



# Newport News Composite Squadron

Jan 2012 Safety Briefing  
10 Jan 2012





# Overview

- COMBATING CARB ICE
- WINTER DRIVING TIPS
- GET AHEAD OF THE WINTER FREEZE
- COFFEE BREAK TRAINING
- GROUND VERSUS PROPELLER



# COMBATING CARB ICE

- The danger zone
- Flight conditions
- Diminishing returns-indications
- The remedy
- Preventive steps



# WINTER DRIVING TIPS

- AAA recommends the following driving tips
- Tips for long distance winter trips
- Tips for driving in the snow



# GET AHEAD OF THE WINTER FREEZE

- Furnace check
- Chimney and vent checks
- Used seasoned wood
- Proper fire place screen
- Use a covered metal container
- 3 feet rule for children
- **Space heater safety**
- Smoke alarm tested
- Carbon monoxide alarm



# COFFEE BREAK TRAINING

- Definition of stress
- Indicators of stress
- Resolution of stress
  - Environment and mind
  - Body



# GROUND VERSUS PROPELLER

- And the winner is!!!!



# Safety Beacon



Official Safety Newsletter Of The Civil Air Patrol

January 2012

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# SAFETY BRIEF

Number 9

## Combating Carb Ice

When we think about the dangers of icing, the first thing that comes to mind is usually airframe ice—but carburetor ice, its insidious and often forgotten cousin, can be just as deadly, having contributed to more than 200 accidents and 13 fatalities in less than a decade. As with most risks in flying, though, the keys to combating carb ice are simple: understanding the danger, recognizing the symptoms, and taking prompt action.



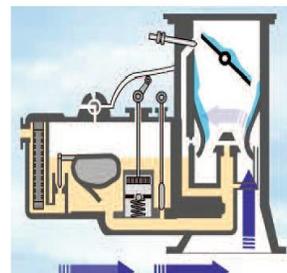
### The Problem

At a basic level, carburetor ice is a product of three inter-related factors:

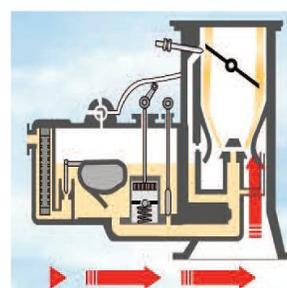
- 1) Air temperature
- 2) Relative humidity
- 3) Carburetor design

The carburetor's job is simple: It blends fuel and air together in the correct ratio before sending it to the engine in the proper quantity. To do this, it draws air through a narrow, curved passageway called a venturi. Much like air flowing over the curved upper surface of a wing, air moving through a venturi speeds up as its pressure decreases. When fuel is injected into this fast, low-pressure airstream, it vaporizes, and the resulting mixture of atomized fuel and air flows to the cylinders.

But there's a problem. The vaporization of the fuel and the pressure change induced by the venturi together cause the air passing through the carburetor to cool rapidly—in some cases, by as much as 70 degrees Fahrenheit. If this lowers the air temperature past the freezing point, and if the incoming air is moist (i.e., humid) enough, ice can begin to form on the inner surfaces of the carburetor. As the ice accumulates, it restricts the flow of the fuel/air mixture to the engine, leading to a reduction in power as the engine is essentially "starved." If the situation isn't remedied, the engine may lose power entirely.



Rapid cooling:  
Carb icing



Carb heat activated: Melting carb ice

### The “Danger Zone”

Although you may have heard that only a specific set of conditions lead to carb ice, the truth is that most of us fly inside the “danger zone” on a regular basis.

Carb ice can form over a wide range of outside air temperatures and relative humidities. While the word “icing” typically brings to mind blustery winds and frigid conditions, carb ice can form when outside temperatures are as high as 100 degrees Fahrenheit with 50 percent relative humidity. At the other end of the spectrum, the risk doesn’t go away until the humidity falls below roughly 25 percent and/or the outside air temperature drops well below freezing.

In other words, carb ice can form at pretty much **any time, in any phase of flight.**



On a mid-June morning in western North Carolina, a flight instructor and the owner of a Cessna 182 ventured out for a training flight. A weather station 13 nautical miles to the southeast reported visual meteorological conditions (VMC) with a temperature of 80°F and a dew point of 45°F. The relative humidity was 28 percent. Shortly after departure the engine lost power, and the pilot attempted to stretch a power-off glide to a nearby grass strip. The airplane impacted tree branches before it stalled, and subsequently impacted the runway environment. The NTSB determined one of the probable causes of the accident to be carb icing that led to a loss of engine power.

