Aviation Investigation Final Report

Location:	PLATTSMOUTH, Nebraska	**Accident Number:**	CHI99LA137
Date & Time:	May 1, 1999, 14:00 Local	**Registration:**	N54WB
Aircraft:	Berrick GP-4	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the initial climb, the airplane was witnessed to pitch nose-down, enter a spin, and impact terrain. According to a pilot, who was current in the accident airplane, the altitude and location where the airplane entered the stall/spin would be consistent with where the landing gear would have been in retraction. According to pilots, who had flown in the accident airplane, the gear retraction procedure was to climb to 1,500 feet above ground level, slow the airplane to within 10 MPH of the stall (power-off, gear-down, flaps-retracted) speed, and then retract the landing gear by the manually-actuated lever. According to pilots, who had flown in the accident airplane, when the airplane was held in a stalled condition it would rapidly pitch down and bank sharply to the left. The designer of the airplane stated that during a power-on stall the wing would drop, 'almost vertical,' and that 300 to 500 feet would be lost during the recovery from the stall.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: aircraft control and airspeed not maintained by the pilot-in-command. A factor to the accident was the inadvertent stall.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
3. (F) STALL/SPIN - INADVERTENT - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On May 1, 1999, at 1400 central daylight time, a Berrick GP-4, N54WB, owned and piloted by a commercial pilot, was destroyed on impact with terrain following a departure from controlled flight during initial climb from runway 16 (4,100 feet by 100 feet, dry/concrete) at the Plattsmouth Municipal Airport, Plattsmouth, Nebraska. Visual meteorological conditions prevailed at the time of the accident. The personal flight was operating under the provisions of 14 CFR Part 91 and was not on a flight plan. The pilot-in-command and one pilot-rated passenger sustained fatal injuries. The local flight was originating at the time of the accident.

Witnesses to the accident stated that the airplane was approximately 500 to 700 feet above ground level (agl) when the airplane pitched nose down, entered a spin, and impacted the terrain. According to a pilot who was current in the accident airplane, the altitude and location where the airplane entered the spin, would be consistent with where the landing gear would have been in retraction.

The airplane came to rest approximately two statute miles south of the departure end of runway 16 and .25 statute miles south of the intersection of U.S. Highway 75 and Nebraska State Highway 1.

PERSONAL INFORMATION

The pilot-in-command (PIC), born September 15, 1926, was the holder of a commercial pilot certificate with privileges for single engine land airplane, and held an instrument rating. Federal Aviation Administration (FAA) records indicate that the pilot's last aviation medical examination was performed on June 6, 1997. The pilot possessed a third class medical with the limitation that he, "Wear corrective lenses for near and distance vision."

According to the pilot's flight records, he had accumulated a total of 1,978 hours of flight time prior to the accident flight. According to the logbooks, the pilot had accumulated 181.4 hours in the accident airplane. According to FAA records, the pilot had completed four phases of the Wings - Pilot Proficiency Award Program. The most recent phase was completed on March 18, 1999, and was awarded by the FAA Safety Program Manager of the Lincoln Flight Standards District Office (FSDO).

The pilot-rated passenger, born June 26, 1939, was the holder of a private pilot certificate with privileges for single engine land airplane. FAA records indicate that the pilot's last aviation medical examination was performed on November 25, 1997. The pilot possessed a third class medical with the limitation that he, "Must wear corrective lenses."

According to the pilot's flight logbook and FAA records, he had accumulated a total of 446 hours of flight time prior to the accident flight. According to the logbook, the pilot had not logged any flight time in the accident airplane. According to FAA records, the pilot had completed two phases of the Wings - Pilot Proficiency Award Program. The most recent phase was completed on June 21, 1997, and was awarded by the FAA Safety Program Manager of the Lincoln FSDO.

AIRCRAFT INFORMATION

The aircraft was a Berrick GP-4, N54WB, serial number 151. The GP-4 is a built-by-plans, all-wood, full cantilever low-wing airplane with a retractable landing gear and can accommodate a pilot and a single passenger in a side-by-side orientation. The airplane was constructed by the owner, William H. Berrick, and was certified as an experimental/amateur-built airplane by the FAA Lincoln FSDO on February 28, 1998. The airplane had logged a total-time of 181.4 hours prior to the accident flight. The last condition inspection of the airplane was completed March 24, 1999, by the owner/builder.

