



**NEW ZEALAND HELICOPTER AND AGRICULTURAL  
AVIATION  
SAFETY UPDATE  
DECEMBER 2018**



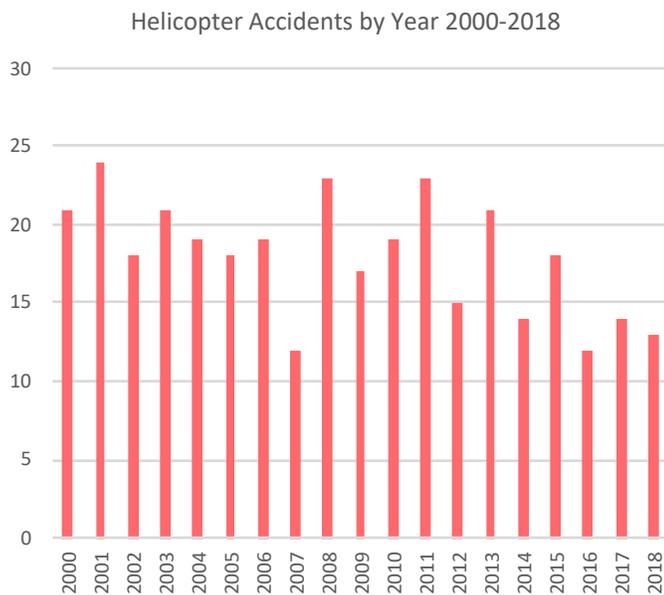
# INTRODUCTION

This is a further update on activity and safety performance in the helicopter and agricultural aviation sectors, with activity and accident rate information current to September 2018. The report includes details of accidents and serious incidents for the purpose of raising awareness about risks and sharing lessons amongst the sector.

If you have questions or comments about the information then please contact me at [Joe.Dewar@caa.govt.nz](mailto:Joe.Dewar@caa.govt.nz).

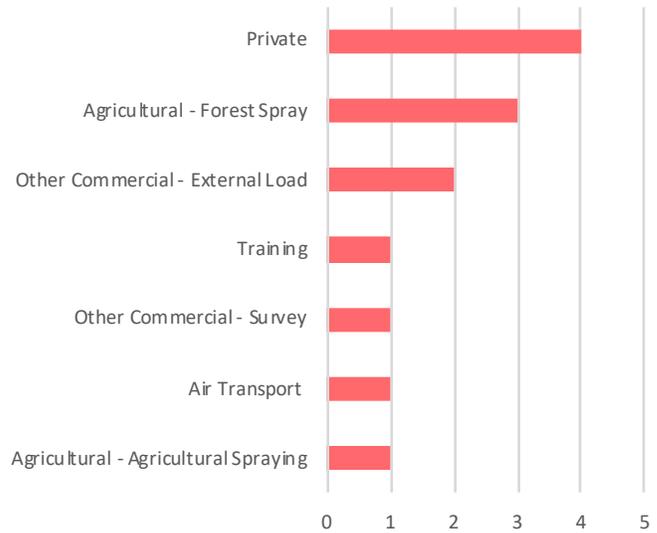
# SAFETY PERFORMANCE

There have been 13 helicopter accidents in 2018 to date, 3 of which involved fatalities. This is one fewer than in 2017 overall which saw 14 accidents.



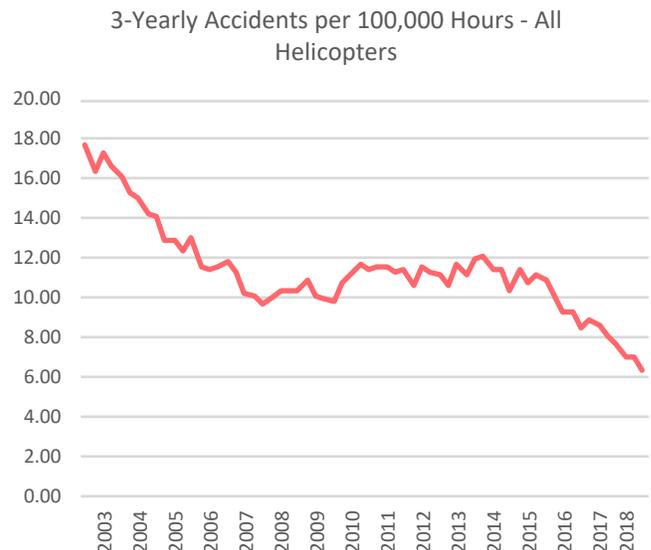
4 of the accidents occurred on private operations, while a further 4 occurred on agricultural operations - 3 on forestry block spray operations and 1 on agricultural spraying operations.