### Flight Conditions

Of course, just because carb ice *can* form over a wide range of temperatures doesn’t mean that it always *will*. In reality, certain situations are considerably riskier than others. Icing is most likely to occur—and to be severe—when temperatures fall roughly between 50 and 70 degrees F and the relative humidity is greater than 60 percent.

Likewise, certain flight conditions carry greater risks. As engine power is reduced, airflow is restricted and ambient heat is lessened. This makes low-power operations like descents considerably more prone to carb ice. Certain aircraft types are also more prone to ice than others. For example, the pilot’s operating handbook (POH) for many single-engine Cessnas calls for the pilot to apply carb heat whenever power is reduced below the green arc on the tachometer. Most Piper singles, however, aren’t subject to this restriction, even when equipped with similar engines and carburetors. Why? Because differences in airflow and engine heat due to cowling design and other factors affect the formation of carb ice. Still, **no aircraft with a carbureted engine is immune to carb ice.**

A flight instructor and student were in a Cessna 172 working on routine traffic patterns at their home airport. The student was performing the before-landing checklist when he became distracted and forgot to turn on the carb heat for descent. The instructor noted the error, but allowed the student to proceed without carb heat. After landing, the instructor took the controls and initiated a climb-out, at which point the engine noise changed and the airplane stopped accelerating. Only when the instructor applied full carb heat did the engine roar back to life.

### Diminishing Returns

Now that we know when carb ice can occur, it’s important to know and recognize the indications that point to *existing* carb ice.

The classic symptoms of carb ice are **reduced power** and a **rough-running engine**. In aircraft with fixed pitch propellers, the first indication is typically a small decrease in engine rpm. Although the engine may still be running smoothly at this point, as ice continues to accumulate the reduction in rpm will continue and the engine will begin to run rough. If the icing conditions are severe enough, and the pilot takes no remedial action, the engine will eventually fail.

The same applies to airplanes with constant-speed propellers, with one important exception: The manifold pressure gauge, rather than the tachometer, should be the focal point for early indications of carb ice. Precise power settings, a consistent instrument scan, and attentive ears can all alert you to the subtle changes in engine performance. You may also want to consider installing a carburetor air temperature gauge to assist in recognizing conditions conducive to icing.

### The Remedy

Although carb ice can form any time, under any number of different circumstances, the remedy is always the same: carb heat. Consult your airplane's POH or flight manual for specifics on using carb heat, but remember this general rule: **It's far better to use full carb heat too soon, than to wait until it's too late.**

When carb heat is applied, unfiltered air that's been heated by the exhaust manifold is routed into the carburetor, melting any ice that may have formed. As the ice melts, water is intermixed with the air/fuel mixture, causing the engine to run rough. Be patient: This increased engine roughness may last several seconds to a few minutes as the ice melts. Once the ice is clear and the engine is operating normally, be sure to turn off the carb heat to restore full power.

#### At the first indication of carb ice:

- 1) Full carb heat ON (partial application could cause additional carb icing)
- 2) Leave carb heat ON until normal engine power returns
- 3) Monitor engine power and re-apply carb heat as necessary

Remember, when carb heat is applied, the warmer air will inherently cause a reduction in engine power.

### Preventive Steps

During your preflight run-up, carb heat should be applied fully to ensure that it's functioning properly. As warm air is routed to the carburetor, you should see a small reduction in rpm on aircraft with fixed-pitch propellers, and a slight reduction in manifold pressure for those with constant-speed props. If no ice is present, the rpm or manifold pressure will remain constant. If ice exists, however, there will be a gradual increase in engine power as the water from the melting ice is purged from the system.

If much time elapses between the carb heat check and takeoff (especially in conditions conducive to carb icing), you may want to consider performing another check just prior to departure. Carb heat should not be left on while taxiing, however, because the unfiltered air could allow foreign debris to be introduced to the engine.

Preceding reduced power or closed throttle operations, full carb heat should be applied (unless the aircraft's POH states otherwise). The warm air will aid in the prevention of carb ice—as will an occasional application of throttle to clear the engine. Again, it's best to err on the side of caution when it comes to carb ice.

