



National Transportation Safety Board Aviation Accident Final Report

Location:	Carthage, NC	Accident Number:	ERA13LA072
Date & Time:	12/01/2012, 1030 EST	Registration:	N416DH
Aircraft:	HANSEN DAVID DANIEL RV-4	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	2 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

During cruise flight, the engine began losing power. The pilot in the front seat, who was flying the airplane, attempted to troubleshoot the engine issue, including activating the carburetor heat; however, the engine continued to run roughly, so he chose to divert to a nearby airport. The rear-seat pilot then took control of the airplane. While on final approach to the runway, the rear-seat pilot asked the front-seat pilot, who was seated near the wing flap control, to configure the flaps for landing. After the flaps fully extended, they retracted. The rear-seat pilot then asked the front-seat pilot to re-extend the flaps. About this time, the rear-seat pilot noticed that people and vehicles were at the end of the runway and chose to abort the landing by increasing engine power and turning the airplane toward an adjacent field. However, the airplane had sufficient altitude and power, so the pilot should have been able to make the runway and land safely. During the subsequent attempt to land the airplane, it stalled and then touched down hard. The airplane was substantially damaged, and both pilots were seriously injured.

Postaccident examination of the airplane revealed that the wing flaps appeared to be fully extended. The front-seat pilot, who was a co-owner, had been working to rectify several maintenance discrepancies he had identified after purchasing the airplane 2 months earlier, one of which included a leaking right fuel tank; he had repaired the exterior of the tank. Examination of the engine and fuel system identified the presence of fuel tank sealant on the exterior of the steel braid of both fuel tanks' flexible pick-up tubes and flaked pieces of fuel tank sealant and other contaminants within the gascolator. However, examinations revealed that the fuel screens at the engine-driven fuel pump and the carburetor were not contaminated. Both fuel tanks were found breached. An examination of the engine did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operation. Although the temperature and dew point about the time of the accident were conducive to the formation of carburetor ice, it is unlikely that carburetor ice played a role in the loss of engine power because the pilots' reported using carburetor heat following the loss of engine power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A partial loss of engine power for reasons that could not be determined because postaccident examinations of the engine and fuel system revealed no anomalies that would have precluded normal operation. Contributing to the severity of the accident was the rear-seat pilots' decision to abort the landing with partial engine power and his failure to successfully perform a forced landing to an available airfield.

Findings

Personnel issues	Decision making/judgment - Pilot (Factor) Incorrect action performance - Pilot (Factor)
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

On December 1, 2012, about 1030 eastern standard time, an experimental amateur-built RV-4, N416DH, was substantially damaged when it impacted terrain during a forced landing following a partial loss of engine power near McConnell Airfield (5NC3), Carthage, North Carolina. The certificated commercial pilot/co-owner of the airplane and the certificated airline transport pilot were seriously injured. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which originated from Long Island Airport (NC26), Long Island, North Carolina, and was destined for Rowan County Airport (RUQ), Salisbury, North Carolina. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to the commercial pilot, he had purchased the airplane about two months prior to the accident and had flown it home from Utah. Since then, he had been trying to identify and rectify some "squawks" he had noted with the airplane. One of the issues he had observed was that fuel seemed to be seeping from the right wing fuel tank, and he had been attempting to identify the source of the leak. About one week prior to the accident flight, he re-sealed all of the rivet lines on the fuel tank from the outside. The purpose of the accident flight was to test fly the airplane and determine if the leak had been fixed.

The commercial pilot, was seated in the front seat of the airplane, which was equipped with a fully functional set of flight/engine controls and instrumentation, while the airline transport pilot was seated in the rear seat, which was only equipped with basic flight and engine controls, and did not include flap or brake controls. The pilots planned to fly around the local area, and had anticipated stopping at several airports throughout the day. After performing a preflight inspection, the pilots filled the airplane's fuel tanks and departed from Lake Norman Airpark (14A), Mooresville, North Carolina. They then proceeded uneventfully to NC26, where after a brief stop, they departed on the accident flight.

About 5 minutes after departing, and while flying at an altitude of about 3,000 feet msl, the airplane's engine began losing power over a period of about 15 seconds, and continued to run roughly at a very low power output. The front seat pilot activated the carburetor heat, richened the mixture, activated the fuel boost pump, ensured that the primer was locked in place, and switched the fuel selector from the right to left fuel tank. The rear seat pilot then took control of the airplane and turned towards 5NC3, which was nearby.

Upon arriving over the airport, the rear seat pilot circled overhead in order to lose altitude before turning onto the final approach to the runway and asking the front seat pilot to set the flaps to 30 degrees. Shortly before reaching the runway threshold, the rear seat pilot heard a loud "bang," and realized that the flaps had retracted from the 30- to the 10-degree position. The rear seat pilot then asked the front seat pilot to reposition the flaps back to the 30-degree position; but could not recall if the front seat pilot had done so. Seeing persons and vehicles near the departure end of the runway, the rear seat pilot elected to abort the landing, increased the throttle to the full forward position, and maneuvered the airplane toward a farm field to the south of the runway. While attempting to land, the airplane touched down hard, collapsing the landing gear, before coming to rest in a stand of trees, resulting in substantial damage to the fuselage and both wings.