The engine was a Textron Lycoming IO-360-A1A, serial number L-760-51, and prior to the accident flight had accumulated 181.4 hours since major overhaul.

METEOROLOGICAL INFORMATION

A weather observation station, located at the Eppley Airfield Airport (OMA), 23 nautical miles from the accident site on 003-degree magnetic heading, reported the weather 8 minutes prior to the accident as:

Observation Time: 1352 cdt Wind: 140-degrees at 10 knots Visibility: 10 statute miles Sky Condition: Sky Clear Temperature: 21-degrees centigrade Dew Point Temperature: 05-degrees centigrade Pressure: 30.16 inches of mercury

WRECKAGE AND IMPACT INFORMATION

FAA Inspectors, from the Lincoln FSDO, represented the National Transportation Safety Board (NTSB) for the on-scene portion of the investigation.

The airplane came to rest approximately two statute miles south of the departure end of runway 16 which was approximately .25 statute miles south of the intersection of U.S. Highway 75 and Nebraska State Highway 1. The wreckage was contained within a 50-yard radius on an embankment originating from the shoulder of U.S. Highway 75.

The airplane was destroyed during the impact with terrain. The wreckage was found nose down, with the forward portion of the engine and one propeller blade buried in the terrain. All

airframe components were accounted for at the accident site. Aileron, elevator, and rudder control continuity was established from the control surfaces to the cockpit. The landing gear and flap positions could not be determined due to impact damage.

Engine continuity could not be established due to impact damage. The oil pan, fuel injector, and starter were found separated from the engine. The engine crankshaft was found separated from the engine/propeller flange, which was found still attached to the propeller hub assembly. The propeller blades exhibited rearward and S-shaped bending. The spark plugs were removed and were light gray in color with no oil fouling noted. There was a fluid, blue in color, leaking from a ruptured fuel tank.

No anomalies, relative to the airplane or its systems, were found that could be associated with a preexisting condition.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot-in-command at the Douglas County Hospital Morgue, Omaha, Nebraska, on May 2, 1999. The autopsy report listed the cause of death as, "... massive blunt trauma to the head, neck, chest, abdomen, pelvis, and extremities...".

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma.

The toxicology report indicated the following results:

* No Ethanol detected in Kidney * 4 (mg/dL, mg/hg) Acetaldehyde detected in Kidney * 29 (mg/dL, mg/hg) Ethanol detected in Muscle * No legal or illegal drugs were detected in Kidney

The toxicology report noted, "The ethanol found in this case is from postmortem ethanol production and not from the ingestion of ethanol."

An autopsy was performed on the pilot-rated passenger at the Douglas County Hospital Morgue, Omaha, Nebraska, on May 2, 1999. The autopsy report listed the cause of death as, "... massive blunt trauma to the head, chest, abdomen, pelvis, and extremities...".

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma.

The toxicology report indicated the following results:

* No cyanide detected in Blood * 12 (mg/dL, mg/hg) Ethanol detected in Blood * 33 (mg/dL, mg/hg) Acetaldehyde detected in Blood * 1 (mg/dL, mg/hg) Acetaldehyde detected in Brain * No Ethanol detected in Brain * 68 (mg/dL, mg/hg) Isobutanol detected in Brain * 204 (mg/dL, mg/hg) Methanol detected in Brain * 39 (mg/dL, mg/hg) N-Propanol detected in Brain * No

Ethanol detected in Muscle Fluid * 2 (mg/dL, mg/hg) Isobutanol detected in Muscle Fluid * 1 (mg/dL, mg/hg) N-Butanol detected in Muscle Fluid * No legal or illegal drugs were detected in Blood

The toxicology report noted, "The ethanol found in this case may be from postmortem ethanol production and not from the ingestion of ethanol."

ADDITIONAL INFORMATION

In a written statement, provided by the designer of the GP-4 airplane, the stall characteristics of the prototype GP-4 were discussed. According to the designer's statement, the Power-on and Accelerated Maneuvering Stalls were described as:

"Power on Stall: Power set at 20 inches, propeller at 2400 a very steep nose high angle is attained before the stall at 70 MPH IAS. In this straight ahead approach the right wing drops almost vertical. Recovery is very fast with rudder and stick application. You can expect to loose 300 to 500 feet in the recovery with full flaps, 32 degrees, gear down the stall is 62 to 65 MPH."

