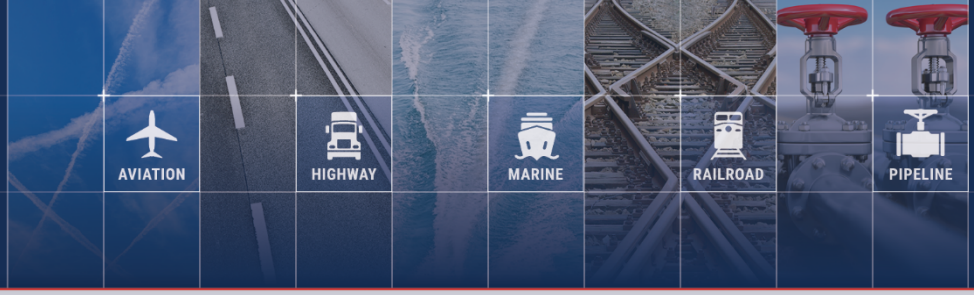

Aviation Investigation Final Report

Location:	Hurt, Virginia	**Accident Number:**	ERA16LA333
Date & Time:	September 27, 2016, 17:45 Local	**Registration:**	N5327K
Aircraft:	Ryan Navion	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During cruise flight, the private pilot felt the engine suddenly begin to vibrate. He then heard a loud bang; the engine vibration increased, smoke and oil emanated from the engine compartment, and the engine lost total power. The pilot was unable to glide the airplane to a nearby airport and performed a forced landing in a field, during which the airplane struck and rolled through a fence, which resulted in substantial damage to the right wing. Examination of the engine revealed that its crankcase was absent of oil, and there were holes in the crankcase near cylinder Nos. 2, 4, and 6. Subsequent teardown examination revealed that the internal engine components exhibited heat distress consistent with a lack of lubrication. Further examination revealed that the oil temperature probe port was safety wired but could be moved by hand and that the crush washer between the probe and the cooler was installed backwards. This evidence is likely indicative that the probe had not been properly installed, although it could not be determined when that may have occurred. Air pressure applied to the oil cooler showed a leak between the oil temperature probe and the cooler. Oil residue noted on the exterior of the cooler indicated that the oil leak had likely been present for some time and that it was likely where the engine's oil had leaked out, ultimately resulting in the engine failure due to oil starvation. Had the leak been noted and addressed, by correctly installing the oil temperature probe, during the airplane's most recent annual inspection, which was completed 11 days before the accident, it is likely that the engine would not have been starved of oil.

Probable Cause and Findings

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

Incorrect installation of the oil temperature probe and an inadequate annual inspection that failed to detect leaking oil around the loose probe, which resulted in a catastrophic engine failure due to oil starvation.

Findings

Personnel issues	Installation - Maintenance personnel
Personnel issues	Scheduled/routine inspection - Maintenance personnel
Aircraft	(general) - Failure
Aircraft	Oil - Fluid level
Environmental issues	Fence/fence post - Contributed to outcome

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)
Enroute-cruise	Loss of engine power (total)
Landing	Off-field or emergency landing
Landing-landing roll	Collision with terr/obj (non-CFIT)

On September 27, 2016, about 1745 eastern daylight time, a Ryan Navion B, N5327K, was substantially damaged during a forced landing, following a total loss of engine power while in cruise flight near Hurt, Virginia. The private pilot was not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the personal flight, which was conducted under the provisions of 14 *Code of Federal Regulations* Part 91. The flight departed Culpeper Regional Airport (CJR), Culpeper, Virginia, about 1700, destined for Long Island Airport (NC26), Long Island, North Carolina.

According to the pilot, about 45 minutes into the flight, at an altitude of 3,000 feet mean sea level, the engine suddenly began to vibrate. He informed Roanoke Approach air traffic control (ATC) of his intent to try to land at the nearest airport, which was New London Airport (W90), Forest, Virginia. A few seconds later he heard a loud bang, the vibration worsened, smoke and oil emanated from the engine compartment, and the engine lost power as the propeller continued to windmill. The pilot then advised ATC that he would not be able to make the airport, and he then performed an emergency landing to a mowed hay field. During the landing rollout, the airplane struck and rolled through a post-and-wire fence resulting in substantial damage to the right wing.

Examination of the airplane by a Federal Aviation Administration inspector revealed that the right wing leading edge sustained substantial damage, and fence wire was wrapped around the propeller flange. The top left side of the engine crankcase was damaged, and there were holes in the crankcase near cylinder Nos. 6, 4 and 2. A connecting rod protruded through the hole near cylinder No. 4. No oil was present in the crankcase. A teardown examination of the engine was subsequently performed at the manufacturer's facility, under the supervision of a National Transportation Safety Board investigator. The examination revealed that the internal engine components exhibited heat distress consistent with a lack of lubrication. Further examination revealed that the oil temperature probe was safety wired, however it could be moved by hand. An air pressure hose was attached to the oil cooler and when 30 psi was applied, bubbles were noted around the crush washer seal of the oil temperature probe. Oil residue was also noted all over the oil cooler and surrounding area of the engine. See Figure 1. The oil temperature probe was removed, and the crush washer was found installed backwards.

