

AIRCRAFT ACCIDENT REPORT
CAA OCCURRENCE NUMBER 13/6300
HUGHES 369E
ZK-HNA
CONTROLLED FLIGHT INTO TERRAIN
GLADEBURN VALLEY, SOUTHLAND
15 December 2013



Photo courtesy of Milford Helicopters Ltd

Foreword

New Zealand's legislative mandate to investigate an accident or incident are prescribed in the Transport Accident Investigation Commission Act 1990 (the TAIC Act) and Civil Aviation Act 1990.

Following notification of an accident or incident, TAIC may conduct an investigation. The Civil Aviation Authority (CAA) may also investigate subject to Section 72B(2)(d) of the Civil Aviation Act which prescribes the following:

72B Functions of Authority

(2) The Authority has the following functions:

- (d) To investigate and review civil aviation accidents and incidents in its capacity as the responsible safety and security authority, subject to the limitations set out in section [14\(3\)](#) of the [Transport Accident Investigation Commission Act 1990](#)

The purpose of a CAA investigation is to determine the circumstances and identify contributory factors of an accident or incident with the purpose of minimising or reducing the risk to an acceptable level of a similar occurrence arising in the future. The investigation does not seek to ascribe responsibility to any person but to establish the contributory factors of the accident or incident based on the balance of probability.

A CAA Safety investigation seeks to provide the Director of Civil Aviation with the information required to assess which, if any, risk-based regulatory intervention tools may be required to attain CAA safety objectives.

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Glossary of abbreviations:

AGL	above ground level
AMSL	above mean sea level
ARFOR	area forecast
CAA	Civil Aviation Authority
CAR	Civil Aviation Rule(s)
CFIT	controlled flight into terrain
DoC	Department of Conservation
GPS	Global Positioning System
km	kilometre(s)
IMC	instrument meteorological conditions
MetService	New Zealand Meteorological Service
MHz	megahertz
NM	nautical mile(s)
NZDT	New Zealand daylight time (UTC +13 hours)
POB	persons on board
RCCNZ	Rescue Coordination Centre of New Zealand
UTC	Coordinated Universal Time
VFR	visual flight rules
VMC	visual meteorological conditions

Data summary

Aircraft type, registration	Hughes 369E, ZK-HNA
Serial number	0477E
Number and type of engines:	One, Allison 250-C20B
Year of manufacture	1991
Date and time of accident:	15 December 2013, 1708 hours NZDT (approximately)
Location:	Gladeburn Valley, Southland Latitude ¹ : S 44° 53' 53" Longitude: E 167° 58' 26"
Type of flight:	Positioning flight
Persons on board:	Crew: 1
Injuries:	Crew: 1 fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Commercial Pilot Licence (Helicopter)
Pilot-in-command's age	49 years
Pilot-in-command's total flying experience:	15,469 hours 2,433 hours on type
Investigator in Charge:	Mr P Stevenson-Wright

¹ WGS-84 coordinates.

Executive summary

The pilot was hired to fly four passengers from Milford Sound Aerodrome to Rat Point on the shores of Lake Wakatipu near Queenstown. Following that, at the request of the Department of Conservation (DoC), he was to fly to Dumpling Hut on the Milford Track to uplift a staff member who had a minor injury.

ZK-HNA did not arrive at Dumpling Hut and a decision was made by the helicopter operator to make local inquiries and conduct an initial search for it.

The operator's first search flight did not locate ZK-HNA so the helicopter operator advised the Rescue Coordination Centre of New Zealand (RCCNZ). The operator then conducted another search flight and located the burnt out wreckage of ZK-HNA in the Gladeburn Valley, just before nightfall. The deceased pilot was found in the wreckage.

No mechanical defects were identified that may have contributed to this accident.

Information supplied by witnesses suggested that the pilot had been experiencing both visual and physical impairments but had not yet sought medical advice. Given the severity of the post impact fire, post mortem examination was not able to determine any relationship to this accident.

It was determined that the most likely cause was ZK-HNA entering cloud, leading to the pilot experiencing spatial disorientation which resulted in a collision with terrain.

Notification

The CAA was notified of an overdue helicopter at 2000 hours NZDT on Sunday 15 December 2013. The wreckage was subsequently located at approximately 2115 hours. The Transport Accident Investigation Commission was notified shortly thereafter and chose not to investigate. A CAA field investigation was commenced the next day.

1. Factual Information

1.1 History of the flight

1.1.1 The pilot was hired to fly four passengers from Milford Sound Aerodrome to Rat Point on the shoreline of Lake Wakatipu, 16 km southwest of Queenstown. He was also advised he may be required to fly to Dumpling Hut on the Milford Track to pick up a DoC worker who had a minor injury, but this would be confirmed later.

