Cockpit2Cowl

Winter Flight Operations

I. Preparing for Winter

- Plan ahead for preparing both the aircraft and yourself.
- Have a specific winter preflight routine, go/no-go criteria for icing, and a survival mindset if it goes wrong.
- Emphasize that winter flights take more time from first weather check to engine shutdown; encourage adding 30–45 minutes to any normal prep window.
- Consider using aircraft covers, including the wings and tail, if your aircraft is tied down outside.
- Check tire pressures regularly. Tire pressures rise and fall with changes in temperature by about 1 psi for every 10° F change in outside air temperature. So, even if you don't plan to fly, make it a point to get out to the airport to top off your tires when the temperature has dropped by 10-20 degrees on an average day.
- Preheat the entire engine compartment and all its components thoroughly prior to flight, but do not leave a pre-heater on continuously to reduce the risk of corrosion. Use an engine blanket and store with a dehumidifier system if possible (such as DryBot).
- Your aircraft's bus voltage should also be adjusted for significant changes in outside temperature. The operating manual for a 14V Concorde RG battery, for example, recommends setting the aircraft's voltage regulator to different bus voltages based on temperature, ranging from 13.75V at temperatures above 87° F to 14.75V at temperatures below 32° F.
- Remove wheel pants if they are at risk of becoming clogged with ice and snow.

II. Preflight Planning and Weather

- Always get a full briefing that explicitly includes: icing AIRMETs, freezing levels, tops/bases, and recent PIREPs along the route and alternates.
- Treat any forecast or PIREP of known or forecast icing at your planned altitude as a **default no-go** unless you have certified equipment and clear escape altitudes/routes.
- Plan conservative altitudes so you can stay **well clear** of freezing rain/drizzle layers, not just "barely below the freezing level."
- For airports:
    - Check NOTAMs for runway closures, braking action reports, and snowbanks near intersections that can hide signs and other traffic.
    - Expect snow-covered signs and markings; brief yourself on airport diagrams before taxi so you're not "heads down" hunting for signage in the snow.
- Fuel planning: add extra reserve beyond legal minimums to allow for slower climbs, reroutes around weather, and potential returns to departure.

- Check the batteries on all of your devices, charge or change them as needed. Battery performance is severely degraded in cold temperatures.

III. Cold-Weather Preflight on the Ramp

- Dress to survive, not just to fly: boots, hat, gloves that allow you to manipulate small items, and layers as if you will spend several hours outside at destination or in a field.
- Plan for a longer walk-around: slow down, start at the tail and make a **systematic, tactile** preflight.
- Engine and airframe:
  - Use engine preheat when temperatures are near or below freezing; follow the engine/airframe manufacturer's guidance (often recommended below about 25 °F / −4 °C). More conservative is better; preheating below 40 °F is a good idea.
  - Check oil type and viscosity are appropriate for winter; improper oil can cause sluggish cranking and poor lubrication on startup.
  - Install winter engine cooling and oil cooler baffles if recommended. Ask your mechanic about taping off part of your oil cooler if you cannot get oil temps above 170 °F in flight.
- Contamination and hidden ice:
  - Insist that **all** snow, frost, and ice be removed from wings, tail, and control surfaces; stress that even thin frost (around 1/64 in) can significantly reduce lift and increase stall speed.
  - Physically run a bare hand along the wing and tail upper surfaces; what looks clean under ramp lights may still be rough with frozen contamination.
  - Pay special attention to inlets, pitot/static ports, fuel vents, control gaps, and wheel wells where snow can pack and later freeze, restricting controls and brakes.
- Practical tips:
  - If possible, cover wings, tail, and windshield when parking overnight to reduce frost and snow removal in the morning.
  - Remove snow/ice from clothing before entering the cockpit to avoid puddles and refreezing on the floor and controls.
  - Snow blowers and aircraft are a bad combination. Resist the urge to power your way through to your plane. It only takes one slip of the hand to do significant damage to the aircraft (it's also considered bad form to bury your neighbor's plane while digging yours out).
  - Nose wheels are meant to be on the ground. Consider a tail stand or another safe method to prevent your aircraft from assuming an unnatural parking position.
  - Don't be a stranger to the airport just because the weather is bad. Large snow and ice accumulations, left unchecked, can overstress parts of the aircraft and control surfaces.
  - Avoid using chemicals on aircraft windows (unless specifically approved for plexiglass). Warm water is the best solution, but be careful to apply it lightly so as not

to “shock cool” the plastic. Dumping a bucket of hot water on a freezing windshield is a sure way to induce a crack.

