CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

# AIRCRAFT ACCIDENT REPORT

## CAA OCCURRENCE NUMBER 11/4430

## Robinson R44 Raven

## ZK-HLL

## Forced landing into the sea

## 155 NM South West of Tokelau, Western Pacific Ocean

## 3 October 2011

(Example photograph source from: http://www.heliflightofmichigan.com/news_new_r44.html)

# Foreword

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 CAA 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

| | |
|---|---|
| AOC | Air Operators Certificate |
| ATO | Air Transport Operation |
| C | Celsius |
| CAA | Civil Aviation Authority |
| CAR | Civil Aviation Rule(s) |
| CPL (H) | Commercial Pilot Licence (Helicopter) |
| CTO | Commercial Transport Operation |
| DGAC | Direccion General de Aeronautica Civil |
| FAA | Federal Aviation Authority |
| ft | foot or feet |
| ICAO | International Civil Aviation Organisation |
| NZDT | New Zealand Daylight Time |
| NZST | New Zealand Standard Time |
| POH | Pilot's Operating Handbook |
| RPM | Revolution per minute |
| RRPM | Rotor Revolutions per minute |
| UTC | Coordinated Universal Time |
| VFR | visual flight rules |

## Data summary

| | |
|---|---|
| **Aircraft type, registration:** | Robinson R44 Raven, ZK-HLL |
| **Serial number:** | 1081 |
| **Number and type of engines:** | One, six cylinder Lycoming O-540-F1B5 piston engine |
| **Year of manufacture:** | 2001 |
| **Date and time of accident:** | 3 October 2011, 1230 hours[1] (approximately) |
| **Location:** | 155 nautical miles south west of Tokelau<br>Latitude[2]: S 10° 11'<br>Longitude: W 174° 16' |
| **Type of flight:** | Day VFR, Commercial Operation |
| **Persons on board:** | Crew: 1<br>Passengers: 1 |
| **Injuries:** | Crew: 1 fatal<br>Passengers: 1 minor |
| **Nature of damage:** | Aircraft destroyed |
| **Pilot-in-command's licence:** | Commercial Pilot Licence (Helicopter) |
| **Pilot-in-command's age:** | 34 years |
| **Pilot-in-command's total flying experience:** | 923.2 hours<br>197 hours on type |
| **Investigator in Charge:** | Mr P B Breuilly |

[1] All times in this report are NZDT (UTC + 13 hours) unless otherwise specified.

[2] NZ Geodetic Datum 1949 (or WGS-84) co-ordinates

## Executive summary

At 1230 hours on 3 October 2011, ZK-HLL was being operated from a purse seine[3] fishing vessel located approximately 155 nautical miles south west of Tokelau. The helicopter, with two occupants on board, advised of a need to return to the vessel due to a mechanical issue. Whilst returning to the vessel, the helicopter descended towards the sea, impacting on the surface and rapidly sank. The Captain of the fishing vessel (the passenger), quickly surfaced followed some time later by the unconscious pilot. The pilot was recovered from the sea; however attempts to revive him were unsuccessful. The helicopter was fitted with pilot activated pop-out floats which were not deployed.

The accident was investigated by the Civil Aviation Authority (CAA) because of the aircraft being registered in New Zealand.[4]

The CAA safety investigation found that the helicopter was being used as an observation platform for a tuna fishing operation when the pilot reported a possible governor fault. Evidence suggests that the reported fault was manageable and that the pilot's unfamiliarity with such a fault and the procedures to deal with it may have been a contributory factor in the accident. The safety investigation also found that there were environmental factors present which could lead to the development of carburettor icing which may also have been a contributing factor.

The safety investigation identified potential gaps in the ability of the Director of Civil Aviation (the Director) to exercise oversight of commercial operations involving New Zealand registered aircraft conducted in international waters. The investigation revealed that other jurisdictions have put in place certification requirements specifically to provide oversight of aircraft operating in international waters registered to their particular State. Safety recommendations have been made on this subject.

[3] A large seine (dragnet) designed to be set by two boats around a school of fish and so arranged that after the ends have been brought together the bottom can be closed.