2018 Helicopter Accidents by Operation Type

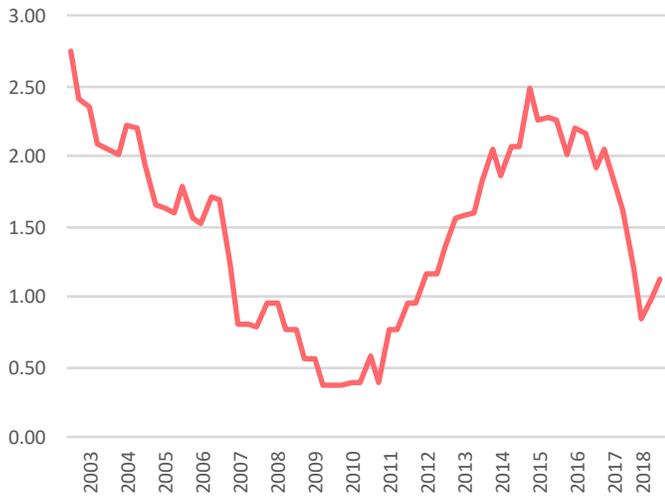


# HELICOPTER ACCIDENT RATES

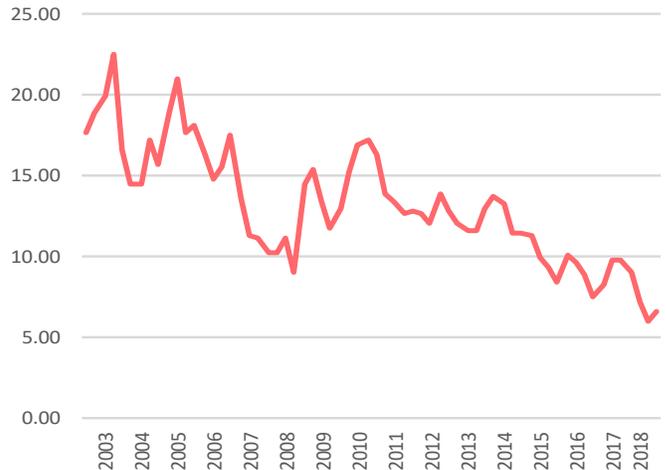
Note that all rates are current to September 2018 and do not include accidents from October onwards. The overall 3-yearly helicopter accident rate per 100,000 flight hours is 6.29. The fatal accident rate is at 1.13 per 100,000 hours.



3-Yearly Fatal Accidents per 100,000 Hours

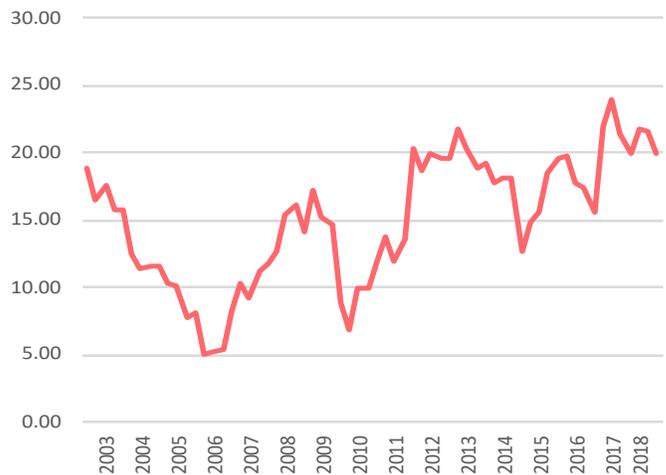


3-Yearly Accidents per 100,000 Hours - Agriculture



The lowest rate by helicopter sector currently is for air transport operations. The rate in this sector is 2.05 per 100,000 hours. The next lowest is in the agricultural sector with 6.66 accidents per 100,000 hours. The rate in the training sector has reduced down to below 20 for the first time since 2014, and the rate for other commercial operations sits at 19.90 per 100,000 hours.