- 1.1.2. The pilot completed a 30 nautical mile (NM) round trip flight in ZK-HNA earlier that afternoon to drop off a hunter at a location north of the entrance to Milford Sound.
- 1.1.3 The actual weather in the Milford Sound area near the time of departure to Rat Point was fluctuating between light and heavy rain showers, with the main cloud base approximately 4000 feet AMSL obscuring the mountain tops. The flight departed from Milford Sound Aerodrome at approximately 1550 hours. A video taken during the departure by one of the four passengers confirmed these conditions.
- 1.1.4 Two of the passengers spoken to stated that the pilot made numerous attempts to cross over various mountain passes during the flight to Rat Point, but had to turn back several times due to low cloud. He then searched for and found alternative routes before being able to enter the Greenstone Valley and then on to Rat Point (refer Figure 1).

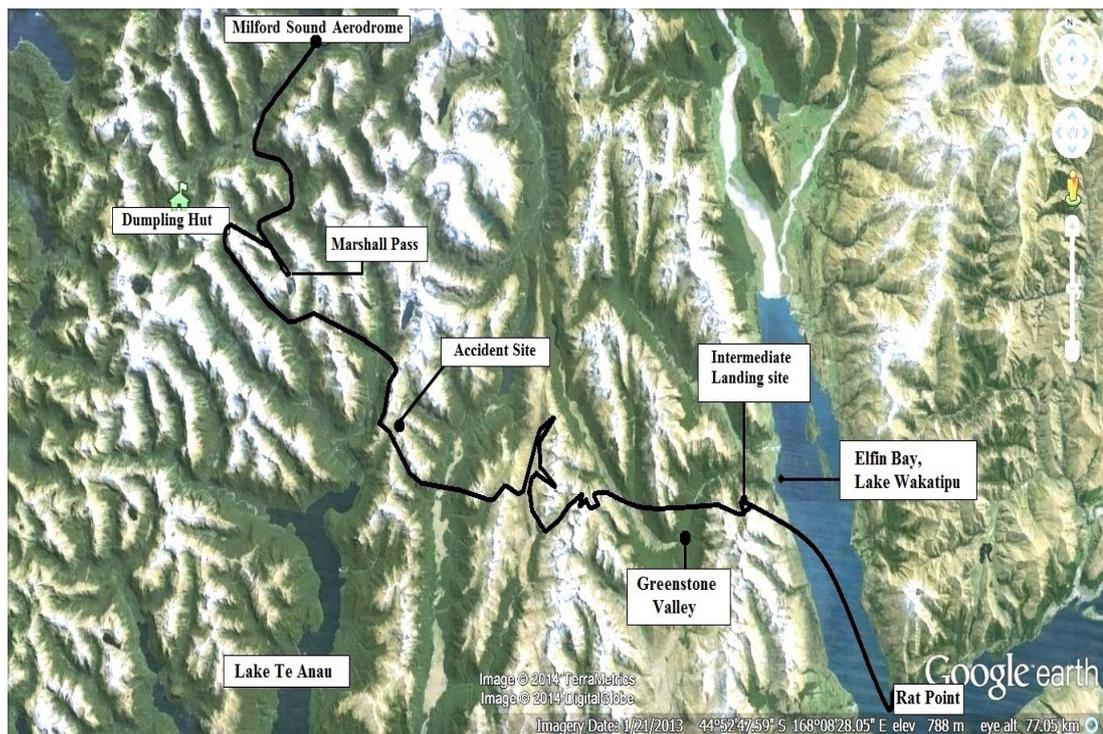


Figure 1. Outbound GPS track from Milford Sound to Rat Point showing attempted ridge crossings.

- 1.1.5 A still frame from the video taken by one of the passengers eight minutes after departure illustrates an attempt to negotiate Marshall Pass (Elevation 4,016 feet). The pilot was forced to turn away from this pass and find an alternative route (refer Figures 1 & 2).



Figure 2. Photo of cloud obscuring Marshall Pass (prior to helicopter turning away).

- 1.1.6 Conditions around Lake Wakatipu were suitable for the helicopter to make a stop on a ridge above Elfin Bay so the passengers could take photos and change seating positions, before continuing on to Rat Point, where they landed at approximately 1646 hours.
- 1.1.7 It was confirmed by radio call during the flight that the pilot would be required to fly to Dumpling Hut to pick up the injured DoC worker.
- 1.1.8 ZK-HNA departed Rat Point and the pilot was heard by staff at the operators Milford Sound base to broadcast a position and intentions radio call at approximately 1655 hours. The pilot stated, “Hotel November Alpha, I’m Greenstone² for Dumpling Hut, 1 POB”.
- 1.1.9 The operator expected ZK-HNA to have returned to their Milford Sound base by 1730 hours. When the helicopter didn’t arrive back at their base the operator radioed Dumpling Hut to ascertain if it was there, however they were advised it had not arrived yet.

² Greenstone refers to the Greenstone Valley, approximately 17 NM West of Queenstown Airport.

1.1.10 The operator made several local inquiries and then sent another of its helicopters to fly the expected route from Greenstone to Dumping Hut. When that pilot flew down the Gladeburn Valley he observed that; Glade Pass (Elevation 4,095 feet) was not visible due to cloud in the head of the valley and that the mountain tops were partially obscured by cloud. The pilot estimated the cloud tops at Glade Pass to be approximately 200 feet AGL at the crest of the pass (refer Figures 3 and 4). He did not see any sign of ZK-HNA and returned to Milford Sound base to alert the RCCNZ that it was overdue.