4 Where an accident occurs outside the territory of a State, such as in international waters, under the Chicago Convention 1944 responsibility to investigate the accident falls the State of Registry for the aircraft. This obligation is incorporated in to New Zealand law, via the Civil Aviation Act 1990 and the Transport Accident Investigation Act 1990. While TAIC and CAA have a statutory function to investigate aviation accidents and incidents, there is no mandatory obligation to investigate.

## Notification

At 1625 hours on 3 October 2011 the CAA was notified of the accident. Following initial inquiries conducted from New Zealand, a CAA field investigation was commenced on 6 October 2011.

# 1. Factual Information

1.1.1 The purpose of the flight was to conduct aerial surveillance of tuna fishing activities being conducted from a commercial purse seine net fishing vessel operating in international waters in the Pacific Ocean.

1.1.2 It was established that such operations involve the helicopter being used to survey for schools of tuna. Once a school has been found, the passenger directs the laying of the purse seine nets and coordinates the smaller surface vessels to herd the fish towards the net. The helicopter is often used in the herding process and operates at the discretion and under the direction of the passenger[5].

1.1.3 The pilot and passenger had been at sea for approximately 45 days and during this time ZK-HLL had been operated for approximately 179.3 hours.

1.1.4 Prior to the accident, ZK-HLL had been airborne for approximately 30 minutes and was circling a school of tuna at 500 ft above the sea, whilst preparations were being made to set the net. The pilot told the passenger that they needed to return to the vessel as there was a problem with ZK-HLL. The passenger agreed and radioed to the vessel that they were returning. ZK-HLL carried out a further circle over the school of fish and then flew towards the vessel.

1.1.5 Whilst travelling towards the vessel, a distance of approximately a quarter of a mile, the passenger asked the pilot what was wrong. The pilot stated that the governor was not responding. The passenger noted that ZK-HLL appeared to be flying a lower, steeper and faster profile than normal. The passenger also noted that the pilot appeared to be tense. The passenger did not notice any warning indicators, changes in engine/rotor noise or unusual indications on the helicopter instruments.

[5] Following consultation and submissions from the New Zealand aviation industry, CAA issued Legal Information Bulletin 4 (LIB4), *Interpretation of CAR Part 1 Crew Member and Commercial Transport Operation.* The interpretations of crewmember and passenger are identified in LIB4 and this position is still held by CAA. (http://www.caa.govt.nz/Legal_Information/Legal_Info_004.pdf)

1.1.6 The pilot then told the passenger that they would have to ditch in the sea. The passenger, whom had survived three previous helicopter ditches, braced for the impact and noted that the pilot was sitting upright.

1.1.7 ZK-HLL struck the water tail first in a nose up attitude then pivoted forward striking the water nose down, on the pilot's side.

1.1.8 The passenger surfaced soon after egressing from ZK-HLL which had sunk rapidly. The pilot surfaced sometime after. The pilot did not respond to vocal or physical stimulation from the passenger or rescue boat crew which had arrived. Both occupants had activated their lifejackets.

1.1.9 First aid was immediately rendered by the passenger and continued over a lengthy period of time involving other members of the fishing boat crew, whilst instruction was given via radio from a land based medical practitioner. The pilot did not display any vital signs during the recovery efforts, which were ceased on the advice of a land based medical practitioner.

1.1.10 The accident occurred 155 nautical miles south west of Tokelau, Pacific Ocean at: latitude S 10° 11', longitude W 174° 16'.

## 1.2 Injuries to persons

| *Injuries* | *Crew* | *Passengers* | *Total* |
|---|---|---|---|
| Fatal | 1 | 0 | 1 |
| Minor/None | 0 | 1 | 1 |

**Table 1. Injuries to persons**

## 1.3 Damage to aircraft

1.3.1 ZK-HLL sank soon after impact with the sea and was not recovered.

1.3.2 The investigation determined that the helicopter wreckage was unrecoverable.

1.3.3 The wreckage was unable to be inspected, and no findings could be made as to the nature of any damage sustained to the helicopter.