3-Yearly Accidents per 100,000 Hours - Other Commercial



3-Yearly Accidents per 100,000 Hours - Air Transport



3-Yearly Accidents per 100,000 Hours - Training



# NZ HELICOPTER ACTIVITY MAP

Colour Total Hours by Operators and Area in 2017-18



| Count by Region          | BoP   | Gisborne |
|--------------------------|-------|----------|
| Part 135 & 137 Operators | 5     | 3        |
| Part 135 Operators       | 2     | 0        |
| Part 137 Operators       | 0     | 1        |
| Total Helicopters        | 33    | 12       |
| Flight Hours 2017 - 2018 | 8,957 | 6,078    |

| Count by Region          | Northland | Auckland | Waikato | Taranaki |
|--------------------------|-----------|----------|---------|----------|
| Part 135 & 137 Operators | 2         | 3        | 8       | 3        |
| Part 135 Operators       | 3         | 9        | 2       | 2        |
| Part 137 Operators       | 3         | 0        | 3       | 1        |
| Total Helicopters        | 28        | 75       | 52      | 17       |
| Flight Hours 2017 - 2018 | 19,408    | 28,303   | 24,393  | 6,040    |

| Count by Region          | Wellington | Nelson/Tasman |
|--------------------------|------------|---------------|
| Part 135 & 137 Operators | 3          | 6             |
| Part 135 Operators       | 1          | 4             |
| Part 137 Operators       | 1          | 0             |
| Total Helicopters        | 13         | 27            |
| Flight Hours 2017 - 2018 | 4,044      | 11,394        |

| Count by Region          | Hawke's Bay | Manawatu |
|--------------------------|-------------|----------|
| Part 135 & 137 Operators | 3           | 2        |
| Part 135 Operators       | 2           | 1        |
| Part 137 Operators       | 2           | 4        |
| Total Helicopters        | 12          | 17       |
| Flight Hours 2017 - 2018 | 6,814       | 9,369    |

| Count by Region          | Southland | Otago  | Canterbury | West Coast |
|--------------------------|-----------|--------|------------|------------|
| Part 135 & 137 Operators | 3         | 6      | 8          | 3          |
| Part 135 Operators       | 2         | 11     | 7          | 4          |
| Part 137 Operators       | 2         | 3      | 3          | 0          |
| Total Helicopters        | 43        | 107    | 65         | 37         |
| Flight Hours 2017 - 2018 | 19,085    | 62,808 | 30,415     | 16,430     |



## 2018 ACCIDENT DETAILS

Details of the 13 accidents in 2018 are provided below. Note that a number are currently under investigation by the Transport Accident Investigation Commission.



January



Canterbury



Hughes 300



Loss of control - performance management

The helicopter's RPM decayed on final approach, approximately 150m from the landing point, at 100 ft. altitude. The pilot was unable to recover the situation, and auto rotated onto a slope from which the helicopter slid 5-6m down the slope, breaking the tail boom and one skid.

No defects were found. The pilot had very limited experience on the helicopter type and did not recognise the onset of low RRPM which required proactive control inputs including rolling on throttle.

Due to the height above ground and the descent rate, impact with the ground could not be avoided.

Pilots are reminded to actively monitor the RRPM and to manage the required control inputs.



January



Canterbury



R44



Collision/strike - tree

The pilot was engaged on an external load operation, sling loads of fencing equipment. While entering a hover and focusing on positioning the load, the main rotor blade made contact with a tree on the pilot's blindside. The pilot released the load and turned towards the track to land. The helicopter made contact with the edge of a bank, spun to the right, and descended backwards into the bush. The pilot was not injured.

The operator's investigation identified situational awareness as the main contributor to the accident. The key lessons identified were the importance of making sure that ground crew understand their responsibilities around providing guidance to pilots where terrain/obstacle clearance has been identified as a hazard.

