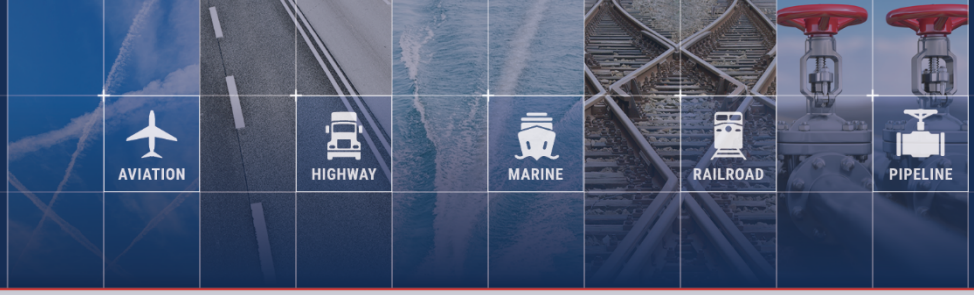

Aviation Investigation Final Report

Location:	Truckee, California	**Accident Number:**	WPR18FA198
Date & Time:	July 17, 2018, 07:39 Local	**Registration:**	N5329K
Aircraft:	Ryan Navion	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after takeoff, the private pilot reported to the tower controller that the airplane had experienced a "power failure" and would be returning to the airport. A witness reported that he observed the airplane flying low and trying to make a sharp turn back toward the airport and that the engine seemed like it was sputtering. The airplane subsequently impacted the upsloping terrain hard, and came to an abrupt stop less than one mile southwest of the departure runway. All major components of the airplane were located at the accident site. Postaccident examination of the airframe revealed no mechanical anomalies that would have precluded normal operation. Although the carburetor diaphragms exhibited tearing/cracks, the fracture surfaces were consistent with impact damage. No other mechanical anomalies were observed that would have precluded normal engine operation, and the reason for the reported loss of engine power could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A loss of engine power for reasons that could not be determined.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Sloped/uneven terrain - Contributed to outcome

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On July 17, 2018, about 0739 Pacific daylight time, a Ryan Navion B, N5329K, was substantially damaged when it impacted terrain shortly after takeoff from Truckee-Tahoe Airport (TRK), Truckee, California. The private pilot and one passenger were fatally injured; the second passenger was seriously injured. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed in the area and no flight plan was filed for the local flight, which was originating at the time of the accident.

According to the fueler on duty and fuel records provided by the airport's fixed base operator, about 20 minutes before departure, the pilot purchased 15 gallons of 100 low lead (100LL) aviation fuel, all of which was added to the right wing tank. According to local air traffic control transcripts and an audio recording provided by the Federal Aviation Administration (FAA), about 2 minutes 24 seconds after takeoff, the pilot reported to the tower controller that he had experienced a "power failure" and would be returning to the airport. The controller cleared the pilot to land on any runway, then asked if he needed any assistance; the pilot did not respond, and there were no further communications from the pilot. The airplane impacted terrain about 1 nautical mile southeast of the departure end of runway 11.

The local fire department incident commander stated that a witness reported that he witnessed the plane [flying] low and trying to make a sharp turn back towards the airport, and that the engine seemed like it was "sputtering". He said that it then lost altitude and glided into the creek.

The surviving passenger reported that on the morning of the accident, after the fueling was complete and having watched the pilot do his preflight, they boarded the airplane with the pilot occupying the left front seat, he the right front seat, and his husband the left rear seat. He stated that he remembered taxiing out to the run-up area prior to takeoff, however, does not remember anything after that.

An airport operations maintenance supervisor who witnessed the airplane take off stated that it "was climbing at an unusually steep angle." Its rate of climb decreased, and he saw the landing gear partially extend, then retract again. He heard the pilot report the loss of power to the tower controller and lost sight of the airplane shortly thereafter.

Pilot Information

Certificate:	Private	**Age:**	60,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 18, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	943 hours (Total, all aircraft), 1 hours (Total, this make and model)		

The pilot, age 70, held a private pilot certificate with ratings for airplane single-engine land and instrument airplane. The pilot's personal flight records were not located and his total flight experience, recency of experience, and experience in the accident airplane could not be determined.