## 1.4 Other damage

1.4.1 Nil.

## 1.5 Pilot information

1.5.1 The pilot, a male Mexican national, was aged 34 years and was the holder of a Commercial Pilot Licence (Helicopter) (CPL(H) issued by the Federal Aviation Authority (FAA). The pilot's Third Class Medical Certificate was also issued by the FAA and valid until 31/08/2012.

| Flying hours | All types | Relevant Type |
|---|---|---|
| Last 24 hours | Unknown | Unknown |
| Last 7 days | 22.4 | 22.4 |
| Last 30 days | 132.8 | 132.8 |
| Last 90 days | 194.9 | 194.9 |
| Total | Approximately 923.2 | Approximately 198.1[6] |

**Table 2. Pilot's flight hours**

1.5.2 A Pilot Logbook belonging to the pilot and issued by the Direccion General de Aeronautica Civil (Mexico) (DGAC), was recovered from the fishing vessel. The records in the logbook commenced on 17 December 2010 with the last entry made on 1 October 2011. This appeared to be one of a series of logbooks as the total hours commenced at 415.9. The total number of hours flown, including the pilot's last flight, totalled 923.2 hours.

1.5.3 Certified records provided from the FAA showed that the pilot had been issued a CPL (H) on 2 October 2008 having taken a flight test in a Robinson R22. Review of the Pilot Logbook showed the pilot had recorded predominately operating a Bell 47 helicopter for 304.3 hours (between 17/12/10-27/03/2011) on commercial fishing operations. On 7 June 2011 the pilot completed a Biennial Flight Review in a Robinson R22 Beta II.

1.5.4 Having obtained a position with Western Pacific Helicopters Limited (Operator) based in New Zealand, the pilot travelled to New Zealand to obtain training in ZK-HLL. The pilot received a total of 3.15 hours of familiarisation training from a New Zealand Category A[7] Flight Instructor and was considered competent but not current. A review of the Pilot Logbook for the same period of instruction showed that 6.9 hours had been

[6] Only one Pilot Logbook was recovered from the Pilot's possessions. It was reported by the operator that the Pilot had approximately 50 hours on R44 prior to joining the Company however it was not possible to obtain relevant documentation to confirm these claims.

[7] Category A Flight Instructor is the most senior level of Flight Instructor in New Zealand

recorded. Between 14 and 15 July 2011 the pilot recorded 2.4 hours. During these dates he was carried as a passenger when ZK-HLL was ferried from Wanaka to Picton by a New Zealand licenced Pilot.

1.5.5 ZK-HLL was subsequently shipped to American Samoa aboard the F/V Cape Breton. The pilot operated the helicopter in American Samoa prior to the vessels departure to the fishing area.

1.5.6 Inquiries with DGAC revealed that the pilot had not been issued a Mexican Pilot Licence or Medical Certificate.

1.5.7 Under the CARs[8], to pilot a New Zealand registered aircraft outside of New Zealand a pilot must hold an appropriate current pilot licence issued in accordance with Part 61 of the New Zealand CARs, issued or validated by the pilot licensing authority of the country in which the aircraft is operated or issued by a foreign pilot licensing authority with a validation permit issued by CAA.

1.5.8 CAA had not issued any aviation documents to the pilot. The CAA has no record of the pilot having ever sought the necessary licence validation document necessary to use his FAA issued Pilot Licence.

1.5.9 It appears that at the time of the accident the pilot did not hold the necessary aviation documents to operate the aircraft.[9]

## 1.6 Aircraft information

1.6.1 The Robinson R44 Raven, ZK-HLL serial number 1081, was manufactured in the United States of America (USA) in 2001. At 1824.8 total airframe hours, the helicopter had been subjected to a 2000 hour/12 yearly inspections and was released to service on 12 July 2011. A newly overhauled engine was also installed during the inspection along with radios suitable for communication between ZK-HLL and the fishing vessel. The helicopter was fitted with a pilot activated pop-out float system. A review of documentation for the 12 yearly inspections indicates the float kit was inspected and found satisfactory.

8 Civil Aviation Rule Part 61.5(b) *Requirement for pilot licence and ratings*

9 Although the CARs are clear on the relevant licensing standard applying to the operation of New Zealand registered aircraft, there is some doubt as to whether the relevant personnel licensing Rule is applicable extra-territorially.