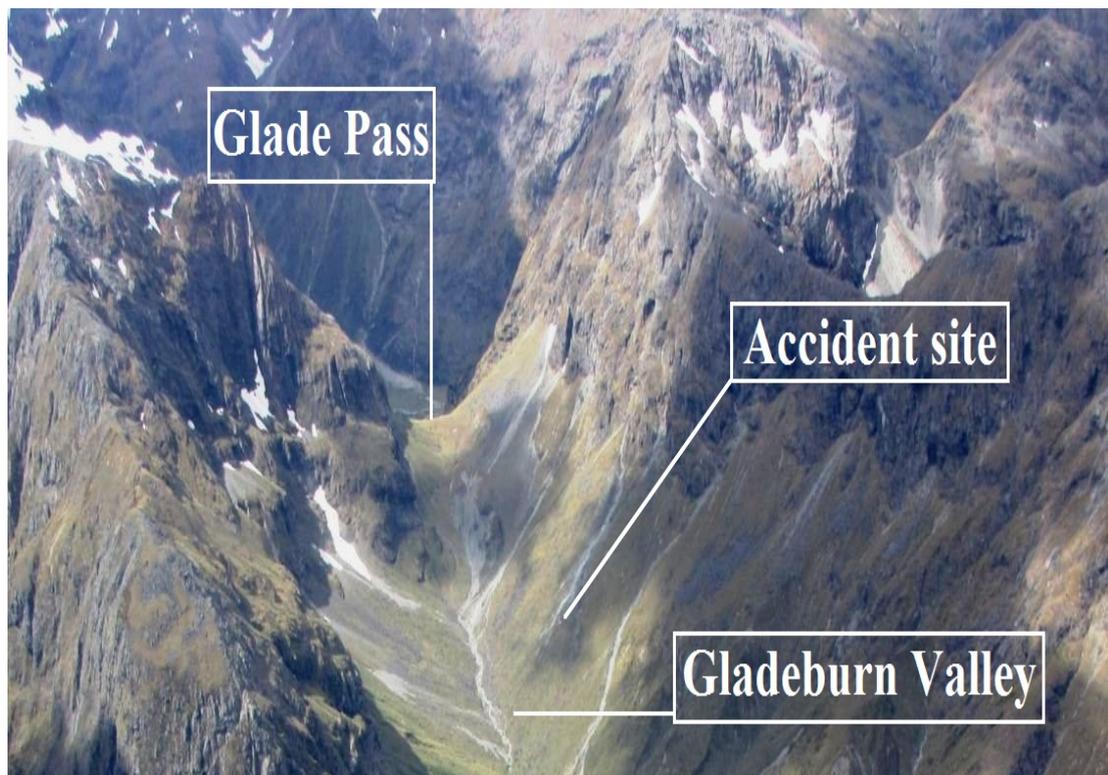


Figure 3. Glade pass and head of Gladeburn Valley. Cloud initially hid the accident site.

1.1.11 The operator's helicopter then departed their Milford Sound base on a further search flight. This time there was an observer on board and they flew the likely reverse track of ZK-HNA. They also landed at several huts along the route to ask if anyone had seen or heard the missing helicopter.

1.1.12 As the searching helicopter turned into the Gladeburn Valley from the south the pilot noticed there was less cloud around Glade Pass than earlier. His attention was then drawn to something white in the distance on the mountain slope. On closer inspection it was found to be the remains of ZK-HNA. The time was approximately 2115 hours.

1.1.13 The missing pilot could not initially be located however his body was subsequently found within the wreckage and later recovered by the Police.

1.1.14 Data recovered from the GPS³ of ZK-HNA provided information of its outbound track from Milford Sound Aerodrome to Rat Point and its inbound track from Rat Point to the accident site. The inbound track showed that the pilot initially flew a more direct north-westerly track towards Dumpling Hut until approximately four minutes before the accident, when the pilot then made a left turn and tracked to the south (refer Figure 4).