- Most importantly, avoid scraping ice and snow at all costs. Credit cards, scrapers and even brooms can scratch the paint and windows. Take your time to do it right so you don’t regret your actions come springtime.

IV. Deicing, Anti-icing, and “No Deice Available”

- If you cannot get the aircraft completely clean, **you do not go.** No “it’s only a little frost” exceptions.
- When using de/anti-icing fluids:
  - Know which type is applied and brief a holdover time; if you exceed it, you must assume renewed contamination and re-treat or cancel.
  - Avoid spraying directly into static ports, pitot tubes, and unprotected inlets.
- At non-deicing airports:
  - If you use hangar time to melt contamination, you need to dry and check all flight controls. Consider where the ice melted, and the water dripped. (Plan a pre-takeoff check of flight controls!!!)
  - Warnings about “cold-soaked” wings from full fuel tanks: frost can form even in clear conditions; instruct pilots to recheck the upper wing surfaces after fueling and just before taxi.

V. Engine Start, Taxi, and Takeoff

- Engine start:
  - Use proper cold-start procedures from the POH: prime carefully, avoid excessive cranking, and allow oil temperature to rise before high power taxi.
  - After start, verify alternator output and battery charging; cold-related electrical issues can show up early.
- Taxi:
  - Taxi at reduced speed on snow or ice; avoid sharp turns and heavy braking to prevent skids and frozen brakes afterward. (USE LOW ACCELERATION RATES!) Acceleration is a change in velocity. Velocity includes direction and magnitude.
  - Use minimal power to start moving, then keep it steady; high power settings on slick ramps can cause loss of directional control.
- Before takeoff:
  - Cycle controls fully and confirm free and correct movement; stiffness can indicate ice or frozen slush in hinges or cables.
  - Reconfirm that leading edges, wing tops, and tail are still clear; contamination can build even during taxi if it’s precipitating.
  - Consider using a slightly higher rotation speed and longer takeoff roll if runway conditions are contaminated; brief a firm “reject” decision point.

VI. En Route Operations and Icing Response

- Conservative routing:
  - Plan and fly with a “way out” in mind: lower, warmer air below, a quick 180-degree turn toward better conditions, and an alternate airport behind you rather than only ahead.
- Recognizing icing early:
  - Teach pilots to look for ice accretion on small probes, leading edge, struts, wheel fairings, and wing root fairings; monitor airspeed and required attitude for level flight. (Ice accumulates on small radius protrusions first)
- Immediate actions when encountering icing:
  - Do not “wait and see.” Request a **turn, altitude change, or both** at the first sign of structural ice.
  - If in IMC, a descent into warmer air or a 180-degree turn toward known better conditions should be the default plan; brief this before entering clouds. Climb if warmer air is known to be above. (ice pellets)
- Induction and instrument icing:
  - Use carb heat early and often in carbureted engines when operating in visible moisture near freezing; monitor for RPM drops and roughness.
  - Ensure pitot heat is on in visible moisture at cold temperatures, not just “if you see ice.”

VII. Approach, Landing, and Postflight

- Approach:
  - Expect higher approach speeds if any suspected contamination; add a modest speed increment, but avoid excessive speed that lengthens landing distance on slick surfaces.
  - Use a stabilized approach and avoid large configuration changes late; choose a flap setting recommended for contaminated runways (often partial flaps) if the POH provides guidance.
- Landing and rollout:
  - Plan to use as much runway as possible; land in the touchdown zone but aim for a long, gentle rollout rather than trying to “make the first turnoff.”
  - Use gentle braking and aerodynamic braking; avoid aggressive braking on ice or packed snow to prevent skids and loss of directional control.
- After landing:
  - Delay retracting flaps until parked to avoid spraying slush into flap wells where it can freeze. Or damage from ice between surfaces.
  - Parking outside: use control locks, secure the aircraft firmly, and consider covers to prevent snow and ice buildup in openings and control gaps.
  - Fill tanks to the top to reduce condensation and the chance of water in the tanks.

- Sump tanks after filling to detect water before it freezes. Wait 15 minutes for the fuel to settle before sumping.