1.6.2 The helicopter had accrued approximately 2005.2 total airframe hours at the time of the accident. As part of the contract with Tri Marine International (Pte) Limited (fishing company), the operator had a maintenance engineer on board the fishing vessel. The most recent scheduled maintenance activity had been carried out at 1974.6 hours total time. This maintenance was in accordance with a Service Bulletin pertaining to the engine[10]. No other maintenance discrepancies had been noted during ZK-HLL's operations from the vessel.

1.6.3 The floats on the helicopter are required to be 'armed' by a pilot prior to operation, which is recommended to be carried out daily or on a pre-flight check.[11] To arm the floats the pilot must set the safety on the activation lever from 'Locked' to 'Ready'. (Figure 1)

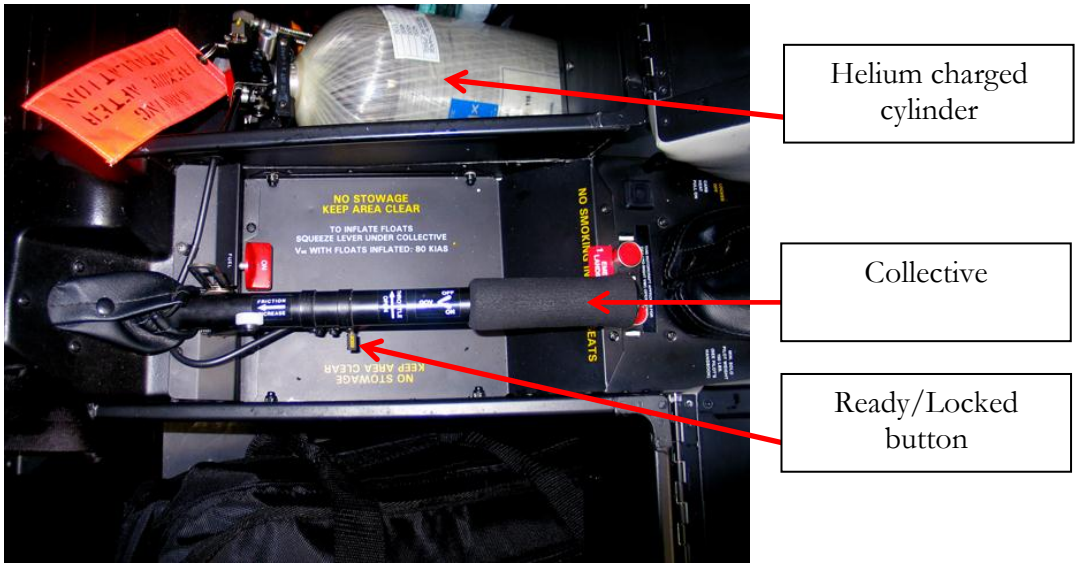


**Figure 1. Locked/Ready button and helium cylinder**

1.6.4 The floats are activated by the pilot squeezing a handle connected under the collective triggering the release of compressed helium from a cylinder located under the front passenger seat. The floats take approximately four seconds to fully deploy and can be activated at indicated air speeds below 80 knots. (Figure 2)

[10] Service Bulletin 480E requires change from mineral oil to ash dispersant oil for newly overhauled engines at predetermined hours of time in service.