In extreme cases of in-flight ice, it may be necessary to continue operating with full carb heat to prevent further ice formation. In this case the mixture should be leaned to compensate for the warmer, less dense intake air, which can cause an excessively rich fuel/air mixture.

Wherever your flying takes you, always be aware of the "danger zone" of carb icing. Preflight prevention, alertness to early indications and a prompt, correct response to carb ice will keep you safely in the air—and out of the NTSB accident database.



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Publisher: Bruce Landsberg • Writers: Elizabeth Partie, Brian D. Peterson

SB09-10/09

## Winter Driving Tips



[www.AAAExchange.com](http://www.AAAExchange.com)

Severe weather can be both frightening and dangerous for automobile travel. Motorists should know the safety rules for dealing with winter road emergencies. AAA reminds motorists to be cautious while driving in adverse weather. For more information on winter driving, the association offers the *How to Go on Ice and Snow* brochure, available through most AAA offices. Contact your local [AAA representative](#) for more information.



### AAA recommends the following winter driving tips:

- Avoid driving while you're fatigued. Getting the proper amount of rest before taking on winter weather tasks reduces driving risks.
- Never warm up a vehicle in an enclosed area, such as a garage.
- Make certain your tires are properly inflated.
- Never mix radial tires with other tire types.
- Keep your gas tank at least half full to avoid gas line freeze-up.
- If possible, avoid using your parking brake in cold, rainy and snowy weather.
- Do not use cruise control when driving on any slippery surface (wet, ice, sand).
- Always look and steer where you want to go.
- Use your seat belt every time you get into your vehicle.

### Tips for long-distance winter trips:

- Watch weather reports prior to a long-distance drive or before driving in isolated areas. Delay trips when especially bad weather is expected. If you must leave, let others know your route, destination and estimated time of arrival.
- Always make sure your vehicle is in peak operating condition by having it inspected by a AAA Approved Auto Repair facility.
- Keep at least half a tank of gasoline in your vehicle at all times.
- Pack a cellular telephone with your local AAA's telephone number, plus blankets, gloves, hats, food, water and any needed medication in your vehicle.
- If you become snow-bound, stay with your vehicle. It provides temporary shelter and makes it easier for rescuers to locate you. Don't try to walk in a severe storm. It's easy to lose sight of your vehicle in blowing snow and become lost.
- Don't over exert yourself if you try to push or dig your vehicle out of the snow.
- Tie a brightly colored cloth to the antenna or place a cloth at the top of a rolled up window to signal distress. At night, keep the dome light on if possible. It only uses a small amount of electricity and will make it easier for rescuers to find you.
- Make sure the exhaust pipe isn't clogged with snow, ice or mud. A blocked exhaust could cause deadly carbon monoxide gas to leak into the passenger compartment with the engine running.
- Use whatever is available to insulate your body from the cold. This could include floor mats, newspapers or paper maps.
- If possible run the engine and heater just long enough to remove the chill and to conserve gasoline.

**Tips for driving in the snow:**

- Accelerate and decelerate slowly. Applying the gas slowly to accelerate is the best method for regaining traction and avoiding skids. Don't try to get moving in a hurry. And take time to slow down for a stoplight. Remember: It takes longer to slow down on icy roads.
- Drive slowly. Everything takes longer on snow-covered roads. Accelerating, stopping, turning - nothing happens as quickly as on dry pavement. Give yourself time to maneuver by driving slowly.
- The normal dry pavement following distance of three to four seconds should be increased to eight to ten seconds. This increased margin of safety will provide the longer distance needed if you have to stop.
- Know your brakes. Whether you have antilock brakes or not, the best way to stop is threshold breaking. Keep the heel of your foot on the floor and use the ball of your foot to apply firm, steady pressure on the brake pedal.
- Don't stop if you can avoid it. There's a big difference in the amount of inertia it takes to start moving from a full stop versus how much it takes to get moving while still rolling. If you can slow down enough to keep rolling until a traffic light changes, do it.
- Don't power up hills. Applying extra gas on snow-covered roads just starts your wheels spinning. Try to get a little inertia going before you reach the hill and let that inertia carry you to the top. As you reach the crest of the hill, reduce your speed and proceed down hill as slowly as possible.
- Don't stop going up a hill. There's nothing worse than trying to get moving up a hill on

# 10 Tips Get Ahead of the Winter Freeze

It's not too early to begin preparing for the heating season. Check these 10 tips off your list and get ahead of the winter freeze.

