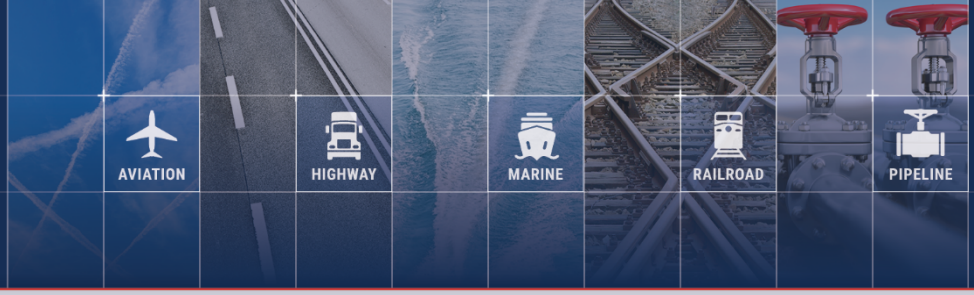

Aviation Investigation Final Report

Location:	Phillipsburg, Kansas	**Accident Number:**	DEN08LA041
Date & Time:	December 15, 2007, 22:50 Local	**Registration:**	N63LH
Aircraft:	Mooney M20C	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was in cruise flight in VFR conditions at 8,500 feet msl when there was a "sudden loss of engine rpm." Vectors were given to the nearest airport approximately 8 miles away. Unable to glide to the airport, the pilot attempted to land in a snow-covered field using what little moonlight there was available. The airplane collided with trees and terrain and caught fire. Post-accident examination revealed no engine anomalies. Disassembly of the carburetor revealed a brown gooey substance in the inlet fuel screen and float valve, restricting movement of the latter. FTIR analysis of the substance by NTSB's materials laboratory revealed it to be "most likely an inorganic compound." EDS analysis of the various samples revealed high peaks of carbon, while other samples had high peaks of sulfur, and still others high peaks of calcium silicon. The laboratory report noted that when aviation gasoline evaporates, various additives, such as anti-knock compounds, dyes, inhibitors and anti-icing compounds, remain in the form of a gum.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Total loss of engine power due to contamination of the carburetor, total blockage of the fuel inlet screen, and partial blockage of the fuel lines and fittings. Contributing to the accident were the dark night light conditions and the trees.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: CRUISE - NORMAL

Findings
1. (C) FUEL SYSTEM,CARBURETOR - CONTAMINATION
2. (C) FUEL SYSTEM,FILTER - BLOCKED(TOTAL)
3. (C) FUEL SYSTEM,LINE - BLOCKED(PARTIAL)

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. (F) LIGHT CONDITION - DARK NIGHT
5. (F) OBJECT - TREE(S)

Factual Information

On December 15, 2007, approximately 2250 central standard time, a Mooney M20C, N63LH, piloted by a commercial pilot, was destroyed when it collide with trees and terrain during a forced landing after the engine lost power 1 mile west of the Phillipsburg Airport (PHG), Phillipsburg, Kansas. Dark night visual meteorological conditions (VMC) prevailed at the time of the accident. The personal flight was being conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 without a flight plan. The pilot sustained serious injury and the pilot-rated passenger sustained minor injury. The cross-country flight originated at Potsdam (PTD), New York, was en route to Las Vegas (LVS), New Mexico, and eventually to Mesa, Arizona, with en route stops at Rock Rapids (RRQ), Iowa, and York (JYR), Nebraska.

The following is based on a telephone interview with the pilot-rated passenger and a written statement he later submitted. He was a recently-certificated private pilot and his flight instructor was the pilot of N63LH. The pilot-rated passenger was on board the airplane "for the purpose of acquiring additional flight time and experience." An IFR flight plan was filed to RRQ, where the airplane was refueled. No flight plan was filed for the flight to JYR which was under VMC. The two pilots had dinner there, but did not refuel the airplane. They planned on spending the night in LVS before continuing on to Arizona. They departed JYR under VMC approximately 2100. The pilot was in the right seat and "was giving [the pilot-rated passenger] flight instruction." Approximately 2250, while the airplane was in cruise flight in VFR conditions at 8,500 feet msl, there was a "sudden loss of engine rpm." Vectors were given to the nearest airport, Phillipsburg, approximately 8 miles away. At first, they thought they would be able to glide to the airport but soon realized they were too low. The pilot attempted to land in a snow-covered field using what little moonlight there was available. The airplane collided with trees and impacted terrain approximately 2250. A post-accident fire ensued. Both pilots exited the airplane. Police arrived about 2315 and the pilots were evacuated around 2325. The pilot later submitted NTSB Form 6120.1/2, Pilot/Operator Aircraft Accident Report. In it, he said he did not know how "any other foreign substance could have gotten into the carburetor." His report corroborated what the pilot-rated passenger had reported.

On January 8, 2008, the airplane was examined and the engine was disassembled at the facilities of Beegles Aircraft in Greeley, Colorado. One propeller blade was bent aft; the other blade was straight. The crankshaft was rotated and drive train continuity was noted throughout. The carburetor, a Marvel Schbler MA-4-5 (s/n K-30-6821), was disassembled and examined. A brown gooey substance was found on the inlet fuel screen and float valve, restricting its movement.

The carburetor float, needle valve, fuel inlet screen, inlet fitting, fuel line, and fuel flow transducer were sent to NTSB's Materials Laboratory for analysis. Most of the components contained the sticky tar-like substance with "a distinct aromatic odor." This substance blocked

90 per cent of the fuel inlet screen. One end of the flex fuel line was 50 per cent blocked; the other end was 30 per cent blocked. Fourier Transform Infra Red Analysis (FTIR) of the substance revealed it to be most likely an inorganic compound. The substance was analyzed by an Energy Dispersive Spectrometer (EDS). some samples had high peaks of carbon, while others had high peaks of sulfur, and still others had high peaks of calcium and silicon.

The report concluded (in part): "Aviation gasoline contains additives such as anti-knock compounds, dyes, oxidation inhibitors, and anti-icing compounds. When the fuel i s evaporated the additives remain in the form of a gum. All grades of aviation gasoline are allowed to contain a maximum of 6 milligrams of gum per 100 milliliters (approximately 0.075 ounces per gallon)."

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	20,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	September 1, 2005
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 1, 2006
Flight Time:	4000 hours (Total, all aircraft), 365 hours (Total, this make and model), 3920 hours (Pilot In Command, all aircraft), 195 hours (Last 90 days, all aircraft), 71 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	20,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 1, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 1, 2007
Flight Time:	98 hours (Total, all aircraft), 7 hours (Total, this make and model), 66 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N63LH
Model/Series:	M20C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:		**Serial Number:**	
Landing Gear Type:		**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	O-360-A1D
Registered Owner:	North Counrtry Flight LLC	**Rated Power:**	180 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	MCK,1887 ft msl	**Distance from Accident Site:**	85 Nautical Miles
Observation Time:	22:53 Local	**Direction from Accident Site:**	285°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	-13°C / -17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	York, NE (JYR)	**Type of Flight Plan Filed:**	None
Destination:	Las Vegas, NM (LVS)	**Type of Clearance:**	None
Departure Time:	21:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Phillipsburg Municipal PHG	**Runway Surface Type:**	
Airport Elevation:	1907 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	Unknown
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Minor	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 Minor	**Latitude, Longitude:**	39.737499,-99.317497

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	Gary Watson; Wichita, Kansas
Original Publish Date:	December 24, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=67281