[11] Robinson R44 POH Section 9, page 9-10.5 and 9-10.6 Rev. 20 Apr 2007

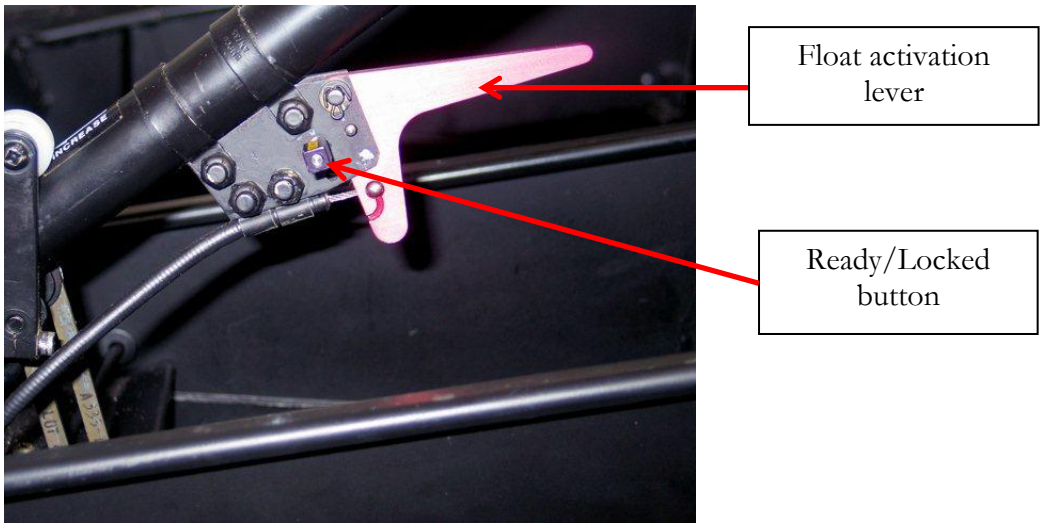


**Figure 2. Activation lever on collective**

1.6.5 Due to ZK-HLL being unrecoverable, it is not possible to establish whether the pilot had armed or attempted to activate the floats. It is possible that if the floats had been deployed as designed, the pilot may have had additional time to egress safely from the helicopter before it sunk.

## 1.7 Meteorological information

1.7.1 Due to the remote location of the accident, assistance was requested from New Zealand MetService to obtain data relating to prevailing weather conditions in the area of the Pacific Ocean at the time of the accident. Weather information was subsequently obtained through the National Oceanic and Atmospheric Administration, USA. The weather data obtained from vessels and weather buoys, showed that the prevailing conditions near the accident site were suitable for the operation to occur.

1.7.2 Ambient temperatures averaged 25.3°C and a dew point average of 28.7°C with a relative humidity of 76% and wind speeds between 10-15 knots.

1.7.3 The recorded ambient conditions are considered conducive to carburettor icing.

## 1.8 Aids to navigation

1.8.1 Nil.

## 1.9 Communications

1.9.1 A message was sent by the passenger to the vessel advising of the pilot's intent to return the helicopter. In response to this, the fishing vessel's first mate had prepared the vessel for the arrival by manoeuvring for a more favourable wind direction for the

helicopter's approach. It can therefore be concluded that two-way communication existed between ZK-HLL and the fishing vessel.

1.9.2 Communication on board the helicopter between the pilot and passenger was through headsets.

### 1.12 Wreckage and impact information

1.12.1 As noted at paragraph 1.3, the aircraft sank and was not recovered. No findings as to the nature of the damage to the aircraft could be made.

### 1.13 Medical and pathological information

1.13.1 The post mortem revealed no apparent pre-existing medical condition which may have incapacitated or impaired the pilot or otherwise contributed to the accident.

1.13.3 An autopsy concluded the pilot's cause of death was due to drowning.

### 1.15 Survival aspects

1.15.1 As the helicopter was not recovered, it was not possible to examine the airframe. From information obtained from the passenger and witnesses on the vessel, it would appear that the helicopter struck the surface in a tail down/nose up attitude and rolled onto the right side (pilot), sinking quickly. The passenger surfaced soon after the helicopter sank, however the pilot did not surface for some time.

1.15.2 The passenger had been involved in three previous water landings and had prepared for the impact following the warning from the pilot, and quickly egressed from the helicopter.

1.15.3 The passenger stated that the pilot had been sitting in an upright position pre-impact with his hands on the controls. The pathology report showed that the pilot had received an impact to the front of the head. This impact could have been sufficient to cause disorientation or unconsciousness to the pilot which delayed a rapid egress from the helicopter. Neither pilot nor Passenger was wearing a helmet.

1.15.4 The helicopter was fitted with pilot activated emergency pop-out floats. The evidence available suggests that these were not activated by the pilot or did not deploy as designed.

