel	**Seats:**	3
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	1750 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-235-C
Registered Owner:	Bruce L. Heiner	**Rated Power:**	108 Horsepower
Operator:	Bruce L. Heiner	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	14°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Burlington, WA (KBVS)	**Type of Flight Plan Filed:**	None
Destination:	Burlington, WA (KBVS)	**Type of Clearance:**	None
Departure Time:	13:05 Local	**Type of Airspace:**	

Airport Information

Airport:	Skagit Regional KBVS	**Runway Surface Type:**	Asphalt
Airport Elevation:		**Runway Surface Condition:**	Dry
Runway Used:	28	**IFR Approach:**	None
Runway Length/Width:	5477 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	48.470832,-122.420829(est)

Administrative Information

Investigator In Charge (IIC):	Anderson, Orrin
Additional Participating Persons:	Pat Paden; Seattle FSDO; Renton, WA
Original Publish Date:	May 28, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74878