In addition the operator noted the importance of ensuring that longlines are of sufficient length to give maximum practical clearance of obstacles.



January



Wellington



BK 117



Collision/strike - tree

At the conclusion of an external load operation it was determined after an inspection of the main rotor blades that they had made contact with trees. The internal investigation identified that the use of a previous risk assessment, without evaluating the site for hazards, prevented the identification of the hazards presented by the tree line. The use of the 50' long line reduced the safety margin and would not have been used if a 100' long line had been available on the site.



February



Wanaka



Cabri G2



Abnormal landing

The operator reported that the helicopter landed heavily and rolled over following a practice autorotation.



May



Nelson



AS 350



Collision/strike - tree

On an operation spraying a forestry block, during a turn coming back to start another spray line the helicopter struck a tree with the main rotor blade. The strike damaged one of the blades significantly and put the aircraft out of balance. The pilot landed the helicopter on an old forestry skid site a 100m away. Cloud cover and poor light were identified as key causal factors for the pilot not identifying the tree.



June



Near Waiouru



Hughes 600



Under investigation

The helicopter crashed while on a survey operation, with one of the occupants dying in hospital after the accident. TAIC are investigating the accident.



The crash scene



June



Southland



Hughes 300



Engine power loss

During the takeoff and departure, the helicopter suffered a loss of power, with the pilot attempting to return and land on a ridge. Due to insufficient power the helicopter impacted a bank and rolled. The pilot was not injured.



July



Otago



Robinson R44



Under investigation

The aircraft went missing in the vicinity of Stevenson's Island, Lake Wanaka. A TAIC investigation into the accident is underway.

-  September
-  Bay of Plenty
-  Robinson R22
-  Loss of control - dynamic rollover

During a private deer hunting operation the pilot flew over a ridge and encountered a tailwind. This led to low rotor RPM, which the pilot could not recover and they subsequently attempted to land in a field. The skids dug in to soil and the helicopter rolled over.

-  October
-  Wanaka
-  Hughes 500
-  Under investigation

The helicopter crashed shortly after take off from Wanaka Airport. All three occupants were killed in the accident. A TAIC investigation into the accident is underway.

-  October
-  Bay of Plenty
-  AS 315 Lama
-  Engine power loss

During a forest spraying operation, taking the weight while lifting with another load, at approximately 40ft there was a load bang from the engine, immediately followed by a loss of power. The pilot used the remaining rotor energy to reduce the rate of descent but landed heavily in the upright position. There were no injuries but the aircraft sustained some damage.

-  November
-  Otago
-  AS 350
-  Component/system failure or malfunction

Forced landing accident. While on approach to conduct a spray run, the engine failed at approximately 60 feet AGL. The pilot manoeuvred the aircraft to land on a nearby track during the autorotation. Upon impact the tail boom failed and one of the skids bent. There was damage to helicopter but nil injuries. The engine had suffered an internal failure causing the turbine assembly to move rearwards severing the Py sense line and shutting down the engine.