1.15.5 The pilot and passenger were both wearing lifejackets which were required to be activated by the wearer. Both parties recovered to the surface with their lifejackets inflated.

## 1.16 Tests and research

1.16.1 Due to the comments made by the pilot to the passenger during the flight that the governor was not responding and the passenger's impression that the helicopter appeared to be flying a lower, steeper and faster profile than normal; the investigation concentrated on the governor system and where a failure may have contributed to the accident.

1.16.2 The governor system installed on the helicopter is a solid-state analogue-circuit control unit mounted behind the left rear seat. The electronic unit senses engine rpm via a set of points in the right hand magneto and rotor RPM (RRPM) from the main rotor gear box. These in turn send a signal to the governor, which activates a worm-gear in the actuator, leading to a friction plate adjoined to a connecting rod assembly at the collective. Changes made by the governor are transferred from the connecting rod through a linkage, through to the collective grip held by the pilot.

1.16.3 The linkage from the governor to the mechanical throttle assembly (pilot's throttle grip) is via friction plates only; therefore in the case of the governor control system failing or not being switched on, the pilot can manually control the throttle inputs.

1.16.4 Flight tests were carried out in a Robinson R44 Clipper II, a comparable configuration to the accident helicopter, to simulate possible governor failures. These tests included: failure by the pilot to turn the governor on, turning the governor off in flight and overriding the governor in flight per the Flight Manual instructions. In all situations it was found that the pilot could manage engine and rotor speed and operate the helicopter within the Manufacturers' prescribed limitations.

## 1.17 Additional information

1.17.1 The New Zealand based operator owned the helicopter and was contracted by the fishing company to supply helicopters, pilots and engineers to four fishing vessels at the time of the accident. The operator has been conducting these types of operations since 2009. Each pilot was employed on individual contracts. The operator did not hold any form of organisation certification, such as an Air Operators Certificate (AOC) that would authorise the carriage of passengers for hire or reward.

1.17.2 Had the operation been conducted within the territory of New Zealand, the operator would have been required to hold an AOC to enable the carriage of passengers in the helicopter during this type of operation.

# 2. Analysis

## 2.1 Governor fault

2.1.1 The pilot reported to the passenger that there was a fault with the governor, requiring them to return to the fishing vessel. The governor system senses engine RPM and applies corrective input forces to the [on the collective] throttle. When RPM is low, the governor increases throttle and vice versa[12]. A number of faults can give rise to a suspected governor fault, which tend to be indicated to the pilot through the dual engine/RRPM tachometer positioned at the top right of the instrument panel as fluctuating or abnormal needle movements.


**Figure 3: Dual needle Engine/RRPM tachometer**

2.1.2 Faults in this system, which include the right hand magneto, can occur. However, adherence to the Robinson R44 Pilot Operating Handbook (POH), Section 3 Emergency Procedures[13] should allow the pilot to maintain control of the engine and RRPM and make a controlled landing if required. The POH states:

> **GOVERNOR FAILURE**
>
> If engine RPM governor malfunctions, grip throttle firmly to override the governor, then switch governor off. Complete flight using manual throttle control.

2.1.3 The amount of pressure required by the pilot to override the governor at the throttle is not specifically identified however, the POH states *'...grip throttle firmly...'*. The Passenger was unable to provide information as to whether the pilot had overridden

[12] Reference information from *Robinson R44 Maintenance Manual Section 8.230 RPM Governor System*.

[13] FAA Approved this Handbook on 13 May 2009.

the governor. The passenger also could not see any other indications on the instrument panel to advise what fault may have arisen.

## 2.2 Carburettor Icing

2.2.1 Another possible mechanical/environmental fault which could have occurred is known as *carburettor icing*. The effect of carburettor icing in a piston engine is to restrict the air flow, resulting in an imbalance of the ideal stoichiometric fuel/air mixture. The resultant "rich" mixture can cause a drop in engine RPM and loss of power.

