A PREFLIGHT FOR ICING

You can prepare for a potential ice encounter on the ground during an intensive preflight, but once you are airborne, center and approach can help.

by Harry Kraemer

While cruising at your assigned altitude, you happen to look out the window and notice that ice has started to accumulate on the leading edge of the wing. Even if your aircraft is approved for flight in icing conditions, you may be heading for a major problem.

Your first action should be to give center a call and tell them how much ice you've got, the rate that the ice is accumulating and whether you have rime, clear or a combination that we identify by saying "mixed."

Your immediate goal is to get out of the precipitation or clouds and find an altitude where the temperature is above freezing.

Center can help you escape. Controllers are required to become familiar with pertinent weather information when coming on duty. Controllers also are required to stay aware of the current weather information and advise pilots of any hazardous weather that may impact operations within 150 nm of their sector or area of jurisdiction.

Controllers may have received icing PIREPs from flights that preceded you along the routing. When you check on, you are likely to hear about it. "Bonanza Nine Seven Three Two Romeo, be advised that a Cherokee reported moderate rime at five thousand one two point five east of Fort Dodge."

If a fresh Airmet has been issued for icing, center will advise flights in their sector to monitor a HIWAS frequency (Hazardous In-Flight Weather Advisory Service), after which you will want to contact Flight Watch on 122.0 to get the details.

ATC has a pretty good idea where the icing events have been occurring, and they may have even a better idea of escape routings or altitudes without ice. Stay alert on the frequency, listen for other aircraft reporting ice and work those reports into your flight's picture. Center will be a lot happier to give you a diversion before it's an emergency.

But don't hesitate to declare an emergency if it gets bad. ATC will provide maximum assistance to an aircraft in distress. Controllers have multiple services available to assist in an emergency.

Just remember that ATC relies on us as much as we rely on them for an escape out of icing. You have got to tell ATC exactly what assistance you need and your plan of action.

Preflight for Ice

Of course, you should know from your preflight weather briefing the areas in which icing is possible. If you are self-briefing, read the Airmets and peruse the PIREPs. Pilot reports may be old — and an hour is old — but you'll be able to see if there is a history of icing along your route.

It's not a bad idea to give Flight Service a call just before you launch to see if they have fresh icing reports. Ask who is picking up ice, how much and what type of ice, and check on cloud tops while you're at it. You'll find that information useful if you need to escape an icing encounter.

Although most of our preflight thinking focuses on routings and altitudes where ice has been reported, ask the briefer where ice-free flight is possible in the event that you have to

Reporting Ice

The speed with which ice accumulates on your airplane is the most important factor to consider when making a plan to divert.

If you encounter icing, give center or approach a call and pass on a PIREP using these standard terms, which describe the rate and the intensity of the icing encounter:

Trace: You have a trace of ice when you can see it and it is either not accumulating or sublimating. Unless it is encountered for an hour or more, no action is necessary.

Light: We call icing light when the rate of accumulation might create a problem during an hour's time. You will want to ask for a different altitude or heading change.

Moderate: The rate of accumulation will cause a problem if you don't divert immediately.

Severe. Severe ice accumulates so fast that even de-ice or anti-ice equipment cannot keep up. Call center and tell them you are in severe ice conditions and then get out of there.

When you have had an icing encounter of any intensity, give a PIREP so somebody else will be spared the excitement.

divert.

In any case, take extra time to flight plan during the icing seasons. Plan to divert, just as you plan to miss an approach.

Where You'll Find Ice

Anytime you fly in clouds with temperatures at or below 0 degrees Celsius (32 degrees Fahrenheit), icing is possible. Droplets falling through colder air may become supercooled in temperatures as low as -40°C and freeze on impact as freezing rain (clear ice).

Generally, clear ice exists in outside air temperatures from 0°C to -10°C. Mixed icing and rime may be found from -10°C to -15°C, and most rime encounters occur in temperatures from -15°C to -20°C.

Two factors affect icing potential: the size of the drops and the amount of moisture available. Large vertical motions in the clouds with temperatures just below 0°C create the largest droplets of clear ice. This convection occurs in cumuliform cloud and produces clear ice.

The ice appears to be clear because the droplets freeze slowly after they have struck the aircraft. Clear ice is dangerous because the water droplets may strike the airplane and stream back across flying and control surfaces before they freeze.

Stratiform clouds produce less convection and therefore smaller drop size. Smaller drops freeze more quickly and produce rime ice; the milky appearance of rime is caused by air trapped in fast-freezing droplets.

The wise pilot attempts to avoid flying in cumulus-type clouds, particularly in the tops of stratocumulus when the temperature is 0°C or below. If you are climbing through layers and find yourself leveling in the tops of stratocu, ask for higher.

If you are going to try to get on top of the clouds, remember that to produce significant precipitation, clouds usually will be 4,000 feet thick or more. The heavier the precipitation, the thicker the clouds.

Airframe icing is a major IFR weather hazard. Icing's nasty effects are cumulative: Ice adds weight and therefore reduces efficiency. Ice reduces lift, decreases thrust, increases stall speed and increases drag.

Ice may interfere with communications and load up an antenna mast, which will begin to vibrate and eventually may depart the airplane. Lost communications in icing conditions is going to lead to a very bad day.

Although forecasters cannot predict the exact area in which icing occurs, they can tell us regions in which icing is possible. An intensive preflight weather brief will produce a picture of the icing probability; what you do with that picture depends on your experience and judgment.

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