



Australian Government

Australian Transport Safety Bureau

Total power loss involving a Bell 47G2A, VH-KHJ

near Amberley Airport, Queensland, 23 July 2013

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Addendum

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Total power loss involving a Bell 47G2A, VH-KHJ

What happened

On 23 July 2013, at about 0910 Eastern Standard Time,¹ the pilot of a Bell 47G2A helicopter, registered VH-KHJ (KHJ), departed Lake Manchester, Queensland, on a local aerial photography flight.

The flight involved orbiting over four different locations and positioning the helicopter for the on-board photographer at each site.

The flight was conducted largely within Amberley military controlled airspace. Before commencing the first photography session, air traffic control (ATC) instructed the pilot to hold outside the controlled airspace and await a further clearance. While holding, the pilot noticed the engine revolutions per minute (RPM) decrease slightly. After a minor adjustment to the throttle and collective, the RPM returned to normal.

The pilot reported that he had taken off with carburettor heat on, as it was required for the climb. He had then adjusted the amount of carburettor heat required as indicated by the carburettor gauge. He referred to the gauge about every 30 seconds during the flight.

During the third photography shoot, the pilot was climbing through about 1,300 ft above mean sea level (AMSL) when the engine stopped suddenly.

The pilot immediately lowered the collective² and established the helicopter in an autorotation.³ He selected an appropriate landing area and broadcast a Mayday⁴ call. Just before reaching the ground, the pilot flared⁵ the helicopter for landing. Within 40 seconds of the engine failure, the helicopter landed heavily and was substantially damaged. Neither the pilot nor the photographer was injured.

Almost no carburettor heat was on, with the lever at about 1/8th of the available travel at the time of the incident.

Meteorological conditions

Weather observations from the Bureau of Meteorology's automatic weather station at Amberley indicated that at 0930, the temperature was 13.5° C and the dew point⁶ was 9.1° C. The dew point depression was calculated by subtracting the dew point from the temperature, and at that time was 4.4.

According to the Carburettor Icing Probability chart (Figure 1), the conditions indicated a serious probability of carburettor icing at any power.

VH-KHJ



Source: Pilot

¹ Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

² The collective pitch control, or collective, is a primary flight control used to make changes to the pitch angle of the main rotor blades. Collective input is the main control for vertical velocity.

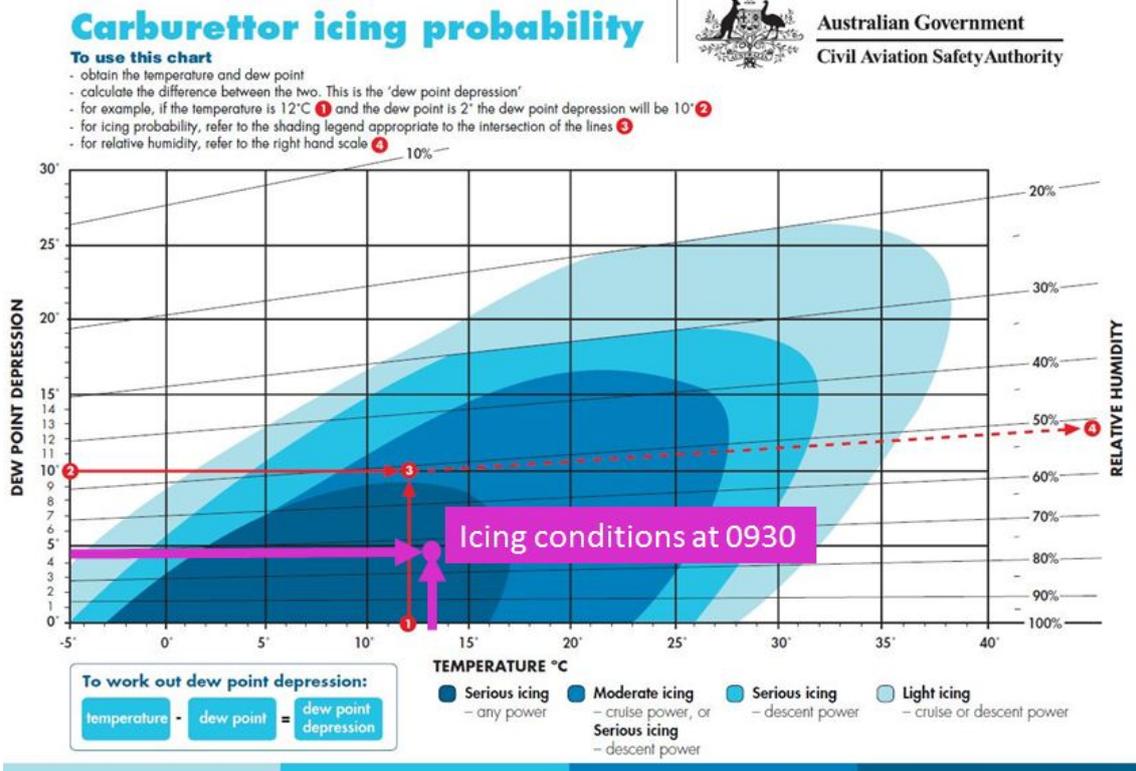
³ Autorotation is descent with power off, air flowing in reverse direction upwards through lifting rotor(s), causing it to continue to rotate at approximately cruise rpm. Pilot preserves usual control functions through pedals, cyclic and collective but cannot grossly alter steep 'glide path'.

⁴ Mayday is an internationally recognised radio call for urgent assistance.

⁵ Flare is aimed to reduce rate of descent before ground impact by increasing collective pitch; this increases lift, trading stored rotor kinetic energy for increased aerodynamic reaction by blades, and should result in a gentle touchdown.

⁶ Dewpoint is the temperature at which water vapour in the air starts to condense as the air cools. It is used among other things to monitor the risk of aircraft carburettor icing or likelihood of fog at an aerodrome.

Figure 1: Carburettor icing probability



Source: Civil Aviation Safety Authority

Insurance assessment

When the insurance assessor arrived on site, the helicopter engine was started and performed without fault. No fuel contamination was found. Other than the damage sustained in the accident, the helicopter was reported to have been well maintained and in excellent condition.

The insurance assessor considered that the weather conditions were an incipient cause of the incident. At the time, the temperature and dew point indicated a risk of serious carburettor icing. The pilot reported that he would have expected the engine to run roughly if carburettor icing was present.

Figure 2: Damage to VH-KHJ



Source: Pilot

Safety message

All pilots of aircraft fitted with a carburettor are advised to check the forecast conditions and know the risk of carburettor icing prior to each flight. The carburettor icing probability chart is available at

www.casa.gov.au/wcmswr/_assets/main/pilots/download/carburettor_icing_chart.pdf.

The following publications provide additional information on carburettor icing:

- Melting Moments: Understanding Carburettor Icing
www.atsb.gov.au/publications/2009/carburettor-icing.aspx
- Flight Safety Australia – A chill in the air
<http://casa.realviewtechnologies.com/?iid=47830&startpage=page0000030>
- Mornington Sanford Aviation – No ice, thank you
www.morningtonsanfordaviation.com/mornington-sanford-aviation-articles.html#ice
- Helicopter Safety – Carb Icing
www.helicoptersafety.org/genericaccident.asp?Keyword=Carb%20Icing

General details

Occurrence details

Date and time:	23 July 2013 – 0950 EST	
Occurrence category:	Accident	
Primary occurrence type:	Total power loss	
Location:	6 NM E of Amberley Airport, Queensland	
	Latitude: 27° 39.58' S	Longitude: 152° 49.35' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 47G2A	
Registration:	VH-KHJ	
Serial number:	478	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.