"Accelerated Stall Clean: Power at 25 square. In a hard left or right 4 to 5 G turn, excessive aft stick pressure will produce a buffet just prior to a fast wing rotation or snap. Rotation is opposite to the turn. Relaxing any aft stick pressure gives immediate recovery. If held the aircraft will snap over the top for a spin entry. Recovery is fast with proper recovery application."

In the designer's written statement, he made the following design notations concerning the GP-4's stability, control, and gear retraction:

"Another characteristic of the GP-4 is its neutral stability. If you roll into a turn or set up a climb or descent, the aircraft will stay there. It will not return to its pre trimmed condition without a control input."

"The elevator is very responsive in pitch control as well as roll. Care must be taken not to bump the stick while retracting the gear with the Johnson bar. Since the GP-4 accelerates rapidly after lift off the gear should be retracted before much over 100 MPH. The faster you go the harder it is to retract the gear due to the low pressure area on the main gear doors."

According to the Pilot's Operating Handbook (POH), developed by the builder of the Berrick GP-4, stalls and their recommended recoveries were described as:

"STALLS

Turn on electric fuel pump before practicing stalls. For power-on stalls, use about 65% power. Enter stalls only from coordinated flight. Approach the stall slowly by reducing

airspeed until detecting the first evidence of the approaching stall. There may be rapid decay of control effectiveness, aerodynamic buffeting, and downward pitching with the rapid loss of altitude with control stick aft.

RECOVER by releasing elevator back pressure and applying power on recognizing the approaching stall. Holding the aircraft in stall with control stick fully aft may result in a roll to one side or the other unless precise control coordination is maintained. The rudder may be more effective than the ailerons in preventing the roll. If the aircraft assumes a steep nose-down attitude, delay adding power to prevent excessive build-up of airspeed."

According to the POH, "Intentional spins are prohibited in this aircraft, however, if stall recovery is delayed or if the airplane is held in stall in an uncoordinated manner, it will likely go into a spin."

The POH states the takeoff procedure as, "Retract gear when safely airborne and in control, after centering nose wheel and applying brakes to stop wheel rotation. (May be necessary to climb to safe altitude, and slow to 80 MPH to retract)."

A pilot, who had accumulated 51.1 hours in the accident airplane, provided a written statement regarding the landing gear retraction for the Berrick GP-4 airplane. According to the pilot's statement, the gear retraction procedure was to climb to 1,500 agl, retard the throttle to idle, slow the aircraft to 80 MPH, then move the landing gear actuating bar to retract the landing gear. The pilot described the power-off stall characteristics as, "...power off, gear down, flaps up configuration, initial buffet was easily identified; however, when the aircraft stalled it rapidly pitched down and banked sharply to the left." The pilot stated that the power-off, gear-down, flaps-retracted stall speed was approximately 65 to 70 MPH. The pilot's statement full statement is attached to this report.

Another pilot, who had accumulated 15 hours in the accident airplane, described similar experiences with regard to the gear retraction procedure and stalling qualities of the accident airplane. This pilot's statement is attached to this report.

A party to the investigation was the Federal Aviation Administration Flight Standards District Office, Lincoln, Nebraska.

Pilot Information

Certificate:	Commercial	**Age:**	72,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 6, 1997
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1978 hours (Total, all aircraft), 181 hours (Total, this make and model), 26 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Berrick	**Registration:**	N54WB
Model/Series:	GP-4 GP-4	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	151
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 24, 1999 Annual	**Certified Max Gross Wt.:**	1985 lbs
Time Since Last Inspection:	22 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	182 Hrs	**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	IO-360-A1A
Registered Owner:	WILLIAM HENRY BERRICK	**Rated Power:**	200 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OMA ,1026 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	13:52 Local	**Direction from Accident Site:**	3°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	21°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(PMV)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	14:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	PLATTSMOUTH MUNICIPAL PMV	**Runway Surface Type:**	Concrete
Airport Elevation:	1201 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	4100 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	41.000907,-95.889442(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	JAKE WILSON; LINCOLN , NE
Original Publish Date:	November 2, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46205