Aviation Investigation Final Report

Location:	Bozeman, Montana	**Accident Number:**	SEA03LA007
Date & Time:	November 5, 2002, 16:33 Local	**Registration:**	N41RJ
Aircraft:	Riddell (Lancair) IV-P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The 848 hour pilot/owner of the kit built Riddell/Lancair IV-P was on a 3-4 mile final to runway 30 when the engine lost power. Witnesses reported observing the aircraft approximately 200-500 feet above ground when it executed a steep right turn; pitched nose up and then rolled left ultimately impacting the ground at a steep angle and exploding. Post-crash examination revealed no evidence of mechanical malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of power for undetermined reason(s) and the pilot's failure to maintain the aircraft's flying speed above the power off stall speed in the landing configuration.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

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

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. (C) AIRSPEED(VSO) - NOT MAINTAINED - PILOT IN COMMAND
3. STALL - ENCOUNTERED

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On November 5, 2002, about 1633 mountain standard time, a Riddell/Lancair IV-P, N41RJ, registered to and being flown by a private pilot was destroyed during impact with terrain and a post crash fire following a loss of power while on three mile final approach to runway 30 at Gallatin Field, Bozeman, Montana. The pilot was fatally injured. Visual meteorological conditions existed and the aircraft was arriving from Minneapolis, Minnesota, on an instrument flight rules (IFR) flight plan. The flight, which was personal, was operated under 14CFR91, and departed Flying Cloud airport, Minneapolis, Minnesota, approximately 1411 central standard time.

The flight progressed uneventfully climbing initially to flight level 220 and later descending and continuing at flight level 200. At 1601, the pilot requested and received clearance to descend to flight level 180 and at 1611, he initiated the descent from flight level 200 and was cleared to 12,000 feet. At 1628, the pilot reported the Bozeman airport in sight whereupon he was cleared for a visual approach and advised to contact Bozeman tower (refer to Attachment AT-I). According to radar data recorded by the Salt Lake City Air Route Traffic Control Center, the aircraft had just crossed 45 degrees 42 minutes 20 seconds north latitude and 110 degrees 46 minutes 53 seconds west longitude (refer to Attachment RD-I and Charts 1A through 1D). The last radar target was one minute and 28 seconds later (1629:26) and showed the aircraft passing through 11,100 feet as it crossed 45 degrees 39 minutes 49 seconds north latitude and 110 degrees 53 minutes 39 seconds west longitude.

At 1629:29, the pilot contacted Bozeman tower reporting "41RJ with information mike is 13.3 just over the pass inbound for landing full stop" and the tower responded with a request to report "5 mile final, runway 30."

At 1633:00, the pilot radioed Bozeman tower declaring "41RJ just lost power" and the last transmission from the pilot was at 1633:20 (refer to Attachment AT-II and Chart 1D).

A witness located in a parking lot near Frontage Road just east of Bozeman reported observing the aircraft approximately 1615 and remarked that it was "directly overhead" heading west-northwest. He estimated the aircraft's altitude between 1,000 and 2,000 feet above ground and reported that it was flying wings level with no apparent climb or descent. He further reported the aircraft's engine was operating and the aircraft was traveling at a "fairly fast" airspeed. He also reported that he did not observe the landing gear extended during the time he observed the aircraft (refer to attached witness statement 1).

A 7,300 hour pilot traveling east on Interstate 90 reported observing the aircraft on about a 3-4

mile final to runway 30. He reported the aircraft in level flight but low, approximately 200-500 feet above ground. He reported observing the aircraft make a steep right turn; pitch nose up and then roll left inverted impacting the ground at a steep angle (refer to statement witness statement 2).

Another witness, who was looking east from the housing development just west of the ground impact site, observed the aircraft emerge from behind a 30-foot high tree coming towards him. He reported that the aircraft turned slightly right, rocked a little, turned further to the right, and then continued turning right rolling over into an inverted attitude and descending to the ground where it burst into flames. He also reported hearing no engine noise (refer to statement of witness 3).

PERSONNEL INFORMATION

The pilot possessed a private pilot certificate with airplane single engine land and instrument ratings. He reported a total of 800 hours of flight experience at his last FAA flight physical, dated September 13, 2002, whereupon he was issued a third class medical without restrictions or waivers. The pilot acquired the aircraft sometime between August and September of 2002, and the flight time in the aircraft (pilots flight time) between that time and the last entry (October 30, 2002) was 48.3 hours. The pilot's total flight time was estimated as 848 hours of which at least 48 hours were in the Lancair IV-P.

AIRCRAFT INFORMATION

N41RJ, a kitbuilt version of the Lancair IVP, was equipped with a Teledyne Continental TSIO-550-E1B engine. The aircraft was assembled by the original kit owner and subsequently sold to the pilot.

Troutdale Aircraft Services, Inc., who maintained the aircraft, provided copies of logs and records for review. A customer record (work order #16393) dated September 17, 2002, showed the aircraft as having 125.4 hours of total time and an engine total time of 924.5 hours (refer to Attachment M-I). The engine's time since major overhaul was also 125.4 hours. The airframe logbooks showed the aircraft having 0.0 hours on March 15, 2002, and a special airworthiness certificate issuance was documented on the following day. The next log entry, dated April 16, 2002, showed the aircraft with 40.0 hours of time. The last entry noted in the engine log referencing the original owner/builder was dated August 7, 2002, and showed a total time of 81.8 hours. The next entry was the previously referenced September 17th entry showing a total time of 125.4 hour and signaled the transfer of the aircraft to the new owner. The last airframe log entry dated October 30, 2002, reported the aircraft total time (tach) as 173.7 hours.