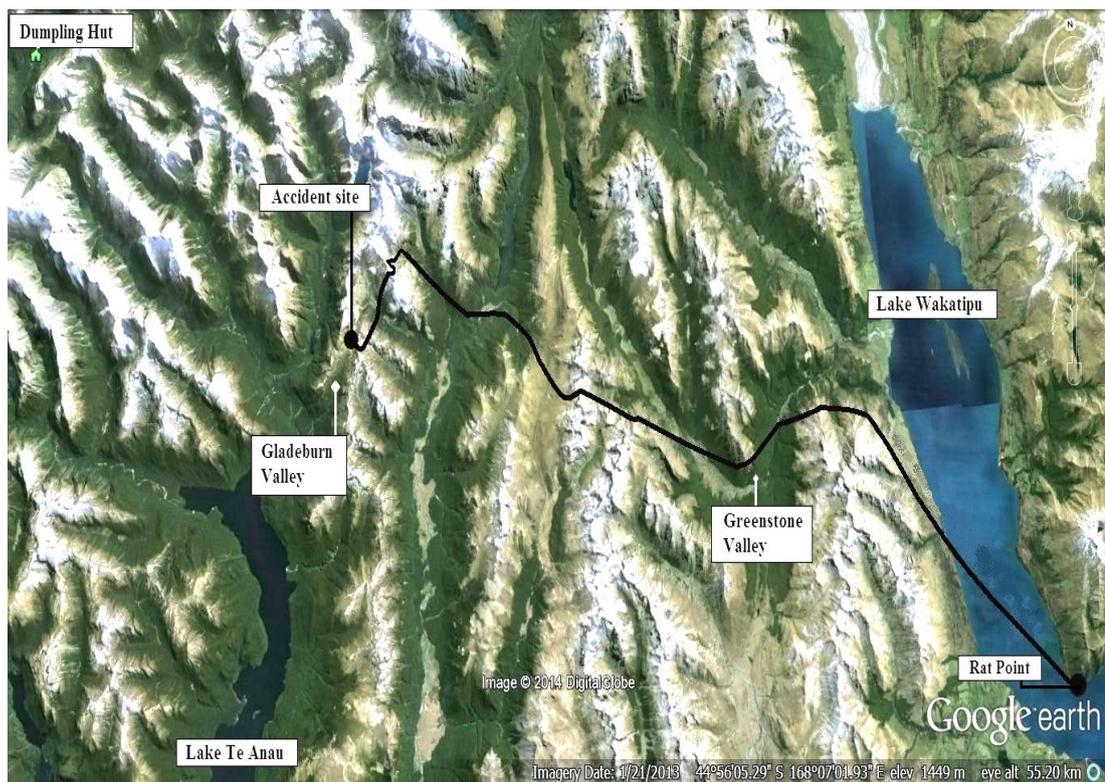


Figure 4. Inbound GPS track flown from Rat Point to Accident site.

1.1.15 The GPS track showed that after ZK-HNA crossed the last ridge prior to the accident, it initially back-tracked parallel to the mountain slope in a northwest direction while in a shallow descent. It then commenced a left turn away from the mountain slope, in the vicinity of a protruding bluff, and flew towards the centre of the valley (refer Figure 5).

1.1.16 ZK-HNA's descent rate then increased and the left turn continued until it was flying in an easterly direction back toward the mountain slope. It struck the mountain

³ GPS. A navigational device that uses satellite based signals to establish the location of the GPS unit in regards to its geographic position. Some GPS units can retain this data which can be useful for later analysis.

slope on a heading of approximately 100 degrees true.

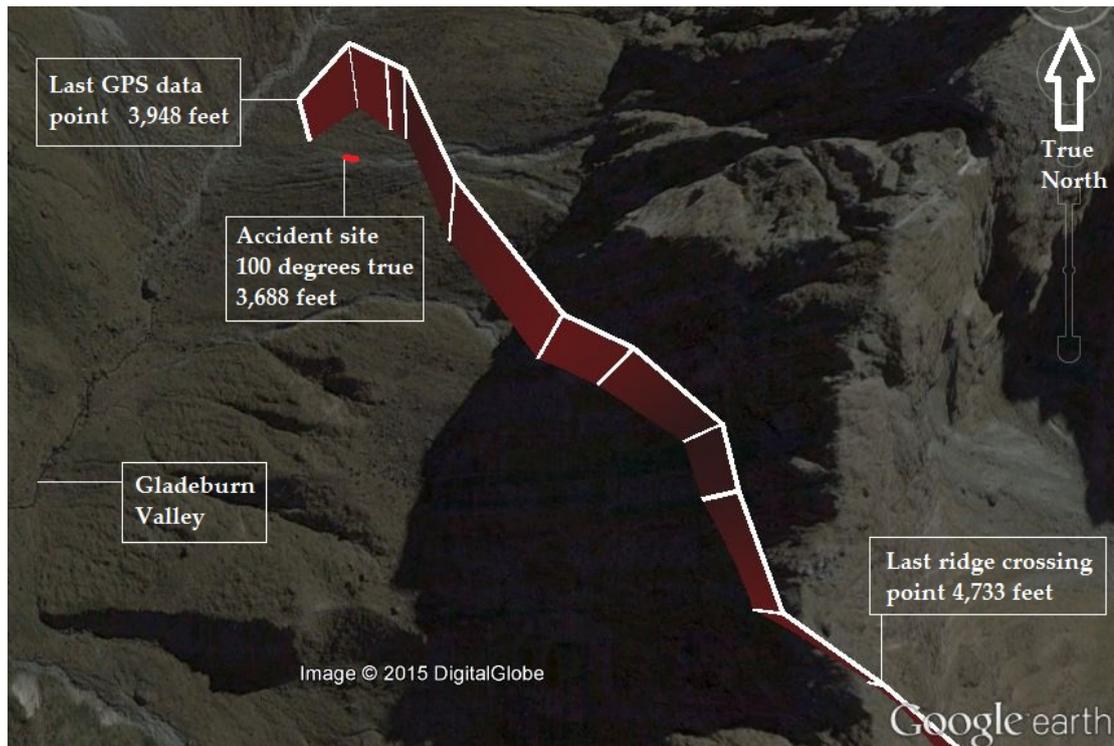


Figure 5. GPS track after crossing last ridgeline showing descending left turn.

