National Transportation Safety Board
Aviation Accident Final Report

Location:	MIDVALE, ID	**Accident Number:**	SEA98FA042
Date & Time:	03/02/1998, 1805 MST	**Registration:**	N727RT
Aircraft:	Cessna T303	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	6 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Radar data indicated that the aircraft completed a figure-eight maneuver at about 3,000 feet AGL, with an estimated airspeed of 140 knots and approximate 40 degree bank angle before leveling out at the completion of the maneuver. The radar data then indicated level flight before a rapid descent. A witness reported observing the aircraft in visual conditions and flying at a high altitude and that it 'appeared fast.' The witness stated that he observed the aircraft make a wide, shallow left turn, then turn back the other way. The nose of the aircraft then started to gradually lower, and the airplane eventually came straight down and started to spin. The witness lost sight of the airplane behind hilly terrain and he did not see the impact. Post-accident examination of the wreckage indicated that the aircraft collided with the terrain in a slight nose-down attitude, located in a gully with approximate 30 degree bank angle. The aircraft then slid downhill to the right and came to rest with the fuselage upright and the empennage was twisted to the right and inverted. No evidence was found to indicate a mechanical failure or malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain aircraft control.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings
1. (C) MANEUVER - PERFORMED - PILOT IN COMMAND
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
3. STALL/SPIN

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

Findings
4. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On March 2, 1998, at 1805 mountain standard time, a Cessna T303, N727RT, operated by the pilot as a 14 CFR Part 91 pleasure flight, collided with the terrain near Midvale, Idaho. Visual meteorological conditions prevailed at the time and no flight plan was filed. The airplane was destroyed by a post-crash fire. The airline transport pilot and his five passengers were fatally injured. The flight originated from Boise, Idaho, about 30 minutes prior to the accident.

It was reported that the purpose of the flight was a local sightseeing flight for the passengers.

A witness, who was approximately four miles east of the accident site, reported that he was outside when he first heard the airplane. The witness stated that he didn't see the airplane at first and indicated that the sound faded as if it was going behind a hill. The witness stated that the sky was clear over him with a few storm clouds along the mountain range. When the sound of the airplane came back, the witness could see that the airplane was climbing at a ten to 15 degree angle to the north. The witness stated that the elevation of the airplane was "high" and the speed appeared "fast." The airplane then made a wide shallow left turn back to the east, then it turned to the south and appeared to be descending at a slight angle. The witness stated that the engines were under power. The witness stated that the descent angle then started to gradually increase and eventually the airplane came straight down and started to spin. The witness stated that he could still hear the engines and saw a blinking light before he lost sight of the airplane behind the rolling terrain. The witness stated that the nose down attitude never changed up to the time that he lost sight of the aircraft.

PERSONNEL INFORMATION

At the time of the accident, the pilot held airline transport pilot and flight instructor certificates, and was rated in single-engine land, multi-engine land and helicopter. The pilot's flight logbook indicated that a total flight time of approximately 7,743 hours had been accumulated in all aircraft, with 319 hours in the Cessna T303. Approximately 6,330 hours were in rotorcraft. The pilot's logbook indicates that flight time was logged in blocks. The last entry identified as "Jan" indicated a blocked time of 34.8 hours in the Cessna T303. The departure and arrival information indicated local flights in the Boise area.

METEOROLOGICAL INFORMATION

The flight departed from Boise at 1727. The 1656, surface observation for Boise, reported the wind from 130 degrees at 12 knots. Visibility was 10 miles. The sky was scattered clouds at 3,800 feet and overcast at 9,500 feet. The temperature was 46 degrees. At 1756, the wind was from 150 degrees and the sky condition was overcast at 10,000 feet. Light rain was not reported until 2136.

At 1753, the Ontario Airport, Ontario, Oregon, located approximately 35 miles southwest of the accident site was reporting the weather as the wind from 130 degrees at 13 knots. Visibility was 10 miles. The sky was broken clouds at 4,800 feet and 10,000 feet. The temperature was 45 degrees. At 1840, the wind was from 190 degrees at 17 knots. Visibility was 9 miles. The sky conditions were a few clouds at 2,400 feet, broken at 4,800 feet and overcast at 5,500 feet. Light rain was falling.

The weather RADAR for six minutes prior to the accident, and one minute prior to the

accident, indicates that light precipitation was moving into the area from the west, with moderate precipitation to the southwest. There was no precipitation reported over the accident site or to the east of the accident site.

The witness located approximately four miles east of the accident site reported that the sky was clear over his position and where he observed the aircraft just prior to the accident. The witness reported some clouds over the mountain range further west of the accident site.

