SAFETY GRAM 4.0

SEPTEMBER 2017

SAFETY GRAM

September 2017

Case:

Carburetor Icing! It's real…….it can sneak up on you. Attached are two NTSB reports. One report is actually from one of our aero clubs. We've been fortunate, as aero clubs, to have minimal exposure to this ongoing issue that continues to plague the general aviation community. Overall, recovery procedures are quite simple. The difficulty is recognizing the problem, confirming it and properly recovering from it. Please take this month to discuss carb icing with your aero clubs members. Keep flying safe team!

Questions (No right or wrong):

- What is carburetor icing?

- How can I recognize it?

- Are there ways to confirm it?

- How do I properly recover from it?

- Should I share my experience with anyone?

- Does it happen in IFR or VFR conditions?

- Review FAA Special Airworthiness Info Bulletin (SAIB) CE-09-35

Discussion:

Discuss proper recovery procedures with club members

FLY SAFE!

Maj Derrick L. Hodges Jr., Director of Operations & Safety, USAF Aero Clubs
derrick.hodges.1@us.af.mil; DSN 969-7232, (210) 395-7232

National Transportation Safety Board
Aviation Accident Final Report

Location:	CRESTVIEW, FL	**Accident Number:**	ATL96LA122
Date & Time:	08/20/1996, 1235 CDT	**Registration:**	N1198D
Aircraft:	American AA5	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The flight instructor stated that he had given the student a simulated engine-out emergency. The student completed the emergency procedure, and had initiated a climb from the low approach when the engine failed to develop power. A 1700-foot long airstrip was selected for the emergency landing. The airplane went off the departure end of the west runway and collided with the ground. During the postaccident examination, the engine was functionally checked. The engine started and operated normally without difficulty. No mechanical problems were noted during the wreckage examination. The review of weather date disclosed that conditions were favorable for the formation of carburetor ice. The flight instructor reported using the carburetor heat. During a subsequent conversation, he stated that the engine was not cleared for more than 2 minutes during the descent for the simulated emergency.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's improper operation of the powerplant controls.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CLIMB

Findings
1. WEATHER CONDITION - CARBURETOR ICING CONDITIONS
2. (C) POWERPLANT CONTROLS - IMPROPER USE OF - PILOT IN COMMAND

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

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Factual Information

On August 20, 1996, at 1235 central daylight time, an American AA5, N1198D, collided with the ground during an attempted emergency landing to a grass airstrip three miles east of Crestview, Florida. The instructional flight operated under the provisions of Title 14 CFR Part 91 with a local flight plan filed through Eglin Air Force Base (AFB) flight operations. Visual weather conditions prevailed at the time of the accident. The airplane was substantially damaged; the flight instructor received minor injuries, and the dual student received serious injuries. The flight departed Eglin AFB, Florida, at 1145.

According to an official from the Eglin AFB Aero Club, the dual student was receiving familiarization training in the AA5 when the accident occurred. The flight instructor stated that he had given the dual student a simulated engine out emergency. The dual student had completed the emergency procedure, and had initiated a climb from the low approach when the engine failed to develop power. A 1700 foot long airstrip was selected for the emergency landing. The airplane went off the departure end of the west runway, and collided with the ground.

During the post-accident examination of the airplane, the engine was functionally check. The engine started and operated normally without difficulty. No mechanical problems were noted during the wreckage examination. The review of weather data disclosed that conditions were favorable for the formation of carburetor ice. The flight instructor initially reported that carburetor heat was used during the flight. But, during a subsequent conversation with a FAA inspector, he stated that the engine was not cleared for more than two minutes during the simulated engine out and emergency descent (see attached FAA inspector's statement)

Pilot Information

Certificate:	Airline Transport	**Age:**	41, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last Medical Exam:**	02/07/1996
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	4383 hours (Total, all aircraft), 64 hours (Total, this make and model), 3778 hours (Pilot In Command, all aircraft), 32 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	American	**Registration:**	N1198D
Model/Series:	AA5 AA5	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	10156
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	100 Hour	**Certified Max Gross Wt.:**	2400 lbs
Time Since Last Inspection:	20 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	1275 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-360-A4K
Registered Owner:	EGLIN AFB AERO CLUB	**Rated Power:**	180 hp
Operator:	EGLIN AFB AERO CLUB	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	KCE, 214 ft msl	**Observation Time:**	1154 CDT
Distance from Accident Site:	4 Nautical Miles	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Scattered / 2500 ft agl	**Temperature/Dew Point:**	30°C / 22°C
Lowest Ceiling:	Broken / 25000 ft agl	**Visibility**	7 Miles
Wind Speed/Gusts, Direction:	10 knots, 100°	**Visibility (RVR):**	0 ft
Altimeter Setting:	30 inches Hg	**Visibility (RVV):**	0 Miles
Precipitation and Obscuration:			
Departure Point:	EGLIN AFB, FL (KVPS)	**Type of Flight Plan Filed:**	VFR
Destination:		**Type of Clearance:**	None
Departure Time:	1145 CDT	**Type of Airspace:**	Class G