1.2 Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Other</i>
Fatal	1	0	0

Table 1. Injuries to persons

1.3 Damage to aircraft

1.3.1 ZK-HNA was destroyed.

1.4 Personnel information

Flying hours	All types	Hughes 369
Last 7 days	2.30	1.60
Last 30 days	9.20	1.60
Last 90 days	65.00	1.60
Total hours	15,469	2,433

Table 2. Pilot flight time hours

1.4.1 The pilot gained his Private pilot Licence (Helicopter) on 11 May 1989 followed by a Commercial Pilot Licence (Helicopter) issued on 12 July 1989.

1.4.2 The pilot had flown extensively in the Te Anau, Milford Sound and Queenstown regions and was very familiar with flying in mountainous terrain and the changeable weather systems associated with that area. He also flew helicopters in Alaska during the New Zealand off peak flying season.

1.4.3 The pilot held a current Class 1 Medical Certificate valid until 04 May 2014.

1.4.4 The pilot did not hold an Instrument Rating and was not permitted to fly in instrument meteorological conditions (IMC).

1.5 Aircraft information

1.5.1 McDonnell Douglas Hughes 369E, ZK-HNA was imported into New Zealand and issued with a Standard Certificate of Airworthiness by the CAA in December 1995.

1.5.2 ZK-HNA had accrued approximately 7,603 hours total time in service at the time of the accident.

1.5.3 ZK-HNA had an extensive rebuild following an accident⁴ in May 2013 due to a loss of engine power. The subsequent emergency landing resulted in the tail boom being severed. The helicopter was returned to service on 22 November 2013 and a scheduled continued airworthiness special inspection, as required by the helicopter manufacturer, was completed on 10 December 2013.

1.5.4 No defects were recorded after ZK-HNA was returned to service or prior to the accident on 15 December 2013.

1.5.5 Detailed engine and airframe examinations were conducted on the wreckage by personnel from Rolls Royce, McDonald Douglas Helicopters and Boeing Helicopters respectively. The CAA Investigator in Charge supervised the examinations.

1.5.6 The examinations found nothing of note in respect to the wreckage that was available for inspection. The engine appeared to have been operating normally at the time of the accident and each of the main and tail rotor blades displayed damage consistent with impact with terrain at high rotational speed.

1.5.7 Due to the intensity of the post-impact fire, complete flight control integrity could not be positively established.

⁴ CAA occurrence number 13/2662

1.6 Meteorological information

1.6.1 On the afternoon of 15 December 2013, the New Zealand Meteorological Service (MetService) report described the following: ‘A weakening ridge of high pressure lay east to west across the North Island while a trough of low pressure was moving eastwards to the south of the South Island. An old frontal system was more or less stalled over the south of the South Island’.

1.6.2 The satellite image shows the broad band of cloud associated with the frontal system lying across the south of the South Island on the afternoon of 15 December 2013 (refer Figure 6).