The pilot held a third-class FAA airman medical certificate with a limitation that he must have glasses available for near vision. On the application for that certificate, dated May 18, 2017, the pilot reported 973 total hours of flight experience, with 8 hours during the previous 6 months.

Aircraft and Owner/Operator Information

Aircraft Make:	Ryan	**Registration:**	N5329K
Model/Series:	Navion B	**Aircraft Category:**	Airplane
Year of Manufacture:	1951	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	NAV-4-2229-B
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 6, 2017 Annual	**Certified Max Gross Wt.:**	2750 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	GO-480-G1D6
Registered Owner:		**Rated Power:**	280 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The airplane, serial number NAV-4-2229-B, was a single-engine, all-metal airplane of semi-monocoque design equipped with retractable landing gear, wing flaps, and a constant-speed propeller.

The airplane's most recent annual inspection was performed on April 6, 2017, at a tachometer time of 569.99 hours, a total airframe time of 3,461.92 hours, and 564.72 hours since the engine's last overhaul.

Maintenance records indicated that the carburetor was overhauled on September 1, 2004. Further, on February 2, 2008, at a tachometer time of 516.5 hours, the fuel selector was replaced with a new-style fuel selector, part number 147-30013-203, in accordance with (IAW) Navion Service Bulletin No. 101A.

On February 1, 2009, at a tachometer time of 594.8 hours, Airworthiness Directive 2008-05-14 was completed IAW Navion Service Bulletin No. 106A, a one-time compliance inspection. The Bulletin stated in part, "If within the last 5 years or at any time after April 16, 2008 (the effective date of this AD) you have replaced the fuel selector valve with any of the valves specified in paragraphs (e)(3)(i) and (e)(3)(ii) of this AD, you may terminate the repetitive inspections and functional tests of the fuel selector valve required in paragraph (e)(2) of this AD.

The airplane was powered by a Lycoming GO-480-G1D6 six-cylinder, air-cooled, geared-drive, carburetor-equipped engine rated at 280 horsepower, which was not original to the airplane.

A review of FAA airworthiness records and partial airplane maintenance records revealed no information regarding the installation of the engine. A search of the FAA Supplemental Type Certificate database found no STC's related to the Navion B aircraft model applicable to the accident airplane.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TRK,5901 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	07:45 Local	**Direction from Accident Site:**	345°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.34 inches Hg	**Temperature/Dew Point:**	12°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Truckee, CA (TRK)	**Type of Flight Plan Filed:**	None
Destination:	Truckee, CA (TRK)	**Type of Clearance:**	None
Departure Time:	07:36 Local	**Type of Airspace:**	Class D

At 0745, the weather reporting facility located at TRK reported calm wind, 10 miles visibility, light haze, clear sky, temperature 12°C, dew point 6°C, and an altimeter setting of 30.34 inches of mercury. The calculated density altitude about the time of the accident was 6,400 ft.

Airport Information

Airport:	Truckee-Tahoe Airport KTRK	**Runway Surface Type:**	Asphalt
Airport Elevation:	5901 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	11	**IFR Approach:**	None
Runway Length/Width:	7000 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal, 1 Serious	**Latitude, Longitude:**	39.301944,-120.125274(est)

The airplane impacted terrain about 0.98 mile southeast (160° magnetic) of the departure end of runway 11. The airplane came to rest upright adjacent to a creek on a heading of about 315° magnetic at an elevation of 5,825 ft mean sea level. Debris was contained within about 5 ft of the main wreckage, which included a separated propeller blade. There was no visible debris path or impact marks surrounding the main wreckage.

Both wings remained attached to the fuselage. The right wing exhibited leading edge crushing from the wingtip to about 30 inches inboard. Upward crushing on the bottom of the leading edge was observed near the wing root and in various areas throughout the span of the right wing. The aileron and flap remained attached to their respective mounts. The flap appeared to be in the retracted position. The right main landing gear appeared to be in the retracted position.

The left wing appeared to be mostly undamaged. The aileron and flap remained attached to their respective mounts. The flap and landing gear were in the retracted position.