VIII. Survival, Equipment, and Decision Making

Practical “what’s in your airplane” advice:

- Personal equipment:
  - Wear and carry clothing appropriate for the coldest part of your route, not for the heated cockpit; assume you may have to spend the night outdoors. Assume you might get CO poisoning and turn off the heater and/or open the vents!
  - Keep survival gear reachable from the pilot seat: signaling devices, fire-starting tools, water, high-calorie food, a first-aid kit, space blankets, and a charged portable phone/PLB/ELT interface.
- Route and communication:
  - Favor routes with roads, towns, and lower terrain rather than the shortest line over remote snow-covered areas.
  - File a flight plan or use flight following so someone starts looking for you quickly if you go overdue.
- Mindset and ADM:
  - Use a winter-specific PAVE checklist:
    - Pilot: recency, cold tolerance, training in icing.
    - Aircraft: deice/anti-ice capability, engine preheat access, battery condition.
    - enVironment: icing, winds, daylight, surface conditions.
    - External pressures: schedule, passengers, holiday expectations.
  - Encourage a “cancel early” bias: praise pilots who cancel or divert as exercising **good** judgment, not “being timid.”

Cockpit2Cowl

Basic survival kit should consist of the 6 C's of survival:

- 🔪 Cutting Tool: A knife is a versatile, indispensable addition to any survival kit. A small, useful tool, a knife can be used to process wood and as a flint-and-steel striker for fire.
- 🔥 Fire Starting (Combustion) Device: This can include stormproof matches, a simple lighter, or a ferro rod.
- 🧣 Cover: A lightweight, compact, and multi-purpose tarp, drop cloth, emergency blanket, or even a heavy-duty plastic trash bag. This cover can be used as a windbreaker, sleeping bag, or ground covering. It can also be used to catch rain/snow for drinking water or to signal for rescue if it's reflective or brightly colored.
- 🗑️ Container: An uncoated metal container can be used directly over a flame to purify water or to create a hot water bottle to aid in keeping you warm.
- 🪢 Cordage: A 7-strand paracord is very helpful for many things and very difficult to replicate in the wilderness.
- 🛰️ Communication: A satellite phone, InReach, or Spot device. Having the ability to communicate your exact location via satellite when you are not in cell coverage significantly reduces the time required to facilitate a rescue.

Survival *(From FAA Winter Flying Tips)*

After a crash landing, it is best to leave the aircraft as soon as possible. Take time to analyze the situation and help others. Take care of any injuries first. Stay away from the aircraft until all gasoline fumes are gone. Sit down and think. Keep in mind that survival is 80 percent mental, 10 percent equipment, and 10 percent skills. Since mental factors are the number one problem, establish a goal to conquer regardless of the consequences. Don't have "give-up-itis" or a "do-nothing attitude." Don't run off without taking time to think out each problem. Don't imagine things that are not there.

There are basic fears in each of us. They are:

- Fear of the unknown
- Fear of darkness
- Fear of discomfort
- Fear of being alone
- Fear of animals
- Fear of death

- Fear of punishment
- Fear of personal guilt

Points to remember:

- Your MIND is the best tool for survival. USE IT!
- The number one enemy is yourself.
- The number two enemy is injuries.
- The number three enemy is temperature.
- The number four enemy is disease.

Whether to stay with the aircraft or start out on foot may be a major decision. Did you file a flight plan? If you did, it may be best to let them find you. Is your emergency locator transmitter operating? Do you have a survival kit? Don't fight a storm. Stay put and find shelter. Most storms are of short duration. What do you have in the aircraft that can be used to aid in survival? Other tips:

- The compass will keep you going in one direction.
- Gasoline will help make a fire.
- Oil can be used for smoke signals.
- Seat upholstery may be used to wrap around feet or hands.
- Wiring may be used for tie strings.
- The battery may be used to ignite fuel.
- Use whatever is available to protect the body from the loss of heat; don't waste body heat by eating snow.
- Make a fire and heat water before drinking.
- You can conserve energy to last three weeks if you have water and stay dry -- body heat can escape 240 times faster from wet clothing than from dry clothing.
- It is best to eat small amounts of sugary foods to replace the energy lost through body heat.

A good survival kit is well worth its weight. The following would be a useful kit; However, you can assemble an inexpensive survival kit of your own.
First, you need a metal container with a lid. This container can be used to heat water, make tea, use as a digging tool, or be polished as a signal mirror. In addition, you need:

- Boy Scout knife.
- Small candle.
- Box of matches (wrapped in plastic).
- Leaf bag (pull over head, cut a hole for face).
- Garbage bag (step in, pull up, and tuck in pants or tie around waist). You now have body protection from heat loss.
- Sugar cubes (wrap in plastic, 6 to 12 cubes).
- Plastic tape.

The list above is only a sample of what can be done. Use your own innovation and remember that survival depends upon you.