Aviation Investigation Final Report

Location:	Phoenix, Arizona	**Accident Number:**	WPR15LA209
Date & Time:	July 10, 2015, 09:00 Local	**Registration:**	N9152V
Aircraft:	Mooney M 20G	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The private pilot receiving instruction reported that, abeam the runway threshold on the downwind leg of the traffic pattern, he reduced engine power to idle to conduct a practice 180^{o} power-off landing. The pilot maintained glide speed until about 40 ft above the ground then noticed that the airplane was slightly below the intended glide path. The pilot applied throttle to initiate a go-around; however, the engine sputtered and power did not increase. The pilot executed a forced landing short of the runway; the airplane touched down hard and bounced. The right main and nose landing gear collapsed, and the airplane came to rest to the right of the runway. The flight instructor reported that, upon the pilot's decision to conduct a go-around, he ensured that the throttle, propeller, and mixture were in the correct position, but made no reference to carburetor heat.

During a postaccident examination, the engine was started, operated, and shut down normally with no anomalies noted. Data from the engine monitoring system revealed that, shortly before the engine lost power, it was operating at idle power for about 1 1/2 minutes, during which the cylinder exhaust gas temperatures were decreasing. At the end of the 1 1/2 minutes, in the engine rpm increased and the the exhaust gas temperatures showed a small spike, then continued to decrease. The rpm then decreased to zero, and the manifold pressure adjusted to barometric pressure, consistent with a total loss of power.

The reported temperature and dew point at the time of the accident were conducive to carburetor icing at glide and cruise power settings. It is likely that the carburetor collected ice during the time the engine was at idle power. When the pilot increased power, the engine responded momentarily, but was unable to continue operation with the restricted airflow through the carburetor. The airplane's pilot operating handbook stated that full carburetor heat should be applied when reducing power for descent or landing.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilots' failure to apply carburetor heat during the approach for landing, which resulted in a total loss of engine power due to carburetor icing.

Findings

Aircraft	Intake anti-ice, deice - Not used/operated
Personnel issues	Identification/recognition - Pilot
Personnel issues	Identification/recognition - Instructor/check pilot
Environmental issues	Conducive to carburetor icing - Effect on operation

Factual Information

History of Flight

Landing	Fuel related (Defining event)
Landing	Landing area undershoot
Landing	Hard landing
Landing	Landing gear collapse

On July 10, 2015, about 0900 mountain standard time, a Mooney M20G, N9152V, experienced a partial loss of engine power while on short final to the Phoenix Deer Valley Airport (DVT), Phoenix, Arizona, and subsequently landed short of the runway. The private pilot undergoing instruction and the certified flight instructor (CFI) sustained no injuries; the airplane sustained substantial damage to the right wing. The airplane is registered to a private individual and operated by the private pilot under the provisions of 14 *Code of Federal Regulations* Part 91 as an instructional flight. Visual meteorological conditions prevailed and no flight plan was filed.

The private pilot undergoing instruction reported that when they passed the approach end of the runway on the downwind leg of the traffic pattern, he reduced power to idle to conduct a practice 180^{o} power off landing. The pilot maintained glide speed until about 40 feet above the ground when the pilot observed the airplane was slightly below the intended glide path. The pilot increased power to initiate a go around, however, the engine sputtered and did not increase RPM. The pilot executed a forced landing short of the runway surface; the airplane touched down hard and bounced. When it settled back onto the ground, the right main landing gear and nose landing gear collapsed and the airplane came to rest to the right of the runway surface.

The CFI reported that when the private pilot decided to conduct a go around, he looked at the throttle quadrant to confirm that the throttle was full forward and the propeller and mixture levers were also positioned correctly.

A postaccident engine run was conducted by a mechanic and inspectors from the Federal Aviation Administration (FAA). The spark plugs were removed and examined; they displayed signatures consistent with a rich running engine. The spark plugs were reinstalled and an undamaged propeller was installed. The engine started without hesitation; after idling temporarily, the RPM was increased and a magneto check was completed with no abnormalities noted. The power was decreased to idle for two minutes to simulate a 180^{o} power off landing. The throttle was abruptly increased to full power; it hesitated for a split second and went to full RPM for a couple minutes. This sequence was conducted twice with no anomalies noted. The engine was shutdown uneventfully.

The engine data monitor download showed that shortly before the engine lost power, the engine was at idle for about 1.5 minutes; during which, the cylinder exhaust gas temperatures were decreasing. At the end of the 1.5 minutes, there was an increase in RPM and subsequent small spike in the exhaust gas

temperatures before they continued to decrease. In addition, the RPMs continued to zero, and the manifold pressure adjusted to barometric pressure.

At the time of the accident, the reported temperature was 29° C and the dew point was 7° C. According to the FAA carburetor icing Special Airworthiness Information Bulletin, the condition was conducive to carburetor icing at glide and cruise power settings.

Pilot Information

Certificate:	Private	**Age:**	18,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	June 29, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 25, 2015
Flight Time:	253 hours (Total, all aircraft), 140 hours (Total, this make and model), 150 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	67,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
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 3 With waivers/limitations	**Last FAA Medical Exam:**	February 10, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 15, 2013
Flight Time:	1 hours (Total, all aircraft), 1 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N9152V
Model/Series:	M 20G	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	690012
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 27, 2015 Annual	**Certified Max Gross Wt.:**	2449 lbs
Time Since Last Inspection:	60 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2993 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	O&VO-360 SER
Registered Owner:	On file	**Rated Power:**	180 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:	DVT,1478 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	29°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Phoenix, AZ (DVT)	**Type of Flight Plan Filed:**	None
Destination:	Phoenix, AZ (DVT)	**Type of Clearance:**	None
Departure Time:	08:00 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	Phoenix Deer Valley Airport DVT	**Runway Surface Type:**	Asphalt
Airport Elevation:	1478 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	7L	**IFR Approach:**	None
Runway Length/Width:	4500 ft / 75 ft	**VFR Approach/Landing:**	Go around;Simulated forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	33.686389,-112.07611(est)

Administrative Information

Investigator In Charge (IIC):	Link, Samantha
Additional Participating Persons:	Dane L Guynn; Federal Aviation Administration; Scottsdale, AZ
Original Publish Date:	January 25, 2018
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=91537