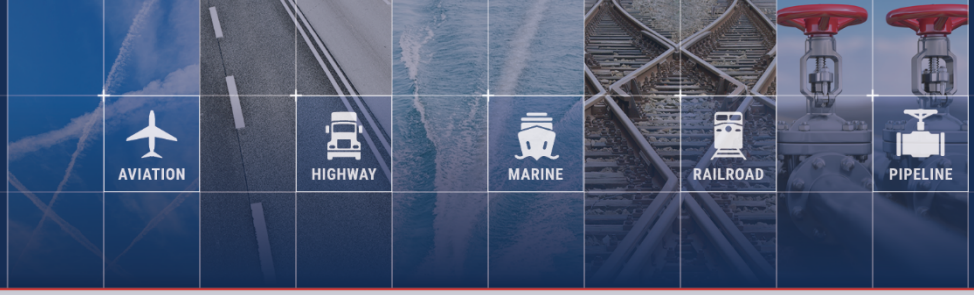

Aviation Investigation Factual Report

Location:	KENT, Washington	**Accident Number:**	SEA95LA026
Date & Time:	December 4, 1994, 15:40 Local	**Registration:**	N39852
Aircraft:	BELLANCA 17-30A	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Factual Information

HISTORY OF FLIGHT

On December 4, 1994, about 1540 Pacific standard time, N39852, a Bellanca 17-30A airplane, operated by the owner/pilot, impacted terrain during a forced landing near Kent, Washington, and was substantially damaged. The forced landing was precipitated by a total loss of engine power during descent. The airline transport rated pilot and his passenger were seriously injured. Visual meteorological conditions prevailed and no flight plan had been filed. The personal flight departed from Electric City, Washington, about 1500 and was destined for Kent. The flight was conducted under 14 CFR 91.

According to the pilot, the airplane underwent a "standard pre-flight" inspection on the day of the accident at a private airstrip near Kent prior to departure to Electric City. The pilot stated he visually checked the fuel quantity and fuel gages; he noted the right tank was "3/4 full" and the left tank was "5/8 full." He also stated that he drained the fuel tank sumps and gascolator during the inspection. The pilot stated that the flight to Electric City took about one hour and that the fuel selector was in the right tank. The pilot stated that his son was with him during the personal flight, and he intended on returning to the private airstrip that day.

Upon landing in Electric City, the pilot stated that he noticed the right tank fuel gage was indicating between 1/4 and 1/2 full, and the left tank fuel gage indicated 5/8 full. The pilot stated that he switched the fuel selector to the left tank prior to departure from Electric City. He did not visually check the fuel tanks at this time. After departure from Electric City, the pilot intended on first landing at Crest Airport, in Kent, for fuel, and then proceed on to the airplane's home base at the private airstrip.

The pilot stated that he climbed to 9,500 feet above mean sea level (msl) and operated the airplane with fuel from the left tank. He then began a descent into the Crest Airport, and was "... very aware of enrichening the mixture and reducing the throttle" during the descent. According to the pilot, a "... sudden engine failure" occurred about 8 minutes into the descent as the airplane descended through 4,000 feet msl. The pilot further stated:

Thinking that I might have run the left tank dry, I switched to the right tank where I knew there was adequate fuel. The engine was still turning a high RPM so I expected a restart within a few seconds. Not getting a restart when I expected, I recycled the fuel selector to make sure it was in the detent. I was satisfied that it was and began manipulating the mixture and throttle hoping to find a place where the engine would start.

The engine did not regain power, and the pilot attempted to force land the airplane on a golf course. The landing gear was extended. During the landing, the airplane bounced once,

impacted a berm next to a pond, and was substantially damaged.

PERSONNEL INFORMATION

The pilot, age 57, is an airline transport pilot with ratings for single and multiengine land airplanes. He reported that he has accumulated 20,000 hours of total flight time, and he received his last biennial flight review in a Boeing 747. The pilot also reported that he had logged a total of 50 hours in the accident airplane, including 5 hours in the previous 90 days. The pilot purchased the airplane in April of 1994, and he stated that prior to the accident, he was not aware that the airplane had a fuel-injected engine in which a fuel pump is required for operation.

AIRCRAFT INFORMATION

The accident airplane, a 1973 Bellanca 17-30A "Viking," was a low-wing, four-place, wood and fabric, high-performance aircraft. It was powered by a 300-horsepower, fuel-injected Continental IO-520-K1B engine.

According to the chief engineer of Bellanca, Inc., the airplane manufacturer, the airplane's fuel system consists of three internal metal fuel tanks in each wing. All three tanks are interconnected via fuel lines, acting as a single tank in each wing. There are no direct vent lines connecting the right wing tanks with the left wing tanks.

Each wing holds a total of 34 gallons of fuel, including 4 gallons which are unusable. The fuel lines connect to fuel ports located on the lower aft corner of the two outboard tanks. The inboard tank has fuel ports on the fore and aft portions of the tank; the ports feed the fuel through the fuel selector valve, gascolator, auxiliary fuel pump, engine-driven fuel pump, fuel flow distribution valve, and engine cylinders, in that order. The fuel selector valve allows fuel to be ported from the left wing, or the right wing, or shut off.

The chief engineer further stated that flight testing of the airplane's design revealed that the "critical attitude" for determining useable fuel flow from the tanks is "nose-down," because the outboard fuel tank ports can become unported thereby prohibiting fuel flow into the most inboard fuel tank pick-up ports.