An AIRMET for the states of Washington, Oregon, Idaho, Montana, Nevada, and Utah indicated occasional light to moderate rime icing between the freezing level and 18,000 feet. The freezing level was at 6,000 feet northwest, sloping to between 8,000 feet and 9,000 feet. The conditions were spreading slowly southeast and continuing beyond 2000 through March 3, 1998 at 0200.

WRECKAGE AND IMPACT INFORMATION

The wreckage was found in a gully surrounded by rolling terrain. The terrain elevation at the accident site is 3,940 feet. The surrounding terrain was sparsely covered with grass and shrub brush as high as four feet. At the time of the accident, the ground was dry; however, that evening, rain followed by snow covered the area. Approximately three feet of snow covered the wreckage. A post-crash fire had consumed the fuselage and the inboard section of the wings. The fire was confined to the wreckage and did not spread to the surrounding vegetation.

The aircraft was positioned flat on its belly with a majority of the forward section of the airplane on the uphill side of the gully. The nose of the airplane was aligned on a magnetic heading of 260 degrees. The post-crash fire completely destroyed the cabin and passenger compartment. Ground impact signatures indicate that the aircraft collided with the approximate 30 degree terrain in a slight nose down attitude. A ground disturbance crater and broken branches of brush were found approximately 20 feet uphill, and to the south of the wreckage. Approximately ten feet from this disturbance, the left propeller assembly with all three propeller blades attached was located. It appeared that the left wing contacted the surface in this area. The wreckage then slid downhill to the right to its final resting point. While the fuselage and wings were upright, the empennage was noted to be twisted to the right and positioned inverted. The outboard tip of the right side elevator was bent downward approximately 80 degrees, jamming the movement of the elevator. The right side stabilizer remained attached at the root and displayed outboard creasing to the skin and crushing damage at the tip where the elevator was pushed inboard. The right side elevator trim remained in place with no damage noted. The trim was determined to be 15 degrees up. The vertical stabilizer, with rudder attached, remained intact. The top leading edge of the vertical stabilizer displayed minor impact damage. The rudder trim tab remained attached to its respective hinges. The rudder trim position could not be determined due to impact damage that pulled the cables and compromised an accurate position reading. The left side horizontal stabilizer remained attached at the root. The left side elevator remained attached at its respective hinges. The stabilizer was bent downward approximately 10 degrees starting about four feet from the root. The bottom surface of the empennage, that was not destroyed by the fire, was noted to be crushed upward. The rudder and elevator control stops were intact with no damage noted. The control cables for the rudder, elevator, and trim tabs remained attached to their respective rearward linkage. The cables were traced forward through the empennage and were twisted about three feet from the rear end. The remaining cables forward of this position were embedded in the burned and melted structure. Exposed sections of the cables

were traced up to the cockpit area.

The left wing remained attached at the root. The inboard section of the wing, the engine cowling, and outboard of the engine about four feet displayed fire damage. The flap and aileron remained attached to their respective hinges. The flap was retracted. The engine remained enclosed in the cowling. The propeller assembly with all three blades attached had separated from the crankshaft flange and was found uphill of the wreckage. Propeller blade "A" was bent aft about 30 degrees. Minor leading edge nicks and chordwise striations were noted along the blade back. Propeller blade "B" was bent aft about 35 degrees. Minor leading edge nicks and chordwise striations were noted along the blade back. The tip of the blade was curled aft. Propeller blade "C" was straight except for the tip that was curled aft about 80 degrees. Minor leading edge nicks and chordwise polishing were noted along the blade back. The spinner was crushed rearward. The entire length of the leading edge of the wing displayed rearward and upward crushing. The main landing gear was retracted. Control continuity was established to the cockpit area.

The right wing remained attached at the root. The entire length of the wing and the engine cowling displayed fire damage more severe than the left wing. The right wing was positioned on the downhill side. The flap and aileron remained attached to their respective hinges. The aileron was bent downward at about the mid-point. The trim tab remained attached to its respective hinges. The trim tab was estimated to be positioned five degrees up. The flap was retracted. The engine remained enclosed in the cowling. The propeller assembly remained attached to the crankshaft. Two of the three propeller blades remained attached to the assembly. Propeller blade "A" was missing two inches of the tip that had been torn away. The blade displayed rearward bending and chordwise scratches were noted at the outboard end. Propeller blade "B" was straight and displayed minor leading edge damage. Propeller blade "C" was not found. The spinner was crushed rearward. The entire length of the leading edge of the wing displayed rearward and upward crushing. The main landing gear was retracted. Control continuity was established to the cockpit area.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by Frank A. Roberts, M.D. at St. Alphonsus Regional Medical Center, Boise, Idaho. The pilot's cause of death was due to extensive total body burns and anterior chest wall trauma.

Toxicological samples were sent to the Federal Aviation Administration Civil Aeromedical Institute, Oklahoma City, Oklahoma, for analysis. The results of the analysis were reported as negative.