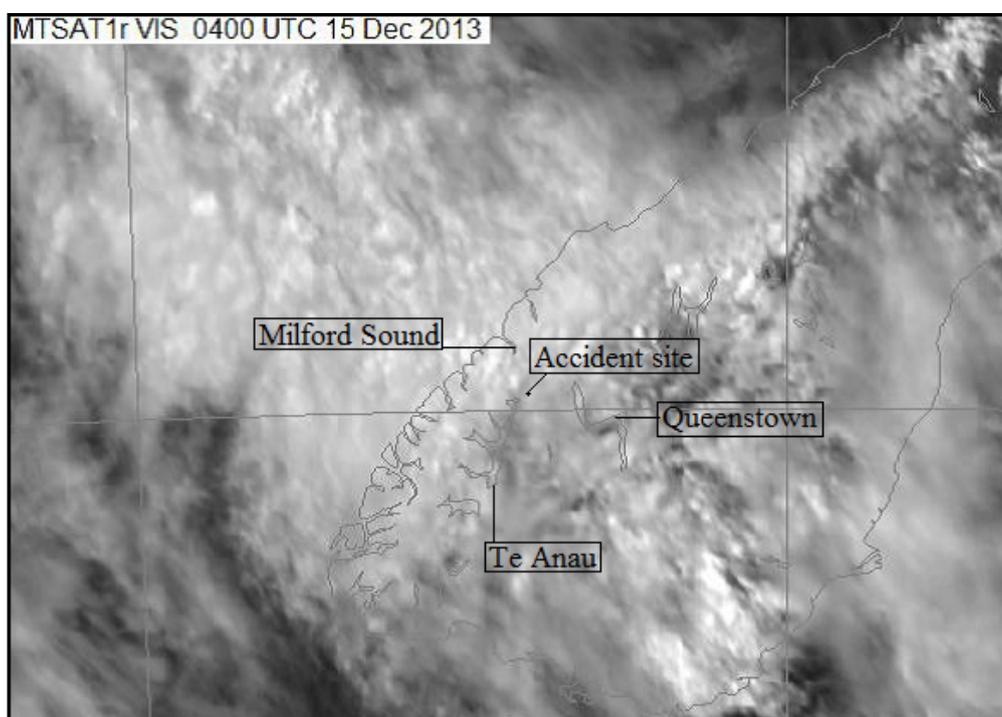


Image courtesy of Japan Meteorological Agency

Figure 6. Broad band of cloud over the lower South Island at 1700 hours 15 Dec 2013.

1.6.3 The area forecasts⁵ (ARFOR) issued by the MetService for the Fiords (FD) and Clyde (CY) regions were both valid from 1100 hours until midnight on 15 December 2013. The Fiords ARFOR forecast ‘areas of broken⁶ strati form cloud layers above 2,000 feet with visibility as low as 2500 metres in heavy rain’. The ARFOR for Clyde forecast, ‘areas of broken cumulus and stratocumulus cloud,

⁵ New Zealand is divided into 17 ‘area forecast’ zones. All heights referred to in ARFOR’s are above mean sea level (AMSL).

⁶ Broken refers to 5-7 eighths of cloud cover in a sky that is divided into 8 equal sections.

with a cloud base approximately 4500 feet AMSL and visibility as low as 4000 metres in heavy showers of rain’.

1.6.4 The pilot had monitored the local weather during the day and obtained a weather briefing for Queenstown Aerodrome from the Milford Sound Aerodrome Flight Information Service Officer.

1.6.5 Weather conditions at Milford Sound Aerodrome at the time of departure were generally consistent with the MetService aerodrome report of heavy rain and a main cloud base approximately 4000 feet AMSL.

1.6.6 The operators search helicopter pilot commented that, on his first flight into the Gladeburn Valley, he observed that there were patches of cloud clinging to some of the ridge lines and a cloud bank obscured the head of the Gladeburn Valley and Glade Pass. The wind was light and there were heavy rain showers present.

1.7 Aids to navigation

1.7.1 ZK-HNA was fitted with a Garmin model GPSMAP 196.

1.7.2 The GPS unit was operating during the flight and was ejected clear of ZK-HNA during the accident. It sustained heat damage from the post impact fire and was sent to the Australian Transport Safety Bureau for examination. Technicians there successfully recovered data relating to this accident and the nine previous flights.

1.8 Communications

1.8.1 ZK-HNA was fitted with a standard VHF radio and the only radio call heard was the position report made approximately ten minutes before the accident occurred.

1.9 Wreckage and impact information

1.9.1 On site examination of the wreckage and analysis showed that the helicopter struck the 40 degree mountain slope heavily in a nose up attitude while banked to the left.

1.9.2 The impact damage to the main rotor blades was substantial and a 25 centimetre length of blade tip was found approximately 140 metres away from the main wreckage site.

1.9.3 The tail rotor drive shaft was found to have twisted approximately 1½ turns due to the sudden stoppage when the main rotor blades struck the terrain and it had failed at

its forward coupling. The tail rotor gearbox was also fractured, separating the tail rotor assembly and its four blades from the helicopter.

1.9.4 The left landing gear skid was found to have fractured into four pieces.

1.9.5 The impact forces with the ground distorted the engine mounting frame and partially split the engines turbine section from its accessory gearbox section. These forces most likely caused the fuel tank to rupture with a subsequent uncontrolled fire.

1.9.6 The wreckage then yawed in an anticlockwise direction with enough energy to separate the tail section from the tail boom. The tail section was found 15 metres up the slope and forward of the fuselage.

1.9.7 The wreckage damage and dispersal indicated a high energy powered impact.

1.10 Fire

1.10.1 An intense post-impact fire broke out. It was mostly confined to the cabin area and main rotor gearbox forward of the engine bay firewall, however some of the engine accessory gearbox casing had also burnt.

1.11 Medical and pathological information

1.11.1 Whilst visiting a friend several days before the accident the pilot mentioned a problem with his eyesight where his vision went blurry and hazy at times. The friend stated that the pilot actually experienced this phenomenon during this visit. The pilot had not visited his doctor in respect to this condition.

1.11.2 The pilot was seen to have a slight limp in his right leg on the morning of the accident and at lunchtime was seen massaging his swollen ankle. He told his colleagues that it was really sore and not like any sensation he had experienced in the past. He said he did not know what was wrong with his ankle. After lunch he completed a short flight in ZK-HNA. On his return his colleagues noticed his limp was worse and he was seen to remove his boot again. Despite that he insisted he was okay to continue flying that day.