The fuselage was mostly intact. The structure just aft of the cabin area was buckled and bent to the right. The empennage was intact and undamaged. The rudder, vertical stabilizer, horizontal stabilizers, and elevators remained attached to their respective attach points. Control continuity was established from the cockpit area to all flight control surfaces.

The engine was partially attached to the airframe and bent downward at an approximate 10-15° angle. When the top cowling was removed, oil residue was observed covering the front of the engine. The propeller hub remained attached. One of the three propeller blades was separated from the hub. Chordwise scratches were observed on all three blades.

The engine, which had been removed from the airframe by retrieval personnel during the recovery process, sustained moderate impact damage to the underside, including the carburetor and exhaust system. Visual examination of the engine revealed no evidence of pre-impact catastrophic mechanical

malfunction or fire.

The wreckage was removed from the site to a secure storage facility for further examination.

Both the engine-driven fuel pump and the electric fuel boost pump were removed. Subsequent bench testing revealed that both components operated normally.

The fuel selector, located on the cockpit floor between the two front seats, was observed in the OFF position. Two local fire department incident commanders provided instruction to their first responder staff to turn the fuel off, which was consistent with their operational procedures. It was not determined during the investigation what position the fuel selector was in prior to it being turned to the OFF position. When rotated by hand, the selector functioned normally; all detents were identified when the handle was rotated. The fuel selector could not be removed due to impact damage to the airframe.

Two samples of residual fuel tested negative for water contamination.

The engine crankshaft, which was rotated by hand using the propeller, was free to rotate in both directions. Thumb compression was obtained in proper order on all six cylinders. Mechanical continuity was established throughout the rotating group, valve train, and accessory section.

The top spark plugs were removed. The spark plugs electrodes remained mechanically undamaged. When compared to the Champion Spark Plugs Check-A-Plug chart AV-27, the spark plug electrodes displayed coloration consistent with normal operation.

Normal lifting action was observed at each rocker assembly. Clean, uncontaminated oil was observed at all six rocker box areas. The bottom spark plugs were removed. Borescope inspection of each cylinder combustion chamber revealed no anomalies.

The left and right magnetos remained securely attached at their respective mounting pads. The ignition harness was secure at each magneto. The magneto to engine timing was observed at 25° before top dead center of cylinder No. 1.

The magnetos were removed for examination. Each magneto produced spark at the end of the respective spark plug lead during hand rotation of the drive. The drives of each magneto remained intact and undamaged.

The carburetor was displaced from the engine due to impact forces. The portion that remained attached at the mounting pad was secure. The fracture surface signatures were consistent with overload. The throttle/mixture controls were found securely attached at their respective control arms. The castellated nut and cotter pin remained secure and the serrated interface at the throttle arm remained securely mated.

The carburetor was disassembled for further examination. The carburetor fuel inlet filter screen was free of visible contaminants. The outer regulator diaphragm (fuel), inner regulator diaphragm (air), and power enrichment rubber diaphragms were ruptured/torn. Microscopic examination of the fracture surfaces of the carburetor inner regulator, outer regulator, and the enrichment valve diaphragms revealed

features consistent with shear and tension fractures likely sustained during the impact.

The engine-driven fuel pump was attached to the engine at the mounting pad. The input fuel line had been removed at the firewall by the retriever. The fuel pump output hose had been removed at the fuel pump by the retriever. The fuel pump was removed for examination. The drive was free to rotate.

Fluid consistent with the appearance and odor of aviation fuel was found within the carburetor during disassembly; testing of the fuel revealed no water contamination.

Due to the extreme impact damage to the airframe, the fuel system, gascolator screen, vent lines, and fuel lines were not examined.

The examinations of the engine and the airframe did not reveal any mechanical malfunctions that would have precluded normal operation.

Medical and Pathological Information

On July 18, 2018, the Placer County Office of the Sheriff-Coroner, Auburn, California, performed an autopsy on the pilot. The cause of death was attributed to multiple blunt injuries.

Toxicology testing performed by the FAA Forensic Sciences Laboratory was negative for all substances tested.

Administrative Information

Investigator In Charge (IIC):	Little, Thomas
Additional Participating Persons:	Frank J Vavra; Federal Aviation Administration; Reno, NV Mark Platt; Lycoming Engines; Williamsport, PA
Original Publish Date:	May 19, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97803

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.