A Federal Aviation Administration (FAA) inspector performed a cursory examination of the airplane at the accident site, and noted that the wing flaps appeared to be fully extended. The

airplane was subsequently recovered from the accident site and examined. Both fuel tanks were breached at the inboard forward attach points where the fuel lines were installed. Both fuel tank caps were in place and their seals were in good condition. Interior inspection of the tanks revealed that they were absent of fuel, water, or contamination. A flop tube was installed in each tank and considerable amount of fuel tank sealant was present on the braided steel cover of each flop tube.

The gascolator was removed opened for inspection, and was completely full of light-blue colored fuel that had a smell consistent with 100LL aviation fuel. About 1/2 teaspoon of solid contaminants was present at the bottom of the gascolator. The contaminants appeared consistent with flaked fuel tank sealant and dirt.

Fuel samples from the fuel pump and gascolator were tested for the presence of water, and none was found.

The cockpit fuel selector valve and fuel lines from the gascolator to the valve and from the valve to the wing roots were tested with compressed air. The valve operated normally and the lines were clear of obstructions. The fuel lines forward of the engine firewall were removed and examined for blockage, with no obstructions noted.

The engine-driven fuel pump was removed from the engine and its input was actuated manually. The pump operated normally and pumped fuel. The pump was subsequently disassembled and examined, and the fuel screen was absent of debris or contamination and the fuel inlet and outlet ports were normal in appearance.

The carburetor fuel inlet screen was examined and was absent of debris. The carburetor could not be tested due to impact damage; however, a visual examination of its components was unremarkable. The carburetor bowl was clean and dry; however, it was broken free from the upper half of the carburetor.

Continuity of the engine's powertrain and valvetrain were confirmed by rotation of the crankshaft at the propeller flange. The crankshaft turned with no binding noted, and suction and compression were observed on all cylinders. Rotation of the crankshaft produced spark at each of the impulse coupler-equipped right magneto's terminal leads, and the left magneto was not tested. The four top spark plugs were removed and all exhibited normal wear and were light gray in color.

According to FAA airworthiness records, the experimental amateur-built airplane was completed and certificated in 1991. The airplane was equipped with a Lycoming O-320-E2A engine. Review of maintenance records revealed that the airplane's most recent condition inspection was completed by the airplane's builder in March 2012.

The weather conditions reported at Moore County Airport (SOP), Pinehurst, North Carolina, located about 8 nautical miles south of the accident site, at 1035, included winds from 220 degrees at 5 knots, 10 statute miles visibility, clear skies below 12,000 feet, a temperature of 15 degrees C, a dew point of 7 degrees C, and an altimeter setting of 30.41 inches of mercury. Consultation of a carburetor icing probability chart published by the FAA showed that the temperature/dewpoint conditions were favorable to the accumulation of "serious icing at glide power."

History of Flight

Enroute-cruise	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Approach	Miscellaneous/other
Approach-VFR go-around	Off-field or emergency landing
Landing	Hard landing

Pilot Information

Certificate:	Commercial	Age:	40
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without Waivers/Limitations	Last Medical Exam:	11/01/2011
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	99999 hours (Total, all aircraft), 99999 hours (Total, this make and model)		

Co-Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	Age:	33
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Rear
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	05/22/2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	11/17/2012
Flight Time:	5500 hours (Total, all aircraft), 50 hours (Total, this make and model), 4700 hours (Pilot In Command, all aircraft), 100 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	HANSEN DAVID DANIEL	Registration:	N416DH
Model/Series:	RV-4	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	1593
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	03/06/2012, Conditional	Certified Max Gross Wt.:	1500 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	617 Hours	Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	O-320-E2A
Registered Owner:	On file	Rated Power:	150 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	SOP, 462 ft msl	Observation Time:	1535 UTC
Distance from Accident Site:	8 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	180°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	15° C / 7° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	5 knots, 220°	Visibility (RVR):	
Altimeter Setting:	30.41 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Long Island, NC (NC26)	Type of Flight Plan Filed:	None
Destination:	Salisbury, NC (RUQ)	Type of Clearance:	None
Departure Time:	1015 EST	Type of Airspace:	

Airport Information

Airport:	McConnell Airfield (5NC3)	Runway Surface Type:	
Airport Elevation:	445 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

Crew Injuries:	2 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Serious		

Administrative Information

Investigator In Charge (IIC):	Dennis Diaz	Adopted Date:	04/23/2014
Additional Participating Persons:	Charles J Kleven; FAA/FSDO; Charlotte, NC		
Publish Date:	04/23/2014		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=85721		

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