



**SAIB:** SW-08-03R4

**Date:** November 26, 2013

**SUBJ:** Recommendations for Rotorcraft During Icing/Snowy Conditions

*This is information only. Recommendations aren't mandatory.*

## **Introduction**

As a continued emphasis on rotorcraft and icing conditions, this Special Airworthiness Information Bulletin (SAIB) alerts you, owners and operators of turboshaft-powered rotorcraft, of the possibility of inflight engine loss of power due to the ingestion of ice and/or snow. Accumulation of ice and/or snow can occur in the area of the airframe engine inlet while the rotorcraft is on the ground or in the air. At this time, this airworthiness concern is not an unsafe condition that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR) part 39. However, this SAIB describes procedures to reduce the probability of an engine in-flight shutdown due to ice and/or snow ingestion. MOST helicopters are not approved or equipped for flight into icing conditions.

We are revising and reissuing this SAIB because ice and snow ingestion continue to be a contributing factor in helicopter accidents. During the winter months of early 2013 at least two helicopter accidents were suspected to have ice or snow ingestion that led to loss of engine power, one of these accidents resulted in fatalities. In several instances aircraft were sitting outside during periods of rain, sleet, or snow with below freezing temperatures for a period of time prior to the accident flight. Some of the aircraft even ran several minutes on the ground prior to take off before their engine lost power in flight due to a suspected ice or snow ingestion.

## **Background**

### Ground Operations

We have determined that ingested ice and snow accumulation in the airframe engine inlet can cause the engine to lose power. This has resulted in accidents and fatalities. Snow and ice can build up in the engine intakes and plenums when the rotorcraft is on the ground with the engine(s) not operating or are operating at a low power setting for extended periods. When a pilot increases engine power during takeoff, the accumulated snow and/or ice can separate from the airframe inlet surface and be ingested into the engine, resulting in decreased power or complete engine failure. Some of the early turboshaft engines with axial inlets are particularly susceptible to loss of power due to ice and snow ingestion. Some inlet designs do not allow for easy detection of accumulated ice and/or snow, and may require detailed inlet inspections to determine if any accumulation has occurred.

### In-flight Operations

Some rotorcraft require a snow protection kit for the airframe engine inlet to successfully operate in falling and blowing snow. Operation in snow without the kit can be especially risky when hovering in snow and then transitioning to takeoff when weather conditions clear. Snow may accumulate on or in the engine inlet area during hover, and then be dislodged and ingested into the inlet during takeoff. Pilots should not believe they have escaped the danger following successful hover in snow with an unprotected inlet.

The flight crew should follow the published Rotorcraft Flight Manual (RFM) procedures for inadvertent ice and snow encounters. If procedures do not exist, we recommend landing the aircraft as soon as possible after any hover or flight in snow or icing conditions, shutting down the engines, and thoroughly inspecting the engine inlet for ice and snow accumulation prior to takeoff.

Pilots should be alert for visual cues of ice accumulation on mirrors, wipers, and antennas. Pilots should also be mindful of possible increased vibrations or power requirements. The degraded performance of the helicopter may be due to increased weight and possible degraded rotor performance due to accreting ice.

Most rotorcraft are NOT approved for flight in known icing (FIKI) conditions. For rotorcraft not approved for FIKI conditions, a pilot can expect icing any time when operating in visible moisture such as fog, rain, or clouds, when the temperature is below 5°C [41°F]. Pilots should be aware that icing is possible in these ambient conditions and should be prepared to leave the area of visible moisture or change to a warmer altitude as soon as possible. (NOTE: This “warmer” altitude may not always be a lower altitude.)

## **Recommendations**

We highly recommend and strongly urge you to perform the following:

- Review the Limitations and Operations sections of the RFM for guidance for flight in falling/blowing snow and/or icing. Many aircraft are prohibited from operating in known icing and/or falling and blowing snow.
- Perform basic airmanship and preflight by evaluating current and predicted weather briefings from the area Flight Service Station. Other resources for weather conditions include:
  - Icing tool: <http://weather.aero/icing>
  - Helicopter Emergency Medical System (HEMS) flight tool: <http://weather.aero/hems>
- Whenever the aircraft is parked outside, install inlet covers and exhaust inserts or covers. Make sure the REMOVE BEFORE FLIGHT streamers are clearly visible. If the aircraft is outside and inclement weather and possible freezing temperatures are expected, move the aircraft to a covered area if possible or take extra care to ensure ice or snow cannot get into the engine intake area.
- Prior to engine start, remove the inlet/exhaust inserts or covers and perform a complete inlet/exhaust inspection (using a flashlight). The inspection should include surfaces inside the inlet, the cowl area forward and around the inlet, and the area behind the particle separator or screen (if installed). Some aircraft may require fully opening the cowlings to gain access to inspect the inlet, assuring that a properly certificated person performs this task. Remove all accumulated snow or ice.
- **CAUTION: DO NOT** remove ice or snow by chipping or scraping! Use heated air or deicing fluid as appropriate, in accordance with the manufacturer’s procedures. In freezing temperatures, pay particular attention to sheet ice on the bottom and forward of the inlet. This ice can also form behind particle separators. Engine preheating may be required.

- Review Transport Canada Aviation Safety Letter Issue 4/2007 article: *Helicopter Operations: The Icing Factor*; Available at: <http://www.tc.gc.ca/civilaviation/publications/tp185/4-07/winter-operations.htm#heli-ops>

If it is necessary to keep the rotorcraft on the ground for an extended period (i.e., waiting for clear weather), you should shutdown the engine(s). Prior to takeoff, you should accomplish a detailed preflight inspection, removing any snow/ice build-up. You should perform the inspection even if the rotorcraft is fitted with some form of inlet protection, such as screens or baffles.

### **For Further Information Contact**

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