The aircraft's flight plan indicated 5 hours of fuel on board and the fixed base operator at

Flying Cloud airport reported that aircraft had been topped off to its full capacity (110 gallons).

METEOROLOGICAL INFORMATION

Surface weather reported at Gallatin Field at 1641 indicated a few clouds at 9,500 feet and a visibility of 10 statute miles. Surface temperature and dew point was 2 degrees and -4 degrees Centigrade respectively. Winds were calm.

WRECKAGE AND IMPACT INFORMATION

The ground impact site was at 45 degrees 44.570 minutes north latitude and 111 degrees 06.121 minutes west longitude approximately 4,550 above mean sea level. The ground impact site was noted to lie 14,000 feet short of the threshold of runway 30 and several hundred feet north of the extended centerline (refer to Chart I). The ground impact site was in the northwest corner of a relatively level wheat stubble field (refer to Image 1 and 2).

All wreckage was observed within a relatively confined area and the distance between the initial ground impact marks to the final resting place of the wing spar was approximately 42 feet. A post crash fire had consumed most of the aircraft. The initial ground scar was oriented along a west-northwesterly bearing and was approximately 19 feet in length. A detached propeller blade was observed at the northwest end of the scar (refer to Image 3). The majority of the wreckage came to rest slightly north of this ground scar (refer to Diagram I).

On site examination revealed the flaps in the extended position and the main gear ratchet rods also extended. The engine was noted in an upright position with two propeller blades still attached to the hub/spinner assembly (refer to image 4).

The fire damaged fuel selector was located and observed to be positioned approximately one-third to one-half way between detents (refer to Image 5). The valve was exercised and found to seat in all detents without difficulty. The position of the valve both prior to ground impact and prior to the loss of power was not known.

The two propeller blades, which remained attached to the hub, displayed minimal leading edge damage and bending deformation and were noted in a relatively flat pitch position (refer to Image 6). The detached propeller blade displayed "S" bending as well as a prominent tip fold along the outboard leading edge. The axis of the fold line was observed to be roughly perpendicular to the scratch marks progressing toward the blade's trailing edge (refer to Image 7). The detached blade separated close in to the blade root and the separation surface was grainy and clean and displayed characteristics of an overload. The propeller hub/spinner was noted to be undamaged except for that portion on the underside adjacent to the separated blade.

MEDICAL AND PATHOLOGICAL INFORMATION

Post-mortem examination of the pilot was not conducted, however, toxicological samples were drawn and shipped to the FAA's Toxicology Accident and Research Laboratory, Oklahoma City, Oklahoma where toxicological evaluation of samples from the pilot was conducted. The findings were reported as negative (refer to attached TOX report).

TESTS AND RESEARCH

The engine was examined on November 14, 2002, at the facilities of Arlin's Aircraft Service, Bozeman, Montana. The engine had sustained extensive fire damage and the number six cylinder exhibited some impact damage. The exhaust system, as well as the oil sump, was crushed. A "thumb compression" test was conducted after the removal/examination of the upper spark plugs and compression was verified during crankshaft rotation. Continuity through the engine to the accessory section was verified during this same check. Although both magnetos had sustained fire damage, both were capable of producing a spark when rotated manually. The fuel manifold, which had fire damage, contained no fuel and its filter screen was clear. There was no reported evidence of any pre-impact mechanical malfunction (refer to extract from TCM report - Attachment TCM-I).

ADDITIONAL INFORMATION

On-site examination of the wreckage was conducted on November 5/6, 2002, after which the wreckage was verbally released to the insurance representative. Written wreckage release was accomplished on November 18/26, 2002, and is documented on NTSB forms 6120.15 (enclosed).

Pilot Information

Certificate:	Private	**Age:**	42,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	September 13, 2002
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	848 hours (Total, all aircraft), 48 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Riddell (Lancair)	**Registration:**	N41RJ
Model/Series:	IV-P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	LIV-443
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 16, 2002 Condition	**Certified Max Gross Wt.:**	3200 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	174 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-550-E
Registered Owner:	Bunch, Jeffrey R.	**Rated Power:**	350 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:	BZN,4465 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	16:41 Local	**Direction from Accident Site:**	300°
Lowest Cloud Condition:	Few / 9500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	0 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	2°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Minneapolis, MN (FCM)	**Type of Flight Plan Filed:**	IFR
Destination:	Bozeman, MT (BZN)	**Type of Clearance:**	IFR
Departure Time:	14:11 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Gallatin Field BZN	**Runway Surface Type:**	Asphalt
Airport Elevation:	4474 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	30	**IFR Approach:**	Visual
Runway Length/Width:	9003 ft / 150 ft	**VFR Approach/Landing:**	Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	45.742778,-111.101943

Administrative Information

Investigator In Charge (IIC):	McCreary, Steven
Additional Participating Persons:	Robert Speicher; FAA FSDO; Helena, MT Peter Stiles; Lancair International; Redmond, OR R. "Scott" Boyle; Teledyne Continental Motors; Arvada, CO
Original Publish Date:	September 30, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=56007