2.2.2 Safety Notice SN-31 issued by the helicopter manufacturer in December 1996 states:

> GOVERNOR CAN MASK CARB ICE
>
> With throttle governor on, carb ice will not become apparent as a loss of either RPM or manifold pressure. The governor will automatically adjust throttle to maintain constant RPM which will also result in constant manifold pressure. When in doubt, apply carb heat as required to keep CAT out of yellow arc during hover, climb, or cruise, and apply full carb heat when manifold pressure is below 18 inches.

2.2.3 In July 2012 the helicopter manufacturer released an amendment to the helicopter POH at Section 4 *Normal Procedures* stating:

> **USE OF CARBURETOR HEAT**
>
> Carburetor ice can form in a wide range of atmospheric conditions, but is most likely to form when OAT is between -4°C and 30°C (25°F and 86°F) and the difference between OAT and dew point is less than 15C° (27F°). When conditions conducive to carburetor ice are suspected, use carburetor heat as follows:
>
> During Run-up: Use full carburetor heat (it is filtered) during warm-up to preheat induction system.
>
> During Flight: Use carb heat as required to keep CAT gage indication out of yellow arc.

Meteorological conditions at the time of the flight were within the parameters described and light carburettor icing could have been reasonably expected. It is therefore possible that the engine was subjected to carburettor icing and the pilot misinterpreted the indications, and failed to apply carburettor heat.

## 2.3 Fish spotting operation

2.3.1 The operator had an established contract with the fishing company to provide and operate: helicopters, pilots and engineers from fishing vessels. The function of the

helicopter is to act as an aerial observation platform and to assist during fishing activities. The passenger was regularly carried to coordinate the fishing vessel movements during the catching period. If carried out in New Zealand, this type of operation would be identified as; an *'Air operation*' and constitute a *'Commercial transport operation'*[14] (CTO).

2.3.2 The CARs stipulate that operations involving the carriage of passengers for hire and reward require an operator to be the holder of an AOC. To obtain an AOC, an operator is required to meet acceptable standards which show that the operations being undertaken will meet and continue to meet both New Zealand and International Civil Aviation Organisation (ICAO) standards of operational management and safety. The operator certification process provides the CAA with information from the operator showing that they meet the standards to carry passengers for hire and reward as a commercial business. Although the operator was conducting CTO's, it was not the holder of an AOC under CARs *Part 119 Air Operator-Certification* and *Part 135 Air Operations- Helicopters and Small Aeroplanes* which it would have been required to hold if operating in areas of seas within New Zealand's territory.

2.3.3 The practise of fish spotting by aircraft in New Zealand waters is not specifically identified as requiring an AOC (unless the operation involves carriage of a passenger and it is done for hire or reward). Fish spotting is often conducted as 'pilot alone' operations under CAR Part 91 *General operating and flight rules*.

2.3.4 ICAO has established a safety framework that is intended to promote consistency across all ICAO Member States.

2.3.5 Annex 2 to the convention prescribes "Rules of the Air" which are minimum requirements for flight operations in areas of high seas or undetermined sovereignty.

2.3.6 Many States, in addition to requiring compliance with Annex 2 Rules, also extend the reach of their own domestic aviation legislation to operators, aircraft and their nationals operating in other territories or international waters[15].

2.3.7 Under the Civil Aviation Act 1990 (the Act), Section 4 (2A) requires New Zealand registered aircraft operating over the high seas to comply with Annex 2. The Act (and

[14] Air operation, Air transport operation and commercial transport operation are defined under CAR Part 1 Definitions.

[15] Both the FAA and Civil Aviation Safety Authority of Australia require an AOC for this type of operation, notwithstanding if passengers are carried.

Regulations and Rules made under it) have limited extra-territorial application. In particular, the Act expressly extends the application of the Act to New Zealand registered aircraft whether they are operating in or outside New Zealand. However it is CAA's interpretation that the requirement to hold an AOC is not extended to New Zealand operators conducting operations in areas of high seas or in overseas territories, although it is encouraged.

2.3.8 The safety investigation identified that CAA was not aware that:

1. The operation was occurring,
2. That the New Zealand registered aircraft was being used outside of New Zealand commercially, or
3. That is was being used for the carriage of passengers for hire or reward.