An examination of the airframe and engine logbooks (excerpts attached) revealed that the airplane had received maintenance as a result of fuel system malfunctions. An entry dated October 3, 1990, states: "removed-tested-reinstalled [inboard] fuel tanks, leak tested [outboard] fuel tanks in wings...aircraft run-up & test flown, no [discrepancies] noted." Another entry dated June 28, 1991, described a "fuel starvation problem" involving a "deformed" right fuel tank. A third entry dated August 2, 1991, states: "Removed inboard [right] fuel tank & installed a new...tank, removed two outboard fuel tanks ... cleaned debris from tanks-leak tested-installed all new rubber interconnects. Calibrated [right] fuel tanks to Bellanca [spec]."

All subsequent entries in the logbooks make no mention of fuel system malfunctions. The last entry, dated July 7, 1994, states: "[Airworthiness directives] checked through 94-10. I certify this aircraft...was found to be in an airworthy condition."

An examination of the pilot's personal logbook and statements from the pilot revealed that the airplane was last refueled at the Auburn Municipal Airport, Auburn, Washington, on November 11, 1994. The airplane was "topped off" at that time, and the airplane was flown for about one hour and 15 minutes on that day. The airplane flew at an altitude of about 3,000 feet msl after one takeoff. The pilot stated that he could not remember which fuel tank was selected during the flight.

The next flight occurred on the day of the accident, when the airplane was flown from Kent to Electric City. The pilot stated that the flight was about one hour in duration; the airplane was flown about 9,000 feet msl after one takeoff, and the right fuel tank was selected. The next flight was the accident flight. The accident flight was estimated to be about 40 minutes in duration at a cruising altitude of 9,500 feet msl after one takeoff. The pilot stated that he cruised at "twenty-four squared," or at 2,400 revolutions per minute and 24 inches of engine manifold pressure, and the left fuel tank was selected.

According to aircraft performance information (excerpts attached) from Bellanca, Inc., and the pilot's statements, the Safety Board estimates that the total fuel consumed from the time the airplane was last refueled to the time of the engine failure was about 55 gallons. An estimation of fuel consumption for each wing tank could not be performed based on available information.

According to the FAA Approved Airplane Flight Manual for the accident airplane (excerpts attached), in the "Normal Procedures," Section II, the following is stated:

If a tank is run completely dry, it is necessary to switch the selector valve to a tank containing ample fuel and then turn the boost pump on "prime" (Up Position). The auxiliary fuel pump must be turned on in order to insure fuel flow to the engine. If ample fuel is available and low boost is used, an air restart should occur in less than 10 seconds. Normal engine restart can be accomplished without changing the throttle or mixture control position. The auxiliary fuel pump is not required for normal operation after engine power is restored.

Also, under the "Emergency Procedures," Section II, the manual states the following: "If the engine loses power because of fuel starvation, select another tank containing ample fuel and turn the auxiliary fuel pump "ON." The "ON" position should be used for all normal air restarts."

The pilot operating handbook provides a checklist (attached) under the heading of "ENGINE MALFUNCTION - ENGINE AIR RESTART." Item 5 of this checklist states "Auxiliary Fuel Pump - ON."

WRECKAGE AND IMPACT INFORMATION

An examination of the wreckage was performed by an FAA aviation safety inspector from Renton, Washington, at the accident site on the day of the accident, and again on December 16, 1994, after the airplane had been removed. According to the inspector (statement attached), no standing fuel was present in the left and right fuel tanks as viewed from the fill point at the accident site. A strong odor of fuel was noted in the cabin, and no fuel or oil was noted in the frozen pond or on the ground around the airplane. The fuel selector was found in the right tank position. The fuel gage read empty with power on and off. All fuel tanks were intact. A fuel line from the fuel selector valve to the engine was "broken at the time of landing." The fuel flow distribution valve was disassembled and inspected; the valve was "damp" with no standing fuel present.

Both magnetos were rotated and produced a spark on all leads. The engine-driven fuel pump was examined and no deficiencies were noted. No preimpact mechanical deficiencies were found with the engine.

According to two airframe and powerplant mechanics (statements attached) who retrieved the wreckage and were acquaintances of the pilot, an estimated 9 gallons of fuel were drained from the left tank, and about 6 gallons were drained from the right tank.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	57,Male
Airplane Rating(s):	Single-engine land; Multi-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:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	October 11, 1994
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	20000 hours (Total, all aircraft), 50 hours (Total, this make and model), 20000 hours (Pilot In Command, all aircraft), 140 hours (Last 90 days, all aircraft), 59 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BELLANCA	**Registration:**	N39852
Model/Series:	17-30A 17-30A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	73-30517
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 7, 1994 Annual	**Certified Max Gross Wt.:**	3325 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1678 Hrs	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520-K1B
Registered Owner:	VINTON, WINFRED C.	**Rated Power:**	300 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:	SEA ,429 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	15:50 Local	**Direction from Accident Site:**	300°
Lowest Cloud Condition:	Scattered / 25000 ft AGL	**Visibility**	20 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	1°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ELECTRIC CITY (WA21)	**Type of Flight Plan Filed:**	None
Destination:	KENT (S36)	**Type of Clearance:**	None
Departure Time:	15:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	47.389007,-122.259307(est)

Administrative Information

Investigator In Charge (IIC):	Guzzetti, Jeffrey
Additional Participating Persons:	ROBERT ARCHIBALD; RENTON , WA
Report Date:	August 30, 1995
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=42091