- Our **furnace has been inspected and serviced** by a qualified professional during the last 12 months. *(A furnace should be serviced at least once a year.)*
- Our **chimneys and vents have been cleaned and inspected** by a qualified professional. I have checked for creosote build-up. *(Not cleaning your chimney is the leading cause of chimney fires from built up creosote. This service needs to be done at least once a year.)*
- Our wood for our fireplace or wood stove is **dry, seasoned wood**.
- Our **fireplace screen is metal or heat-tempered glass**, in good condition and secure in its position in front of the fireplace.
- We have a **covered metal container** ready to use to dispose cooled ashes. *(The ash container should be kept at least 10 feet from the home and any nearby buildings.)*
- Our children know to stay at least **3 feet away** from the fireplace, wood/pellet stove, oil stove or other space heaters.
- Our portable space heaters have an **automatic shut-off**.
- Our portable space heaters will be **plugged directly into an outlet** *(not an extension cord)* and placed at least three feet from anything that can burn; like bedding, paper, walls, and even people. *(Place notes throughout your home to remind you to turn-off portable heaters when you leave a room or go to bed.)*
- We have **tested our smoke alarms** and made sure they are working. *(You need a smoke alarm on every level of the home, inside each bedroom and outside each sleeping area. For the best protection, the smoke alarms should be interconnected so when one sounds, they all sound.)*
- We have **tested our carbon monoxide alarms** and made sure they are working. *(Carbon monoxide alarms should be located outside each sleeping area and on every level of the home.)*



Your Source for SAFETY Information

NFPA Public Education Division • 1 Batterymarch Park, Quincy, MA 02169

[www.nfpa.org/education](http://www.nfpa.org/education)



## Coffee Break Training - Management Science Program

### Stress—the Silent Killer

No. MS-2011-9 November 23, 2011

**Learning Objective:** The student shall be able to recognize and have an understanding of the signs and symptoms of stress and their coping mechanisms.

Signs and symptoms of stress are screaming at us, but are we listening?

**Definition of stress:** A physical or emotional element that causes bodily or mental tension and may be a factor in disease causation.

Do you think you're stressed? What about your coworkers? Your answer is probably, "Not me. Other people are, but I can deal with my stress."

We consider ourselves invincible and strong. Officers watch out for their crews, but who is looking out for them? As emergency service personnel we need to take a hard, honest look at ourselves and see if we have any of these signs and symptoms of stress:

- general irritability or depression;
- impulsive behavior or emotional instability;
- insomnia and restlessness; and
- drug and alcohol abuse.

If you have any of these signs and symptoms, there are many control techniques that you can try to help you resolve or cope with your stress:

- environment and mind:
  - reduce external sources of stress,
  - talk about your issues by finding a confidant,
  - have a positive attitude and find your "happy place"; and
- body:
  - exercise,
  - rest, and
  - proper diet.

Studies show that in the emergency services, heart attack, cancer, and stroke are the most common causes of death. Can the root of these illnesses be caused by stress and is stress our number one killer?



High levels of stress may result in depression, restlessness, or even substance abuse.



## Local Civil Air Patrol propels young members to greater purpose

By ANDREA MARILYN GARCIA  
For the Pocono Record  
December 05, 2011 12:00 AM

Mount Pocono Composite Squadron 207 is the local chapter of the Civil Air Patrol, a volunteer civilian auxiliary of the U.S. Air Force that celebrated its 70th anniversary on Dec. 1.

Squadron Commander Frank Shinn has been the acting commander for three years. His interest was sparked with the military and becoming a pilot at a young age.

"I read a newspaper article about CAP," said Shinn, who is 35 and works at Tobyhanna Army Depot as an electronics mechanic.

CAP takes volunteer boys and girls as young as 12. Older members are made up of senior citizens, retired executives or recent college graduates.

Because of Shinn's work with CAP, he went straight into the Navy after high school, which brought him around the world to the Persian Gulf, Mediterranean and Caribbean.

"I don't know what I would have done without this organization," he said. "It was a priceless opportunity for me."