ADDITIONAL DATA/INFORMATION

Radar data provided from the Salt Lake City Air Route Traffic Control Center indicates that the aircraft was identified flying in a northerly direction and maintaining an altitude of approximately 7,000 feet. At 1802, the flight path turned to a northeasterly direction and continued to turn to the east. The RADAR data indicates that the aircraft completed a "figure 8" maneuver and maintained an altitude between 6,600 feet and 7,000 feet. At the completion of the "figure 8", the flight path continued in a north westerly direction at approximately 6,500 feet. At 1804, the flight path turned to a westerly direction and descended to 6,300 feet. The last RADAR target indicated that the flight continued to descend to 5,100 feet in nine seconds before it dropped from RADAR coverage. The elevation at the accident site is 3,940 feet.

The radar data, weather information and aircraft data were sent to the National Transportation Safety Board, Office of Research and Engineering, Vehicle Performance division for study. The Aerospace Engineer reported that 19 radar returns and one impact point resulted in a data point every 9 - 10 seconds. The engineer noted that radar data in general suffers from some error and the data does not reflect the exact position of the aircraft at the indicated time. This inaccuracy made defining the aircraft position and attitude with precision difficult. The engineer noted that the last radar return and the accident location nearly coincide, therefore, the calculated performance parameters for the time between the last radar point and impact point are probably inaccurate and should be ignored after Elapsed Time (ET) of 280s.

A smooth interpolation of the aircraft position between radar returns is shown in Figures 1, 2a, and 2b.

Figure 3 indicates the speeds and rate of climb resulting from the smooth approximation through the points. Large diversions in speed are noted, however, the engineer reported that due to inaccuracies, these speeds are estimates and the data should not be used to determine whether the aircraft decelerated below stall speed or exceeded its design speed.

Figure 4 represents pitch, roll, and yaw. The engineer noted that due to inaccuracies in speed, this data could also be erroneous in places and does not necessarily depict evidence of a stall. The roll angles depicted, indicate that the aircraft was maneuvering relatively aggressively, with an approximate 40 degree bank angle. The 70 degree and 85 degree points at ET=225s. and ET=270s. could be a result of radar point interpolation and should not be used to conclude that the airplane achieved these large bank angles.

Figure 5 depicts the winds used in the calculation. The engineer reported that the wind information was based on data from a weather balloon launched from Boise on March 2, 1998, at 1700. The engineer reported that the contribution of the wind was irrelevant due to the uncertainty of the radar data.

The Cessna 1982 Model T303 Information manual, Section 2, Airspeed Limitations, indicates that Vne - never exceed speed of 210 knots indicated airspeed (KIAS) is not to be exceeded in any operation. Va - maneuvering speed for weights 4,150 pounds - Va is 133 KIAS; 4,650 pounds - Va is 141 KIAS; and 5,150 pounds - Va is 148 KIAS. Full or abrupt control movements should not be made above these speeds. Figure 3 depicts a speed range from 70 knots to 210 knots. The figure depicts an average calibrated airspeed of 140 knots. Note: The aircraft weight at the time of the accident could not be accurately calculated due to lack of information related to fuel quantity.

The Information Manual also depicts the Normal Operating Airspeed Range (green arc on airspeed indicator), of 66 KIAS to 175 KIAS. The lower limit is the maximum weight Vs (stalling speed or the minimum steady flight speed at which the airplane is controllable), with the flaps retracted. The upper limit is the maximum structural cruising speed.

The wreckage was recovered and transported to Boise, Idaho, for further examination.

The cabin heater, located in the nose of the airplane, was examined. The igniter displayed minor wearing signatures. The fan was intact. The outer case displayed evidence of heat distress from the post-crash fire. The jacket was intact with no indications of hot spots. The burner can was intact with no evidence of burn through or hot spots. All of the ducting between the heater and the cockpit had been destroyed by the post-crash fire.

The fuel float valves and associated plumbing in both wings were visually examined. Both the front and aft float valves in the left wing moved freely when manipulated by hand. The fuel selector valve was in the "main tank" position. The fuel strainer bowl was removed and the interior was found to be clear of any fuel or sediment. The fuel strainer screen was clear of sediment and debris. There was no visible damage to any of the fuel lines. The front fuel float valve in the right wing moved freely when manipulated by hand. The aft float valve was partially melted to the stringer and made the float "sticky" to manipulate at first. Both valves displayed evidence of heat distress from the post-crash fire. The fuel selector was found in the "main tank" position. The fuel strainer bowl was removed and the interior was found to be clear of any fuel or sediment. The fuel strainer screen was clear of sediment and debris. There was no visible damage to any of the fuel lines.

