



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Wonewoc, WI	<b>Accident Number:</b>	CEN13LA216
<b>Date &amp; Time:</b>	04/01/2013, 1220 CDT	<b>Registration:</b>	N8033B
<b>Aircraft:</b>	CESSNA 172	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The pilot reported that, during the flight before the accident flight, the engine began running roughly during cruise flight with the right wing fuel tank selected. After attempting to resolve the issue by applying carburetor heat, he made a precautionary landing at a nearby grass airstrip. After landing, the pilot loosened the right fuel tank cap and heard a "whoosh" sound and the metal fuel tank "crinkle." The pilot stated that he thought he had resolved the fuel tank venting issue when he removed the right fuel tank cap. After spending 30 minutes on the ground, the pilot restarted the engine with both fuel tanks selected and performed an uneventful engine run-up before departing. Shortly after takeoff, the engine experienced a total loss of power, and the pilot executed a forced landing into a marsh. A postaccident examination revealed that the external and cross-tank vent lines were obstructed by foreign material likely deposited by insects. In this condition, the engine responded to cockpit controls during an operational test run. Following the engine test run, the right fuel tank cap was loosened, and a "whoosh" sound was heard. Testing of the right fuel cap revealed a restriction to the flapper-valve assembly, which prevented air from passing freely through the vented cap as designed. The combination of a restricted vented fuel cap and the obstructed vent lines likely prevented the fuel from flowing to the engine and resulted in fuel starvation and the total loss of engine power.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The restricted vented fuel cap and obstructed fuel vent lines, which resulted in a total loss of engine power due to fuel starvation.

## Findings

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Aircraft

## Factual Information

On April 1, 2013, at 1220 central daylight time, a Cessna model 172 airplane, N8033B, was substantially damaged during a forced landing following a loss of engine power shortly after takeoff from Three Castles Airpark (4D1), Wonewoc, Wisconsin. The commercial pilot was not injured. The airplane was registered to and operated by the pilot, under the provisions of 14 Code of Federal Regulations Part 91, without a flight plan. Day visual meteorological conditions prevailed for the personal flight. The flight originally departed Park Falls Municipal Airport (KPKF), Park River, Wisconsin, at 1030, and was destined for St Louis Metro-East Airport (3K6), St. Jacob, Illinois.

The pilot reported that he planned on making one fuel stop during the cross-country trip, although he had not selected the actual airport because the airplane still had ample fuel. The engine began running rough during cruise flight while operating on the right wing fuel tank. After attempting to resolve the issue with an application of carburetor heat, he made an uneventful precautionary landing at a nearby grass airstrip (4D1). After landing, the pilot reported that he couldn't find anything wrong with engine during a visual check of the engine. However, he heard a "whoosh" sound and heard the metal fuel tank "crinkle" as he loosened the right fuel tank cap. The pilot reported that he attributed these sounds to an accumulated pressure differential that occurred during his rapid descent while operating on a single fuel tank. The left wing fuel tank contained about 2 gallons of fuel. The right tank contained about 10 gallons of fuel. The pilot stated that he thought he had resolved the fuel tank venting issue when he removed the right fuel tank cap. The pilot subsequently restarted the engine, with the fuel selector drawing fuel from both fuel tanks, and performed an uneventful engine run-up before departing again. Shortly after takeoff, at an altitude of about 300 feet, the engine began running rough. The pilot reported that the engine lost power completely at an altitude of about 200 feet as he attempted to return to the airport. The airplane's left wing collided with a tree during the forced landing into a seasonal marsh.

A postaccident examination was performed by a Federal Aviation Administration Airworthiness Inspector. The inspector reported that the external fuel tank vent line, located on the left wing strut, was obstructed by foreign material likely deposited by insects. Additionally, he noted that the cross-tank vent line was also obstructed. The engine responded to cockpit controls during a postaccident operational test run. Following the engine test run, the inspector heard a "whoosh" sound as he loosened the right fuel tank cap. Testing of the right fuel cap revealed a restriction to the flapper-valve assembly, which prevented air to pass freely through the vented cap as designed. Although there was no foreign object debris or material noted around the valve seat, the rubber-flap material would remain engaged to its corresponding metal seat when pressure was applied via plastic tubing. The air restriction became progressively less apparent after several applications of pressure and suction by the FAA Inspector.

## History of Flight

<b>Initial climb</b>	Fuel related Fuel starvation Loss of engine power (total) (Defining event)
<b>Landing</b>	Off-field or emergency landing Collision with terr/obj (non-CFIT)

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	29, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without Waivers/Limitations	<b>Last Medical Exam:</b>	10/21/2011
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	09/07/2011
<b>Flight Time:</b>	325 hours (Total, all aircraft), 194 hours (Total, this make and model), 197 hours (Pilot In Command, all aircraft), 15 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	CESSNA	<b>Registration:</b>	N8033B
<b>Model/Series:</b>	172	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	29833
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	09/21/2012, Annual	<b>Certified Max Gross Wt.:</b>	2200 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	4488 Hours	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	C91A installed, not activated	<b>Engine Model/Series:</b>	O-300-A
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	145 hp
<b>Operator:</b>	On file	<b>Air Carrier Operating Certificate:</b>	None

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	VOK, 912 ft msl	Observation Time:	1155 CDT
Distance from Accident Site:	16 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	357°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Few / 4300 ft agl	Temperature/Dew Point:	-1° C / -11° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	18 knots/ 23 knots, 270°	Visibility (RVR):	
Altimeter Setting:	30.14 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Park Falls, WI (PKF)	Type of Flight Plan Filed:	None
Destination:	St Jacob, IL (3K6)	Type of Clearance:	None
Departure Time:	1030 CDT	Type of Airspace:	Class G

## Airport Information

Airport:	Three Castles Airpark (4D1)	Runway Surface Type:	Grass/turf
Airport Elevation:	921 ft	Runway Surface Condition:	Snow; Wet
Runway Used:	28	IFR Approach:	None
Runway Length/Width:	2740 ft / 90 ft	VFR Approach/Landing:	Forced Landing

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None		

## Administrative Information

Investigator In Charge (IIC):	Andrew T Fox	Adopted Date:	01/30/2014
Additional Participating Persons:	Timothy H Anderson; Federal Aviation Administration - Milwaukee FSDO; Milwaukee, WI		
Publish Date:	01/30/2014		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=86558">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=86558</a>		

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