Airport Information

Airport:	SWEENEY (NONE)	**Runway Surface Type:**	Grass/turf
Airport Elevation:	214 ft	**Runway Surface Condition:**	Dry
Runway Used:	9	**IFR Approach:**	None
Runway Length/Width:	1800 ft / 200 ft	**VFR Approach/Landing:**	Simulated Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Serious, 1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 Minor	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	PHILLIP POWELL	**Adopted Date:**	05/02/1997
Additional Participating Persons:	BILL ELLIOTT; BIRMINGHAM, AL		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

National Transportation Safety Board
Aviation Accident Final Report

Location:	Watertown, WI	**Accident Number:**	CEN15LA333
Date & Time:	08/01/2015, 1745 CDT	**Registration:**	N1685R
Aircraft:	CESSNA 182	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The private pilot was planning to conduct some practice takeoffs and landings. The pilot reported that he conducted a normal preflight and that the airplane had about 75 gallons of fuel on board. Shortly after takeoff and while on the base leg to the runway, the engine lost power. The pilot pushed the throttle, mixture, and prop levers full forward and then turned the auxiliary fuel pump on, but the engine did not respond. The airplane subsequently impacted trees near a residence and then came to rest on its right side.

On-scene examination revealed that the left wing's fuel bladder tank appeared intact but that it was absent of fuel and that the right wing's bladder tank was torn and contained about 2 gallons of fuel. However, the examination was unable to determine the quantity of fuel that may have leaked out after the fuel system was compromised during the accident. An engine test run was conducted, and the engine started and ran with no abnormalities noted. A review of the carburetor icing probability chart indicated that the airplane was operating in weather conditions associated with a serious risk of carburetor ice accumulation at glide power settings. The pilot was on the base leg of the traffic pattern, and he likely reduced engine power to a glide power setting because he was approaching the runway for landing.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total loss of engine power due to carburetor icing.

Findings

Environmental issues	Conducive to carburetor icing - Effect on equipment (Cause)

Factual Information

On August 1, 2015, about 1745 central daylight time, a Cessna 182 airplane, N1685R lost engine power while in the traffic pattern at the Watertown Municipal Airport (KRYV), Watertown, Wisconsin. The airplane impacted trees and was substantially damaged. The private rated pilot was seriously injured. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed at the time and no flight plan was filed for the local flight.

The pilot reported that he planned on doing some practice pattern work, including some touch-and-goes landings in preparation for a flight review. He added that the preflight and taxi were uneventful, and then he departed. While on the base leg, the engine lost power; he advanced the throttle, mixture, and prop levers full forward, and then turned the auxiliary fuel pump on. The engine did not respond, he was unable to locate an open area for an emergency landing, so he decided to aim for nearby trees to arrest his descent. The pilot reported that the airplane had about 75 gallons of fuel on board.

The responding Federal Aviation Administration (FAA) inspectors reported that the airplane came to rest on its right side near a residence. The empennage separated from the fuselage, with heavy damage to the right wing and fuselage. The left wing's fuel bladder appeared intact but absence any fuel, the right wing's bladder tank was torn, and contained about two gallons of fuel. The inspector wasn't able to determine the quantity of fuel that may have leaked out after the fuel system was compromised during the accident. The airplane was recovered, and an engine test run was performed. An external fuel source was connected to the airplane; the engine was then started and run. No abnormalities were noted.

At 1755, the automated weather observation facility located at KRYV recorded a temperature of 82 degrees Fahrenheit (F), dew point 60 F.

The carburetor icing probability chart included in Federal Aviation Administration Special Airworthiness Information Bulletin No. CE-09-35, Carburetor Icing Prevention, indicated that the airplane was operating in an area that was associated with a serious risk of carburetor ice accumulation at glide power settings.

History of Flight

Approach-VFR pattern downwind	Loss of engine power (total) (Defining event)
Approach-VFR pattern base	Other weather encounter Fuel related

Pilot Information

Certificate:	Private	**Age:**	82
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With Waivers/Limitations	**Last Medical Exam:**	08/13/2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1976 hours (Total, all aircraft), 1561 hours (Total, this make and model), 1734 hours (Pilot In Command, all aircraft), 3 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	**Registration:**	N1685R
Model/Series:	182	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	R18200514
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	10/09/2014, Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4545.2 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-540
Registered Owner:	On file	**Rated Power:**	235 hp
Operator:	On file	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	KRYV	**Observation Time:**	1755 CDT
Distance from Accident Site:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	28°C / 16°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	6 knots, 280°	**Visibility (RVR):**	
Altimeter Setting:	29.88 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Watertown, WI (KRYV)	**Type of Flight Plan Filed:**	None
Destination:	Watertown, WI (KRYV)	**Type of Clearance:**	None
Departure Time:	1740 CDT	**Type of Airspace:**	

Airport Information

Airport:	Watertown Municipal (KRYV)	**Runway Surface Type:**	
Airport Elevation:	833 ft	**Runway Surface Condition:**	Vegetation
Runway Used:	N/A	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	43.165833, -88.719444 (est)

Administrative Information

Investigator In Charge (IIC):	Craig Hatch	**Adopted Date:**	02/17/2016
Additional Participating Persons:	Dan Oskar; FAA FSDO; Milwaukee, WI		
Publish Date:	02/17/2016		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=91694		

FAA
Aircraft Certification Service

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SAIB: CE-09-35
SUBJ: Carburetor Icing Prevention **Date:** 06/30/2009

This is information only. Recommendations aren't mandatory.