1.11.3 The pilot had completed several international long haul flights as a passenger in the previous seven weeks prior to the accident. He had flown from Alaska to New Zealand on 27 October 2013, New Zealand to Bangkok on 20 November and back to New Zealand on 26 November 2013. The most recent long haul flights and

the symptoms the pilot described raised the possibility of him having a deep vein thrombosis (DVT⁷).

1.11.4 Due to the intensity of the post-impact fire the pathologist was unable to take toxicological samples from the pilot and a complete and detailed post mortem examination could not be performed. This precluded establishing whether a medical event may have been a contributing factor in this accident.

1.11.5 The pathologist stated that the pilot most likely died as a result of massive traumatic injuries consistent with a high-energy impact.

1.12 Survival aspects

1.12.1 This accident was not survivable due to the severity of the impact forces and the post-impact fire.

2. Analysis

2.1 The investigation into this accident has found that ZK-HNA is likely to have entered cloud causing the pilot to experience spatial disorientation, and subsequent controlled flight into terrain (CFIT).

Outbound flight

2.2 The recovered GPS information showed that numerous attempts had been made to cross mountain passes and ridgelines during both the outbound and inbound flights, rather than fly a more direct route.

2.3 The progress of the flight was clearly affected by the prevailing weather conditions⁸ which would have increased the overall workload and mental demands on the pilot. The pilot had to manage the additional physical stressors of operating in poor visibility, increased decision making and the need to keep his passengers informed of the flights progress.

⁷ A deep vein thrombosis is most often associated with a blot clot in the veins of the lower leg that can then suddenly migrate to the heart or lungs.

⁸ The Meteorological Service forecast indicated marginal weather below published meteorological minima at times and passenger statements commented that the actual conditions were very 'foggy'.

Inbound Flight

- 2.4 A review of the ZK-HNA's GPS track to Dumping Hut showed that it initially flew a direct north-westerly track from Greenstone, then turned on to a southerly track approximately four minutes before the accident. This turn and the subsequent track flown prior to the accident were most likely due to low cloud obstructing the more direct route.
- 2.5 After crossing the ridgeline into the Gladeburn Valley ZK-HNA initially back-tracked north-west parallel to the mountain face for approximately 280 meters while in a shallow descent before it turned and flew towards the centre of the valley. This turn was possibly commenced to avoid a protruding bluff.
- 2.6 The track after this point shows that the helicopter continued flying towards the centre of the valley in a shallow descent before continuing a sharper left descending turn with an associated increased rate of descent back towards the mountain slope.
- 2.7 It is considered likely that the helicopter inadvertently entered cloud which resulted in subsequent pilot disorientation and a descending left turn back towards the mountain side until just before impacting the ground.
- 2.8 On site observations and evidence from the accident site show that the nose attitude of the helicopter was high and upslope at the time of impact. This change in nose attitude position is consistent with a pilot control input.

Pilot Health

- 2.9 The pilot's issue with his eyesight was not reported to his Doctor therefore it could not be determined what medical condition may have been causing this problem. It was therefore not possible to determine if the medical issue with the pilot's eyesight was a causal factor in this accident.
- 2.10 Similarly, the symptoms described by the pilot regarding his sore ankle, combined with the fact that he had completed several long haul flights as a passenger did raise the possibility of a developing DVT. This possibility and its effect on him could not be ruled out even though there was no evidence available from the autopsy to support such an event.

Operational Performance

- 2.11 Analysis of the ZK-HNA's GPS data⁹ showed that on this operation the helicopter had been flown on a number of occasions at heights well below the prescribed minimum of 500 feet AGL. Data revealed that in some instances the helicopter had been operating below 100 feet AGL.
- 2.12 Further analysis of the GPS data from the units nine other recorded flights identified that the practice of flying over ridgelines below 500 feet was also common. The data revealed 27 occasions where this had occurred.
- 2.13 Civil Aviation Rules prescribe the minimum heights¹⁰ that all pilots must abide by. The pilot in this accident was highly experienced therefore it is reasonable to conclude that he had knowledge of the applicable rule sets for the flights he was conducting.
- 2.14 No evidence was found of any pre-existing maintenance discrepancies. The pilot had conducted a flight a few hours before the accident flight and did not log any faults or recount any mechanical issues to his colleagues.
- 2.15 All evidence gathered during the investigation indicates that the engine was operating normally and was delivering power to the rotor blades.

3. Conclusions

- 3.1 The pilot was appropriately licensed and experienced to carry out the flight.
- 3.2 The pilot may not have been medically 'fit to fly' based on his own medical concerns and the observations of his colleagues¹¹.
- 3.3 GPS analysis coupled with meteorological information show that the helicopter was operated in a manner adversely affected by prevailing weather conditions and terrain.
- 3.4 It is possible that the pilot inadvertently entered cloud resulting in spatial disorientation and collision with the terrain.

