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Low-level flight and the wire environment- SAU and associated agency operations.

For information

This Briefing Note has been issued in response to two wire-strike accidents involving helicopters associated with interstate locust control operations. Agency personnel may be engaged in forthcoming local locust management operations and should carefully note the following.

1. A Bell 206B helicopter conducting aerial work near Forbes, New South Wales on 31 October 2004 in support of the Forbes area locust control campaign. The accident resulted in minor injuries to one passenger and extensive damage to the helicopter (ATSB Report: 200404285).
2. A Bell 206B helicopter near Dunedoo, New South Wales on 22 November 2004 in support of the Dubbo area locust control campaign. The accident resulted in fatal injuries to the pilot and one passenger, serious injuries to another passenger, and extensive damage to the helicopter. (ATSB Report: 200404590).

The potential for low elevation obstacle or wire strike is a significant safety concern during both agency operations and has the potential to result in fatalities.

Low elevation obstacle and wire strikes generally occur when an aircraft is operating in close proximity to the ground, they have also occurred over water where wires have been strung between two high points.

Low flying is hazardous because of the aircraft's close proximity to obstructions such as trees, powerlines, buildings and communication towers.

While the hazards of low-level flight are recognised by the SAU and associated agencies, some tasks require aircraft to be flown at low level, which includes landing and take-off, the manoeuvring phase of flight, fire bombing and FLIR missions.

Regardless of the identification during the flight planning stage and reconnaissance of the proposed 'low-flying areas' prior to the

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operation low elevation obstacles like wires are often difficult to detect.

The potential of aircrew seeing and avoiding low elevation obstacle and power lines can be influenced by a number of factors including:

- the number of wires,
- type of support structure,
- length of wire span and
- the surrounding environment and
- wind direction and speed
- turbulence,
- aircraft lift and speed and
- maintaining height

Low elevation obstacles like wires have various configurations consisting of high voltage wires strung on large towers or single wire earth return systems, which are high tensile heavy gauge wires.

In addition to this supporting guy wires are also difficult to see even if the location of the wire is known. They are generally located at angles leading away from the poles acting as a counterbalance for the weight of the wire.

Factors that determine if aircrew can see low elevation obstacles such as powerlines are:

- the number of wires,
- the height of the wires,
- the direction of the wire run,
- material used to manufacture the wire,
- includes the position of the sun,
- diurnal light conditions,
- background camouflage,
- terrain,
- and poor weather and
- a dirty windscreen.

Single powerlines are difficult to detect from the air and similarly on the ground and can be found in unexpected areas.

Comments

An important factor that has the potential to limit the ability of the pilot and aircrew to recognise low elevation obstacles and power poles is the limitation of the eye despite the quality of eyesight.

Normally each eye without obstructions from items like sunglasses, a protective helmet and airframe structures has a normal field of vision of about 120 degrees in the vertical



plane and approximately 200 degrees horizontally.

These fields of vision do not accurately interpret images on the periphery. The ability to interpret images in a clear and detailed manner is much narrower. Anecdotal information indicates that the field of vision that enables clear and detailed is within a 70-80 degree arc looking forward.

The location of key indicators for low elevation obstacles, power poles and wires can be positioned outside this detailed field of view. The aircrew's ability to focus on the infrastructure and recognise a potential wire hazard is markedly decreased.

The ability to identify the presence of powerlines can be assisted by the presence of structures and other man made features on the ground. Structures such as houses and sheds are most likely to have aboveground wires present.

Identifying the location of power poles will also assist in the determining the direction and height of wires. The ability to identify a minimum of two poles may allow aircrews to determine the path of the wire.

In some cases the poles themselves are not always easy to see. Wooden poles can be easily hidden by the landscape or by vegetation, or may be painted an environmental sympathetic colour. This has the potential to increase the risk of a wirestrike.

In addition the configuration of the insulators could indicate whether the wire continues in the same direction or deviates at an angle.

Another key factor, which has a significant impact on the ability of the pilot and/or aircrew, is the number of distractions that can occur within the cockpit environment. There are a number of factors that have the potential to cause aircrew distraction. Each of these distraction, either singularly or in combination, can take a pilot's and aircrew's attention away from the task of flying.

These factors may include and are not limited to:

- deteriorating weather conditions,
- personal stress,

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- objects on the ground,
- radio calls,
- equipment malfunctions,
- visual distractions,
- mobile phones,
- physical distraction,
- mission focus and
- aircrew/passengers.

Actions

Pilots and aircrew members should note the above comments and information.

Pilots and aircrew members should use the information to develop, establish and maintain flight mission strategies to safely operate in the low level flying and low elevation obstacle environment using discipline and adequate situational awareness by incorporating the following:

- reading the physical structure indicators
 - ◆ configuration - insulators and cross arms
 - ◆ sighting two or more poles.
- pre-flight planning and briefing,
- pre-flight reconnaissance and observation,
- recent memory and situational awareness,
- appropriate flying techniques,
- maintenance of a good visual scan and
- consideration of weather factors

In addition to the above key points of consideration pilots and aircrew need to be vigilant and avoid any unplanned deviations or reactionary flight operations during the planned mission.

Further information

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Visit the State Aircraft Unit web page, click - Useful Information, click – Hot Topics to view the following documents:

- Aviation Occurrence Investigation 200404590 Final Bell 206B, VH-CSH Dunedoo, NSW 22 November 2004.
- Aviation Research Investigation Report B2004/0337 Risks associated with aerial campaign management: Lessons from a case study of aerial locust control June 2005.
- Wire-strike Accidents in General Aviation: Data Analysis 1994 to 2004 June 2006.