November



Canterbury



Robinson R44



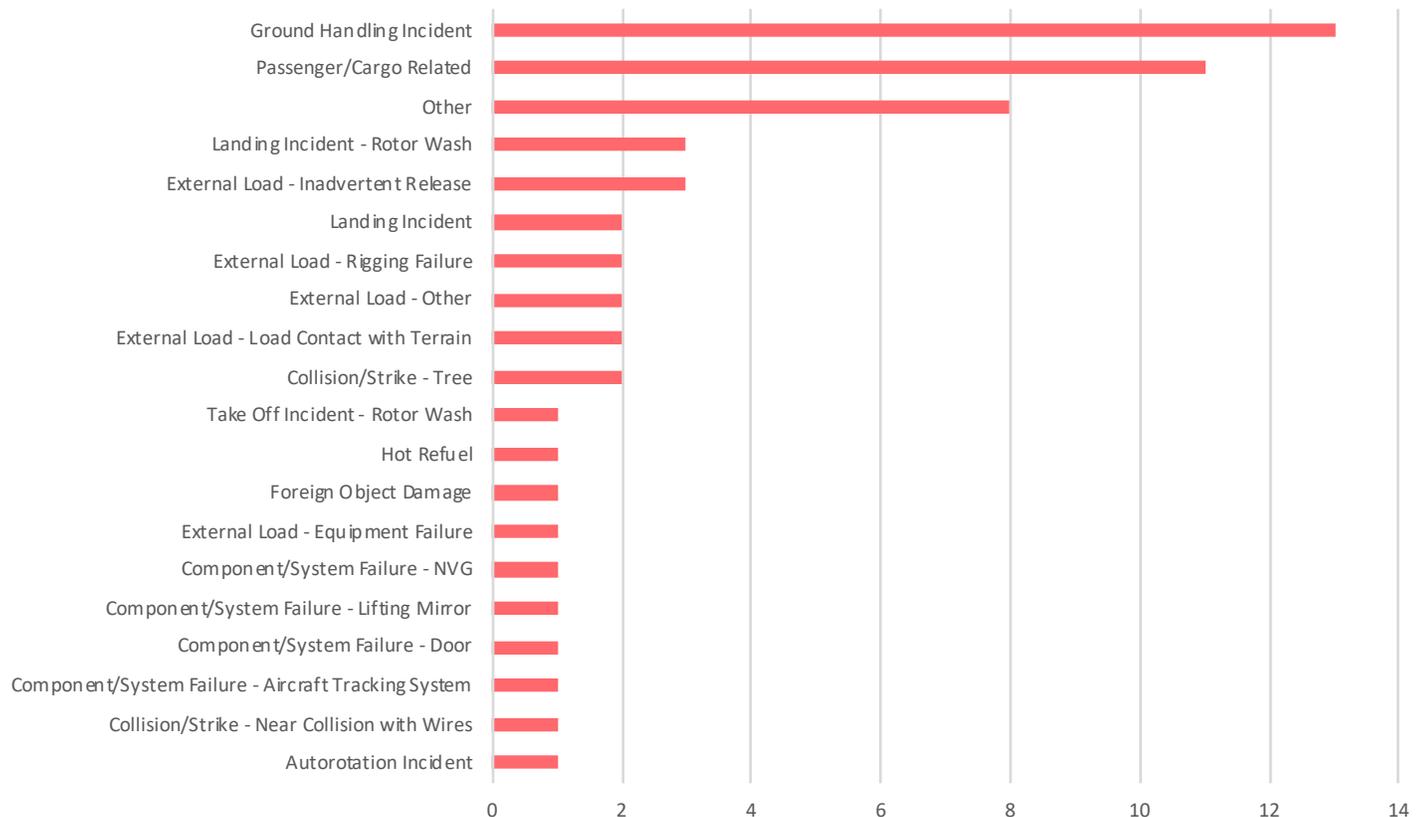
Loss of control - dynamic rollover

The helicopter was spraying a field, and when the pilot made a reversal turn to fly out the low RRPM warning horn sounded. The pilot dumped the load and decided to make a run-on landing directly ahead. During this the skid dug into the ground and the helicopter rolled over. There were no injuries but the helicopter sustained some damage.

## INCIDENT REPORTS IN 2018

The most frequent types of incidents reported by helicopter operators in 2018 involved ground handling/loading incidents and passenger/cargo related incidents. Together these reports accounted for 41% of total incident reports. Other serious incidents involved external load operations and incidents involving rotor wash disturbing objects on the ground.

2018 Helicopter Incident Reports By Incident Type





March



Canterbury



AS 350



Ground handling

During take-off the LH transmission cowl came open and contacted the main rotor frequency adapter bolt tails and blade pin tails, causing light composite damage to the cowl. The transmission cowl lower latches had not been fastened securely prior to flight.



October



West Coast



AS 350



Ground handling

RHS transmission cowl was left open following the pre-flight. The aircraft was flown with the cowl in open position approximately 2 minutes. During the pre-flight the pilot wished to observe oil through oil reservoir sight glass after starting the aircraft. He had made a plan to close the cowl door prior to flight but was contacted by radio, became distracted and forgot about closing the cowl door before proceeding with the brief ferry flight.