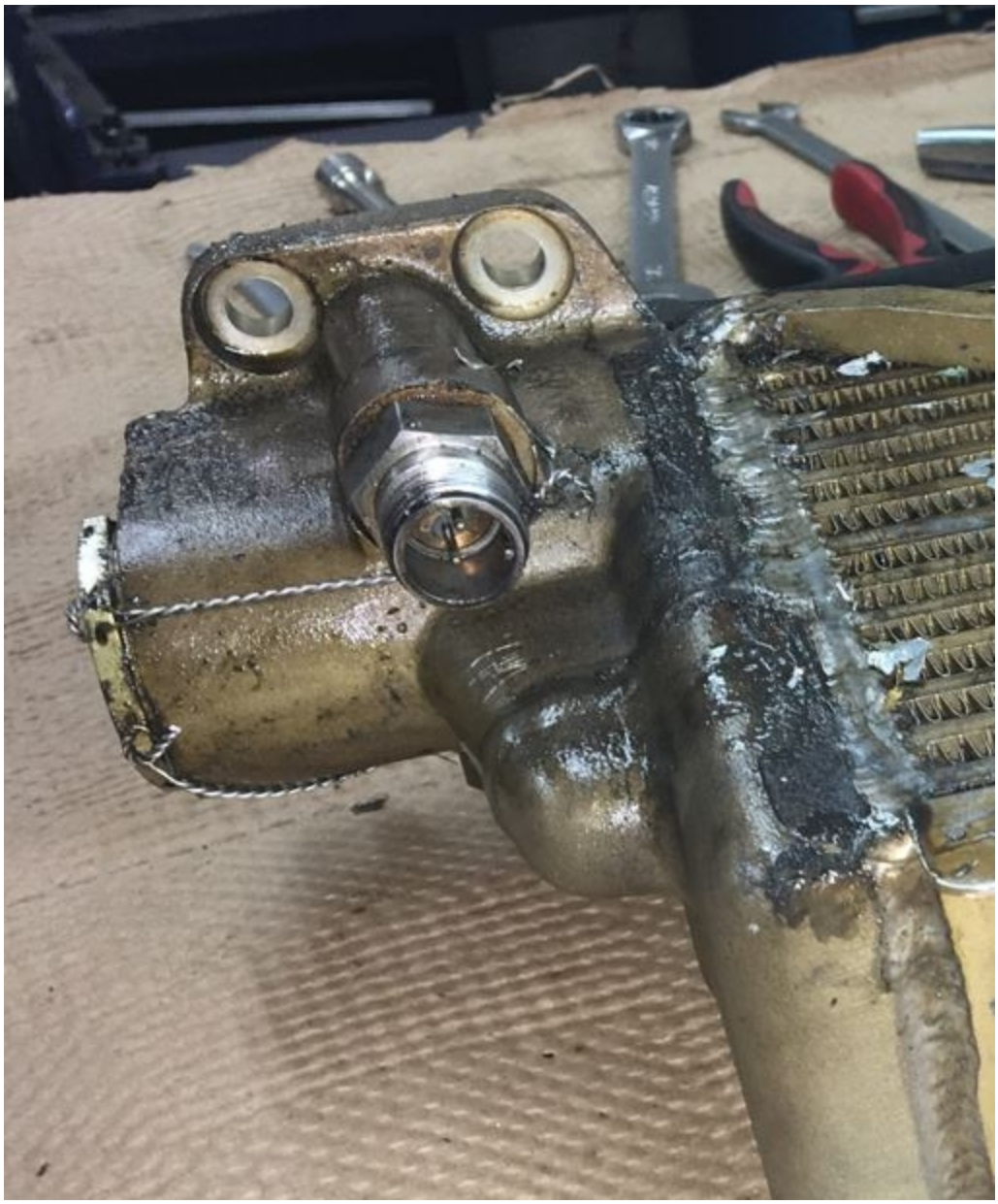

Figure 1. Oil Temperature Probe

The temperature probe was considered an airframe item and was not installed by the engine manufacturer. The engine was delivered with a plug in the oil temperature probe port, and the installer could remove the plug and replace it with an oil temperature probe. A review of the 1951 Navion B Service Manual revealed no specific torque values for tightening the oil temperature probe. The maintenance manual for the accident engine provided a torque range for the oil temperature port plug (with crush washer), as 190 in/lbs to 210 in/lbs. The version of the manual in effect at the time of the accident did not specify the orientation of crush washers.

Maintenance records revealed that the airplane's most recent annual inspection occurred on September 16, 2016. At that time, the airplane had accrued a total of 4,488 flight hours, and the engine had accrued a total of 832 hours since overhaul.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 18, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 19, 2016
Flight Time:	1014 hours (Total, all aircraft), 708 hours (Total, this make and model), 964 hours (Pilot In Command, all aircraft), 23 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Ryan	**Registration:**	N5327K
Model/Series:	Navion B	**Aircraft Category:**	Airplane
Year of Manufacture:	1950	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	NAV-4-2227-B
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 16, 2016 Annual	**Certified Max Gross Wt.:**	2850 lbs
Time Since Last Inspection:	1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4488 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO-550B
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLYH,938 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	17:54 Local	**Direction from Accident Site:**	15°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 7000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	24°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	CULPEPER, VA (CJR)	**Type of Flight Plan Filed:**	None
Destination:	LONG ISLAND, NC (NC26)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	37.055278,-79.294998(est)

Administrative Information

Investigator In Charge (IIC):	Brazy, Douglass
Additional Participating Persons:	Jay Veneble ; FAA/FSDO ; Richmond, VA Nicole L Charnon; Continental Motors, Inc.; Mobile, AL
Original Publish Date:	June 25, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94212