FAA
Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SAIB: SW-08-03R1

SUBJ: Recommendations for Rotorcraft During Icing Conditions **Date:** January 11, 2010

This is information only. Recommendations aren't mandatory.

Introduction

As a continued emphasis item regarding loss of engine power resulting from snow or ice ingestion on turboshaft powered rotorcraft, we are revising and reissuing this Special Airworthiness Information Bulletin (SAIB) and are urging you to follow our recommendations.

This SAIB alerts you, owners and operators of turboshaft powered rotorcraft, of the possibility of in-flight engine loss of power, due to the ingestion of ice and snow. Accumulation of ice and snow can occur in the area of the airframe engine inlet while the rotorcraft is on the ground or in the air. **This SAIB describes procedures to reduce the probability of an engine in-flight shutdown due to ice and snow ingestion.**

Background

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 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.**

Ground Operations

On the ground with the engine(s) operating at a low power setting, ice and snow can accumulate on the airframe cowl forward of the inlet, on the inlet lip, and inside the inlet. Under extreme conditions, usually when the rotorcraft is on the ground waiting for clear weather, the buildup of ice and snow can be enough to cause the engine(s) to lose power or fail completely if the ice or snow is ingested.

On the ground with the engine(s) **not** operating, proper use of inlet inserts (pillows) or inlet covers can eliminate the accumulation of snow, but these measures cannot fully guarantee that ice will not form in the inlet. Ice can also develop in the inlet area when water seeps into the inlet from rain or snow melting on a warm cowling, even when proper inlet protection is used.

Inflight Operations

Some rotorcraft require a snow protection kit for the airframe engine inlet in order to successfully operate in falling and blowing snow. Operation in snow without the kit is prohibited and 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. If possible, land the aircraft immediately after the hover and thoroughly inspect the engine inlet prior to takeoff. If terrain will not allow an immediate safe landing, transition to takeoff as smoothly as possible when the weather clears with minimum application of engine power. Land and inspect the inlet area as soon as practical.

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 immediately leave the area of visible moisture or change to a warmer altitude. (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 aircraft Flight Manual for Limitations and Operations guidance 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. Recommended web sites include:

  Icing tool: **http://weather.aero/icing**

  HEMS flight tool: **http://weather.aero/hems**

- When the aircraft is on the ground without the engines operating, install inlet and exhaust inserts or covers.

- 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). 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 pre-flight 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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