Introduction

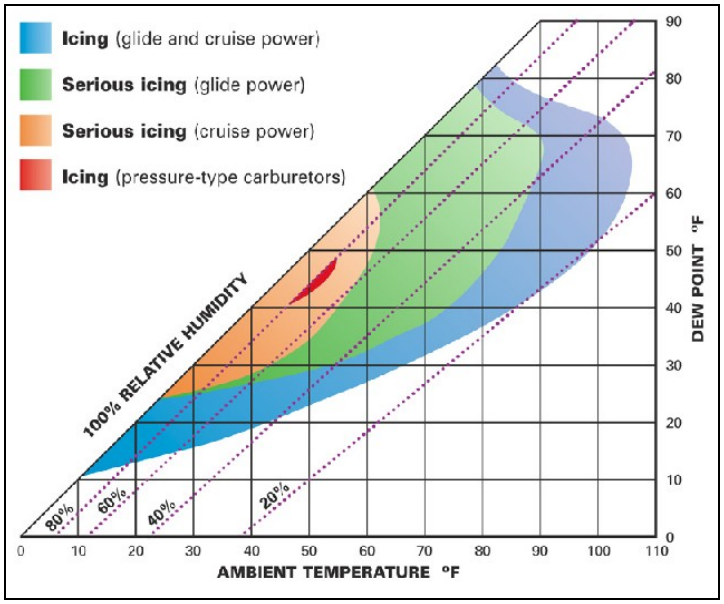
This Special Airworthiness Information Bulletin is written to inform pilots of the potential hazards associated with carburetor icing.

At this time, this airworthiness concern is not considered an unsafe condition that would warrant an airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR part 39).

Background

There were 212 accidents attributed to carburetor icing between 1998 and 2007. Of these accidents, 13 resulted in fatalities. The certification requirements for carbureted airplanes require that a heated source of air be provided as mitigation for carburetor icing. The FAA and the Aircraft Owners and Pilots Association (AOPA) have addressed the subject of carburetor icing several times in various forms. Despite the certification requirements, and the information provided by the FAA and AOPA, the accident trend has remained fairly steady throughout the years.

Pilots should be aware that carburetor icing doesn't just occur in freezing conditions, it can occur at temperatures well above freezing temperatures when there is visible moisture or high humidity. Icing can occur in the carburetor at temperatures above freezing because vaporization of fuel, combined with the expansion of air as it flows through the carburetor, (Venturi Effect) causes sudden cooling, sometimes by a significant amount within a fraction of a second. Carburetor ice can be detected by a drop in rpm in fixed pitch propeller airplanes and a drop in manifold pressure in constant speed propeller airplanes. In both types, usually there will be a roughness in engine operation. The graph below shows the probability of carburetor icing for various temperature and relative humidity conditions:



Recommendations

There are some steps a pilot can take to prevent, recognize, and respond to carburetor icing.

To prevent carburetor icing, the pilot should:

- Assure the proper functionality of the carburetor heat during the ground (Before Takeoff) check.
- Use carburetor heat on approach and descent when operating at low power settings, or in conditions where carburetor icing is probable.

To recognize carburetor icing, the warning signs are:

- A drop in rpm in fixed pitch propeller airplanes.
- A drop in manifold pressure in constant speed propeller airplanes.
- In both types, usually there will be a roughness in engine operation.

The pilot should respond to carburetor icing by applying full carburetor heat immediately. The engine may run rough initially for short time while ice melts.

The above recommendations are general suggestions. The pilot should consult the AFM or the pilot's operating handbook for the proper use of carburetor heat.

Included below are some references, and their associated links, for more information:

- AC 20-113, Pilot Precautions and Procedures to be taken in Preventing Aircraft Reciprocating Engine Induction System and Fuel System Icing Problems
  http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/F5BD7904E845409D862569AE00783347?OpenDocument&Highlight=carburetor%20icing

- AC 91-51A, Effect of Icing on Aircraft Control and Airplane Deice and Anti-Ice Systems
  http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/451296DBDF212C81862569E70077C8F9?OpenDocument&Highlight=carburetor%20icing

- AOPA Safety Advisor – Aircraft Icing
  http://www.aopa.org/asf/publications/sa11.pdf

- AOPA Safety Advisor – Aircraft Deicing and Anti-icing Equipment http://www.aopa.org/asf/publications/sa22.pdf

For Further Information Contact

Peter L. Rouse, Aerospace Engineer, Small Airplane Directorate; phone: (816) 329-4135; fax: (816) 329-4090; e-mail: peter.rouse@faa.gov.