2.3.9 Despite the Act having some extra-territorial provision, there is no legislation requiring aircraft operators to notify the CAA when the aircraft is being used outside of New Zealand territory, even where it is engaged on hire or reward operations. However, if the operator wants to conduct overseas operations under a New Zealand AOC, the operator must identify all aircraft being used for those operations under the AOC.

2.3.10 In July 2012 the CAA published a policy titled: *Safety Regulatory Oversight of Commercial Operations Conducted Offshore* (the Policy). The policy was directed at the increasing number of New Zealand based operators being contracted to undertake operations in overseas states, in areas of high seas and in areas of undetermined sovereignty. The policy expressly provided that it extended to fish spotting operations at sea.

2.3.11 The policy identified that the present legal framework in New Zealand is such that offshore operations are not necessarily prevented, but nor are they specifically provided for. A number of difficulties were identified with New Zealand's legislation, being:

i. Operators are not required to notify the CAA of their intention to conduct commercial operations overseas, or seek authorisation to conduct such operations (unless the operation is to be conducted under a New Zealand Air Operator Certificate – this policy requires such notification, although there is

no consequence for failing to notify). As a result, the CAA does not necessarily know who is operating what and where.

ii. There is uncertainty regarding the application of the Act in the context of operations conducted within the jurisdiction of a foreign state, particularly in relation to Air Operator Certification.

iii. New Zealand's rules relating to aircraft registration require no connection with New Zealand other than an address for service. If the aircraft is operated overseas by an overseas entity the CAA has only limited ability to exercise New Zealand's regulatory responsibilities as the State of Registry.

iv. Present rules inhibit the CAA's ability to transfer New Zealand's responsibilities as the State of Registry to a foreign State (as provided in Article 83 bis[16] of the Convention and Section 4 of the Act). This limits the options available for facilitating operations by New Zealand registered aircraft leased to foreign operators.

2.3.12 The policy indicated that further work has been undertaken on these issues. While it was established that these issues have been raised as part of the Ministry of Transport's (the MoT) review of the Act, MoT requested that further data be provided regarding the considered risks and was not addressed during the review process.[17]

2.3.13 An additional issue has also been identified regarding pilot licencing. While it is clear that the Act extends to New Zealand registered aircraft operating outside New Zealand, there is some uncertainty as to whether the Act extends to the licensing requirements for operating the aircraft when overseas per CAR Part 61 *Pilot Licences and Ratings.*

2.3.14 It is recommended that CAA evaluate risks in the CAA/Director's ability to exercise safety regulatory oversight of New Zealand aircraft conducting non-certificated, commercial operations off-shore. A fresh assessment of the legislative issues identified in the policy could also be considered to ensure that these matters have been adequately articulated and considered as part of the Act review.

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[16] '83 bis agreement' means an agreement entered into under Article 83 bis of the Chicago Convention. This is an agreement between ICAO contracting States which transfers some regulatory and oversight functions from one State to another.

[17] Review of the Act was conducted between January and June 2014.

## 3. Conclusions

3.1 The pilot did not hold the necessary aviation document (FAA Class 2 medical) or validations (NZCAA) required carry out the operation.

3.2 Due to the helicopter being unrecoverable, it was not possible to establish if a technical malfunction of the helicopter contributed to the accident.

3.3 The helicopter was fitted with pop-out floats which were not deployed, or failed.

3.4 The prevailing environmental conditions of both temperature and relative humidity were conducive to the production of carburettor icing, which may have caused a drop in engine RPM and consequential loss of power.

3.5 By virtue of the passenger's successful egress, it would appear that the accident was survivable.

3.6 It is conceivable that had safety devices such as a helmet for the pilot been worn and the helicopter floats been deployed, then the pilot could feasibly have survived.

3.7 It appears that current regulatory safety oversight may not be fully addressing the risks associated with off-shore uncertificated operations for commercial purposes.

## 4. Safety Actions

4.1 A Safety Action (CAA 14F1143) has been raised for the General Manager of the General Aviation Group to provide endorsement for an issue assessment of the potential risks and CAA regulatory oversight of New Zealand registered aircraft carrying out non-certificated commercial operations off-shore.

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