Both engines were shipped to Teledyne Continental Motors, Mobile, Alabama, for teardown and inspection. On March 24, 1998, the right engine was inspected. A visual inspection noted fire damage to the left rear side, and the ignition harness had been burned. The exhaust and intake tubing was crushed and bent. The turbocharger exhibited impact damage, however, the turbine turned freely. Both rear engine mounts were broken from impact damage. All of the rocker box covers were damaged from impact. The oil sump was crushed upward and had flattened up against the bottom of the crankcase sump rails. The engine oil pump gears and their respective cavities displayed normal operating signatures. No evidence of hard particle passage was noted. Evidence of oil was present, however, since the oil sump had been compromised, the majority of oil had leaked out.

The crankcase was intact with impact damage noted to the front of the case. The crankshaft rotated easily. Rocker arm, valve train and accessory gear continuity was established. A cold compression check was performed prior to disassembly. All of the cylinders held varying amounts of compression using 80 PSI input to each cylinder. All spark plugs displayed normal operating signatures. Both magnetos sparked in firing sequence when tested on a magneto bench tester. The engine-driven fuel pump was free to rotate. The driveshaft was intact. The fuel pump was tested on a bench. The test revealed that the pump was capable of flowing fluid and appeared to be adjusted on the rich or high side. The manifold valve was also tested and flowed within specifications.

The left engine displayed fire damage that was more concentrated near the rear. Both the intake and exhaust tubing were crushed. The turbocharger displayed thermal damage, however, the turbine turned freely. All engine mount legs were broken from impact. The engine oil sump was crushed upward and had flattened up against the bottom of the crankcase sump rails. The engine oil pump gears and their respective cavities displayed hard particle passage. The pump cavity walls were scored. Evidence of oil was present, however, due to impact damage to the oil sump, the majority of the oil had leaked out.

The crankcase was intact. The crankshaft rotated easily. Rocker arm, valve train and accessory gear continuity was established. A cold compression check was performed prior to disassembly. Impact damage was noted to the underside pushrods for cylinders 1, 2, 3, and 6, which resulted in valve leakage when air pressure was applied. Cylinders 4 and 5 held compression using 80 PSI input. All spark plugs displayed normal operating signatures. Both magnetos sparked in firing sequence when tested on a magneto bench tester. The engine-driven fuel pump was seized. Evidence of external heat distress was noted. The pump could not be bench tested. The fuel pump was disassembled and no abnormalities were noted to the

internal components. The manifold valve was bench tested and flowed within specifications.

The camshaft and associated lifters were examined and some operational distress was noted. The number 3, 5, and 6 intakes, and the number 1 exhaust lifter faces displayed evidence of spalling. The number 3 intake and number 1 exhaust were spalled full face. The camshaft lobes were worn at the number 2 and 5/6 intake lobes, and at the number 1 exhaust positions.

Both propeller assemblies were shipped to McCauley Propeller Systems, Vandalia, Ohio, for inspection. The Chief Engineer who inspected the propeller assemblies reported that both propeller assemblies displayed similar damage and energy at impact. Both assemblies' feather-stop mechanisms were undamaged and not engaged at impact. Counterweight impact signature marks found on the surfaces of the hub sockets indicated that both the left and right side propeller blades were operating at, or very near, the low pitch stop at impact. There was no evidence found to indicate any type of fatigue failure.

The wreckage was retrieved by personnel from SP Aircraft, Boise, Idaho, and secured at their facility. The airframe was released to the owner's representative on March 10, 1998. The engines and propellers were retained for teardown and inspection. At the completion of the inspections, the engines and propellers were returned to SP Aircraft. The owner's representative signed for receipt of the engines and propellers on July 31, 1998.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial; Military	**Age:**	37, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	07/29/1997
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	7743 hours (Total, all aircraft), 319 hours (Total, this make and model), 7034 hours (Pilot In Command, all aircraft), 169 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N727RT
Model/Series:	T303 T303	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	T30300090
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	01/27/1998, Annual	**Certified Max Gross Wt.:**	5175 lbs
Time Since Last Inspection:	20 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	1675 Hours	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520-AE2B
Registered Owner:	DEAN E. SORENSEN	**Rated Power:**	250 hp
Operator:	JEFFREY J. JOHNSON	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	BOI, 2858 ft msl	**Distance from Accident Site:**	53 Nautical Miles
Observation Time:	1756 MST	**Direction from Accident Site:**	155°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Overcast / 10000 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	7°C / 3°C
Precipitation and Obscuration:			
Departure Point:	BOISE, ID (BOI)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1727 MST	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	5 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	6 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	DEBRA J ECKROTE	**Report Date:**	11/17/1999
Additional Participating Persons:	LEON S LINDSAY; BOISE, ID GEORGE HOLLINGSWORTH; RESTON, VA LEAH D RIDDLE; WICHITA, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.