

**FLIGHT OPERATION INSTRUCTION – 104**  
**V1.0 Sep 06**

## **HELICOPTER FROST PROTECTION PROCEDURES**

### **Scope**

The purpose of using a helicopter for Frost Protection is to raise the air temperature in the area being treated by dragging down warmer air from the inversion layer above and stopping cold air from 'ponding" ie. keeping the air moving.

This is achieved by identifying the 'cold spots' in the area, establishing the natural air flow to and from those cold spots, using the aircraft OAT gauge to locate the inversion layer level and establishing a suitable hover height to drag down the warmer air.

### **Hazards**

A number of hazards exist in this type of operation. Only trained and experienced pilots will be approved to carry out this work.

All frost protection operations **must** be carried out with visual reference to the ground. If a risk of losing this visual reference exists then the operation **must stop** immediately.

Frost protection is only approved if the pilot has thoroughly inspected the area in 'daylight conditions' prior to commencing operations. This requires that the aircraft be positioned to the location in time to carry out the necessary inspections. Any/all obstacles that could create a hazard must be adequately illuminated prior to the operation commencing.

Pilots must be aware of optical illusions associated with night flying operations, particularly when operating over a crop with bird covers in place.

Fatigue can also be a problem as frost operations are often programmed after the pilot has completed a normal day's work. A period of at least 6 hours of rest, and preferably 8 hours, should precede any frost operations.

Flight operations should be carried out with landing, navigation and strobe lights on. All instrument lights should be operational and a torch

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must be carried in the cockpit. The hook mirror should be removed or otherwise masked before starting operations. The pilot should also check for anything that may reflect light into the cockpit, and ground staff and others must be warned of the danger of directing lights at the helicopter which may affect the pilots' night vision. A comprehensive brief for all personnel involved in the operation must be carried out prior to the start of flying, clearly outlining the responsibilities of those involved and their role in the safe and efficient completion of the job.

### **Callout Procedures**

- 1)** Advise the client of the latest time that a Frost Protection callout will be accepted. That time is calculated by adding the time needed to get the aircraft and crew prepared, the ferry time and the site inspection time. This total time is deducted from Evening Civil Twilight to establish the latest callout time.
  
- 2)** Prepare the aircraft by:
  - (i) Removing or masking the hook mirror;
  - (ii) Checking that the Frost Protection 'Minimum Equipment' is on the aircraft;
  - (iii) Carry out thorough preflight inspection including instrument, navigation and landing lights;
  - (iv) Ensure that sufficient fuel will be available to conduct the operation.
  
- 3)** File a flight plan or establish "flight follow" procedures as appropriate with the client, ensuring that both you and the client know where you will be landing the aircraft. This needs to be as close to the scene of operations as possible to allow the aircraft to hover taxi to the area.
  
- 4)** Ensure that you have personal overnight gear and that adequate rest facilities are available prior to commencing night frost operations.
  
- 5)** Once the aircraft is located at the scene, thoroughly inspect the area with the client or representative for any hazards. Pay particular attention to any wires or other hazards that may infringe onto the area or into adjacent areas, and in the track that you will need to use to hover-taxi from the aircraft park.

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- 6) Cover the windscreen with an appropriate cover. If no cover is available operations must not commence until all condensation has been dried off the outside and inside of the windscreen using the aircraft heater.

### Operational Procedures

- 1) Preflight the aircraft and establish the maximum flight time available for the fuel on board (minimum of 20% if fuel is available on site). Ensure that adequate OGE hover performance is available. Advise ground crew of the anticipated refuel time.
- 2) Remove the covers, start the aircraft and ensure the canopy is clear of all condensation.
- 3) Check that the 'OAT gauge' is operational and visible.
- 4) Check communications with client/ground crew.
- 5) Hover-taxi to operational area ensuring that visual reference with the ground is maintained and establish references relative to the operational area.
- 6) On site check the OAT and establish the height of the inversion layer, if it exists. This operation can be dangerous and visual reference with the ground **MUST** be maintained at all times. If it is not possible to establish the presence of an inversion layer, use a procedure to keep the air moving ie, establish the low point where cold air will 'pond' and, with the assistance of ambient air flow, keep the air moving through this zone. Operations should be continued until the air temperature in the block is raised sufficiently or the client advises you to stop.
- 7) Once the operation has been completed, all equipment must be recovered (refueling gear, hazard lights etc) before returning to the primary operational base.

### Responsibilities

- 1) **Pilot in Command must ensure;**
  - i) That all the required equipment is available prior to departure from base (see Frost Protection Equipment List).
  - ii) That s/he is operationally current and holds the appropriate authorization, is fit to carry out the operation (IMSAFE), is aware of the potential fatigue aspects, and

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flight and duty limits placed on the pilot, particularly in relation to positioning flight before Evening Civil Twilight

- iii) That s/he understands all aspects of the operation and is aware of the exact location in which the operation is to be conducted.
- iv) That she/he has completed all the documentation required for the operation, including filing a flight plan or flight follow procedure and completes post operation documentation.
- v) That s/he has briefed the client and the ground crew on the safety requirements of the operation and has inspected the area of operations from the ground in daylight prior to commencement of any operations.
- vi) That s/he has formulated a fuel plan, established refueling times, quantities required and coordinated these with the ground crew.
- vii) That s/he has established hazard lights or some other system of recognizing any hazards identified in daylight, that pose a risk or potential risk to the safety of the operation.
- viii) That s/he carries out a full preflight inspection including instrument and landing lights, that the windscreen is clear and the mirror has been removed or masked prior to commencing frost operations.
- x) That s/he fully understands the dangers of losing visual reference with the ground and establishes procedures that will not allow this to happen.

#### **2) Ground crew must ensure;**

- i) That they have been fully briefed on all aspects of the operation including the area of operation.
- ii) That they carry the necessary equipment for the operation (see Frost Protection Equipment List).

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- iv) That they carry out an inspection of the block along with the pilot in daylight prior to commencing operations.
- v) That they maintain a continuous radio watch on the appropriate radio frequency and advise the pilot of any potential hazard to the safety of the operation.

#### **3) Client must ensure;**

- i) Adequate notice to the helicopter operator to allow them to prepare and dispatch a helicopter to arrive at the area of operations in time to properly carry out an inspection in daylight.
- ii) They provide a landing area adjacent to the block such that the helicopter is able to hover-taxi (IGE) from that parking area to the block.
- iii) That all hazards or potential hazards are identified to the pilot and a method of illuminating them during the operation is established.
- iv) That suitable facilities are provided for pilot rest and is aware of the requirement of at least 6 hours complete rest before the commencement of frost operations.
- v) Where possible, continuous support for the pilot and ground crew during the operation.

#### **Frost Protection Equipment List**

- 1)** Hazard Lights
- 2)** Outside Air Temperature Gauge (O.A.T.)
- 3)** Helicopter covers and tie downs
- 4)** Fuel - sufficient for the operation and return flight
- 5)** Cockpit Torch
- 6)** Overnight Kit including sleeping bag
- 7)** Windscreen cleaning kit
- 8)** Thermos flask and food (optional)

*Minimum Equipment List (MEL) requirements for night operations will apply.*