⁹ GPS data has an accuracy of 15 meters (49 feet) feet: refer Garmin GPSMAP 196 Pilot's Guide

¹⁰ Rules 91.311 and 135.85 Minimum Heights for VFR flights

¹¹ Section 27C (1) of the Civil Aviation Act 1990 requires that you (pilot) not fly if you have any change in your medical situation, or if you have any previously undetected medical condition, that may interfere with the safe exercise of the privileges to which your medical certificate relates.

3.5 The accident was not survivable.

4. Safety Consideration

4.1 Pilots should conduct their own self-assessment as to whether they are fit to fly and make a decision based on that assessment. In this case the pilot persuaded two other company pilots that he was fit to fly¹².

4.2 The CAA has produced information relating to aircrew health, including an 'IMSAFE' poster which provides guidelines prompting aircrew to make the decision whether they are fit to fly or not.

4.3 The New Zealand Ministry of Health provides information about DVT on their website. Visit www.health.govt.nz then enter DVT into their 'search' tool.

4.4 VFR accidents caused by entry into IMC with resultant controlled flight into terrain has been regularly identified by investigating agencies worldwide and is ranked as one of the top ten causes of accidents.

4.5 Analysis of CAA data from 1st January 2000 to 31 December 2015 found that there were 24 CFIT accidents¹³ in New Zealand. Continued flight into deteriorating weather was identified as a causal factor in 15 of those accidents and resulted in the total loss of 31 lives.

4.6 With the implementation of Safety Management Systems, all operators will be required to identify any new hazards and introduce mitigation plans to reduce the risks those hazards might pose. Operators should use GPS track data as a tool to help identify any non-standard practices, or at risk behaviour that may affect the safe operation of aircraft in their organisation.

¹² Section 27C (2) of the Civil Aviation Act 1990 advises that if an operator is aware of, or suspects a change in medical status that may interfere with the safe exercise of the privileges to which the medical certificate relates, then they must advise the license holder as soon as possible. The intention of this section is to give an operator the option to stand-down a pilot if necessary

¹³ These statistics were based on investigated accidents that met the ICAO definition for CFIT events. These statistics exclude Agricultural, Glider, Hang Glider, Parachute and Paraglider accidents.

Report written by:

Authorised by:

Mr Peter Stevenson-Wright
Safety Investigator

Mr Jim Burtenshaw
Manager Safety Investigation

Date

Date

Civil Aviation Authority of New Zealand
Level 15, Asteron Centre
55 Featherston Street
Wellington 6011
NEW ZEALAND

Tel: +64-4-560 9400 Fax: +64-4-569 2024
www.caa.govt.nz



Erratum to controlled flight into terrain involving Hughes 369E, ZK-HNA

Glade Burn, Southland, 15 December 2013

Introduction

This erratum addresses three inaccurate points in the original report released on 5 September 2016. New medical information is included and the probability statement in paragraph 3.4 has been updated to make it consistent with paragraph 2.7. The corrections do not affect the safety considerations of the original report.

Point One

Paragraph 1.11.1 from the original report:

Whilst visiting a friend several days before the accident the pilot mentioned a problem with his eyesight where his vision went blurry and hazy at times. The friend stated that the pilot actually experienced this phenomenon during this visit. The pilot has not visited his doctor in respect to this condition.

Paragraph 1.11.1 updated:

In 2012 the pilot was diagnosed with several vision problems. The pilot was aware of vision impairment during the period prior to the accident.

In his 2 November 2013, CAA Medical Certificate application the pilot reported "eye or vision trouble". The CAA Medical Examiner (ME1) noted presbyopia (age related vision changes) and the use of lookover spectacles for flying.

There is no evidence to indicate that the ME1 was aware of the pilot's other 2012 vision diagnoses:

- Large right posterior vitreous detachment,
- Bilateral large physiological cupping of the optic discs, and
- Bilateral posterior subcapsular cataract.

The 2 November 2013 medical examination of the pilot reported within-standards corrected visual acuities. During the period prior to the accident, the pilot had also mentioned vision problems, blurring and haziness, to a friend. There is also no record of that having been reported to the CAA.

There is no evidence that these problems, other than the presbyopia, were reported to the CAA.

Point Two

Paragraph 2.9 from the original report:

The pilot's issue with his eyesight was not reported to his doctor therefore it could not be determined what medical condition may have been causing this problem. It was therefore not possible to determine if the medical issue with the pilot's eyesight was a casual factor in this accident.

Paragraph 2.9 updated:

The pilot had vision problems, but due to a lack of complete knowledge concerning the pilot's vision problems it is impossible to determine the extent to which his vision may, or may not, have contributed to the accident sequence.

Point Three

Paragraph 3.4 from original report:

It is possible that the pilot inadvertently entered cloud resulting in spatial disorientation and collision with the terrain.

Paragraph 3.4 updated:

It is likely that the pilot inadvertently entered cloud resulting in spatial disorientation and collision with the terrain.

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Civil Aviation Authority of New Zealand
Level 15, Asteron Centre
55 Featherston Street
Wellington 6011
OR
PO Box 3555, Wellington 6140
NEW ZEALAND

Tel: +64-4-560 9400 Fax: +64-4-569 2024
www.caa.govt.nz