Mount Pocono Squadron 207 has 30 cadets and 12 adults — a number above average for a CAP squad. It is the second-most popular in northeastern Pennsylvania.

Cadets learn to fly single-propeller Cessna 172 and 182 aircraft.

## Honors sought for earliest CAP members

Civilian pilots defended U.S. shores

By Dan Namowitz

As observances began for the Civil Air Patrol's seventieth anniversary, a bid to honor its earliest members who flew as civilian defenders of the nation's coastlines during World War II was making its way through Congress.

After being awarded, the gold medal would be given to the Smithsonian Institution for display.

"On Dec. 1, Civil Air Patrol, the official auxiliary of the U.S. Air Force, observes 70 years of vigilant service. But the celebration won't be complete until CAP's earliest members--now in their eighties and nineties--are 'rightly honored' with the Congressional Gold Medal," said a CAP announcement on the status of the effort on Nov. 28.

The pilots, flying missions for the Coastal Patrol, as it was then named, at the request of the Office of Civilian Defense were credited with helping to stop U-boat attacks on supply ships outbound from U.S. ports.

In all, 90 CAP planes were forced to ditch at sea. Of 59 CAP pilots killed during World War II, 26 "were lost while on Coastal Patrol duty and seven others were seriously injured while carrying out the missions," the CAP said. "Their wartime service was highly unusual because they were civilian volunteers flying combat missions in their own aircraft at a time when the military could not adequately respond to the U-boat threat."

CAP's national commander, Major General Chuck Carr, considers the pilots "unsung heroes" of World War II.

"They provided selfless service, without fanfare, in defense of their homeland," he said.

Three profiles offered by CAP capture the spirit of the pilots for whom the award would be dedicated. Charles Compton, now 94, was in his twenties when he left two jobs to join the flight staff of Coastal Patrol Base 1 in Atlantic City, N.J. He sought out subs and escorted convoys along the east coast.

World War I pilot Wylie Apte Sr. returned to the skies and searched for enemy subs off the Maine, New Hampshire, and Massachusetts coasts in his own Waco YKS-7 biplane. He died in 1970.

Joseph W. Leonard joined CAP literally on Day One, and remained a member until his death in March 2011. He flew from Coastal Patrol Base 2 at Rehoboth Beach, Del. In a personal journal entry he related how, while surfing on a day off, he had to dodge a German torpedo.

Today, with only a few hundred of the roughly 60,000 pilots of the era still living, Carr stressed the importance of winning recognition for the group's heroism. CAP is urging members to contact their House members and senators to urge support for the bills. CAP also asks that anyone with information about CAP members who served the organization during World War II to add the information to this [database](#).

The nonprofit CAP remains the official auxiliary of the Air Force, with

more than 61,000 members. CAP performs 90 percent of continental U.S. inland search-and-rescue missions. In fiscal 2011, CAP was credited by the Air Force Rescue Coordination Center with saving 54 lives, the organization said. CAP members also play a leading role in aerospace education, and serve as mentors to nearly 27,000 young people in CAP cadet programs.

In June, the CAP was awarded a [World Peace Prize](#) by the World Peace Corps Mission in a ceremony in Washington, D.C.





“Ground vs. Propeller ... and the Winner is?”

## The Official Safety Newsletter of the Civil Air Patrol - January 2012

VISIT US ON THE WEB  
[WWW.COCIVILAIRPATROL.COM](http://WWW.COCIVILAIRPATROL.COM)

Discover, report, stop, share, listen, and learn. The things we have read about in this issue already have happened, so you are not allowed to experience these for yourself.

Remember to "Knock It Off" and slow down. For streaming dialogues on some subjects, remember CAP Safety is on Facebook and Twitter.

### SUMMARY

CAP's safety awareness and program management has significantly improved with the addition of NHQ safety staff working in conjunction with the National Safety Team (NST). The NST is comprised of the National Safety Officer and volunteer assistants assigned as subject matter experts for flight and ground safety. Region and Wing Commanders are moving away from a punitive safety program towards a behavior-based safety program that has shown significant improvement in using safety mishaps as an educational opportunity to raise awareness and prevent risk exposure.

Got a great safety article that you would like to see in a future Beacon newsletter? Please send it to Lt Col Sharon Williams at [safetybeacon@capnhq.gov](mailto:safetybeacon@capnhq.gov).

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