January



Southland



AS 350



Ground handling

While descending in a turn, an abnormal audible sound, similar to a seatbelt outside the door was noted, coming from the right hand side of the helicopter. The aircraft was landed as soon as possible and the pilot inspected the aircraft. The transmission cowl was noted to be not latched. The chief pilot was contacted. An additional aircraft was arranged to pick up passengers and engineer ferried to location. The transmission cowl lower latches had been locked but not fastened securely on pre-flight, resulting in the cowl coming open in flight and contacting the main rotor frequency adapter bolt tails, causing light damage to the main rotor sleeve bonding braid, cowl latch, cowl support strut and light composite damage to cowl.



July



Hawke's Bay



AS 350



Ground handling

The pilot landed to refill the spray tanks after spraying for several hours on the second day of the operation. The loader driver connected the hose and approached the cockpit to discuss the performance of the spray gear with the pilot. Upon leaving the cockpit to begin pumping the chemical load into the tanks, the pilot

initiated the takeoff. The loader driver signalled to the pilot to abort and the aircraft was landed in place. The procedure in use for the operation included a visual signal from the loader driver that the helicopter was ready for takeoff. This signal was not received by the pilot.

One contributing factor identified in the operator's investigation was fatigue, which may have been amplified due to inadequate consumption of fluids throughout the day.

Based on the operator's findings, the procedures for filling the spray tanks were updated, and crews were briefed. Future spray operations require the use of earpieces supplied by the company for ground crew to communicate with pilots. When this is not possible, ground crew are only permitted to talk to the pilots when the hose is disconnected from the helicopter. Filler hoses will now be laid out where the pilots can confirm that they are not connected as a before take off check in addition to the visual signal from the ground crew. All crew were reminded to consume food and fluids throughout the operation to prevent the onset of early fatigue and that safety always takes precedence over the pressure to finish a job.



October



Canterbury



Robinson R44



Passenger/cargo related

Shortly after take-off the forward passenger door popped open. Prior to departure passenger brief given, pre-start walk around carried out. The door and

locking mechanism were inspected post flight and nothing abnormal was found. After discussion with the passenger it was found that the passenger had 'assisted' with closing the door and had moved the position of the handle.



November



Canterbury



AS 350



Passenger/cargo related

After take off while aircraft was gaining speed, a passenger was observed with her hand on the door and knocked the door handle, opening the top latch on the main LH door. The pilot continued the descent then approximately one minute later the quarter door popped and slammed back against the fuselage. This resulted in a broken window within the quarter door as well as a bent frame and damage to the side of the LH locker door.



November



Waikato



Hughes 500



External load

Sling line was attached to cargo hook by ground crew without pilots knowledge prior to lift off, resulting in the lifting dart on the end of the line hitting a farm gate

next to the take off area as the helicopter lifted for a departure. The gate was damaged. The operator's detailed investigation determined that a deviation from normal procedures had occurred that day, and the pilot and ground crew had not sufficiently established an alternative line attachment procedure.



November



West Coast



Bell 206



Take off - rotor wash

On take-off the pilot noted the rotor wash disturbed an unseen empty fadge bag. The bag rolled across the ground, but did not lift or come near the helicopter. It appears that ground crew did not secure equipment prior to the helicopters arrival.



June



Auckland



BK 117



Component/system failure or malfunction

The left sliding door fell out during a maintenance test flight, landed on the grass, and was slightly damaged. The investigation revealed that both the emergency release latching pins and their associated mechanisms were worn and dirty, and that in one in five tests, the latching pins were not traveling their full distance.

The OEM requires a check of the operation of doors and windows every 600 hours, however the nature of this issue and the inability to see the latching pins when the door is in place, made it unlikely the problem would have been identified. The operator undertook to review their inspection schedule in this area, specifically to include disassembly, cleaning, wear checks and full functional checks of that mechanism.



February



Otago



AS 350



Landing - rotor wash

When hovering down into a DOC pad at the tramping hut, the pilot reached approximately 30ft AGL when a tent and a large sheet of plastic blew up in the down wash and almost made contact with the main rotor blades. The operator's report noted that the pad was quite tight and required pilots to line up with a marker beam when landing - the pilot was focused on this when the incident occurred, limiting their situational awareness of the rest of the pad.

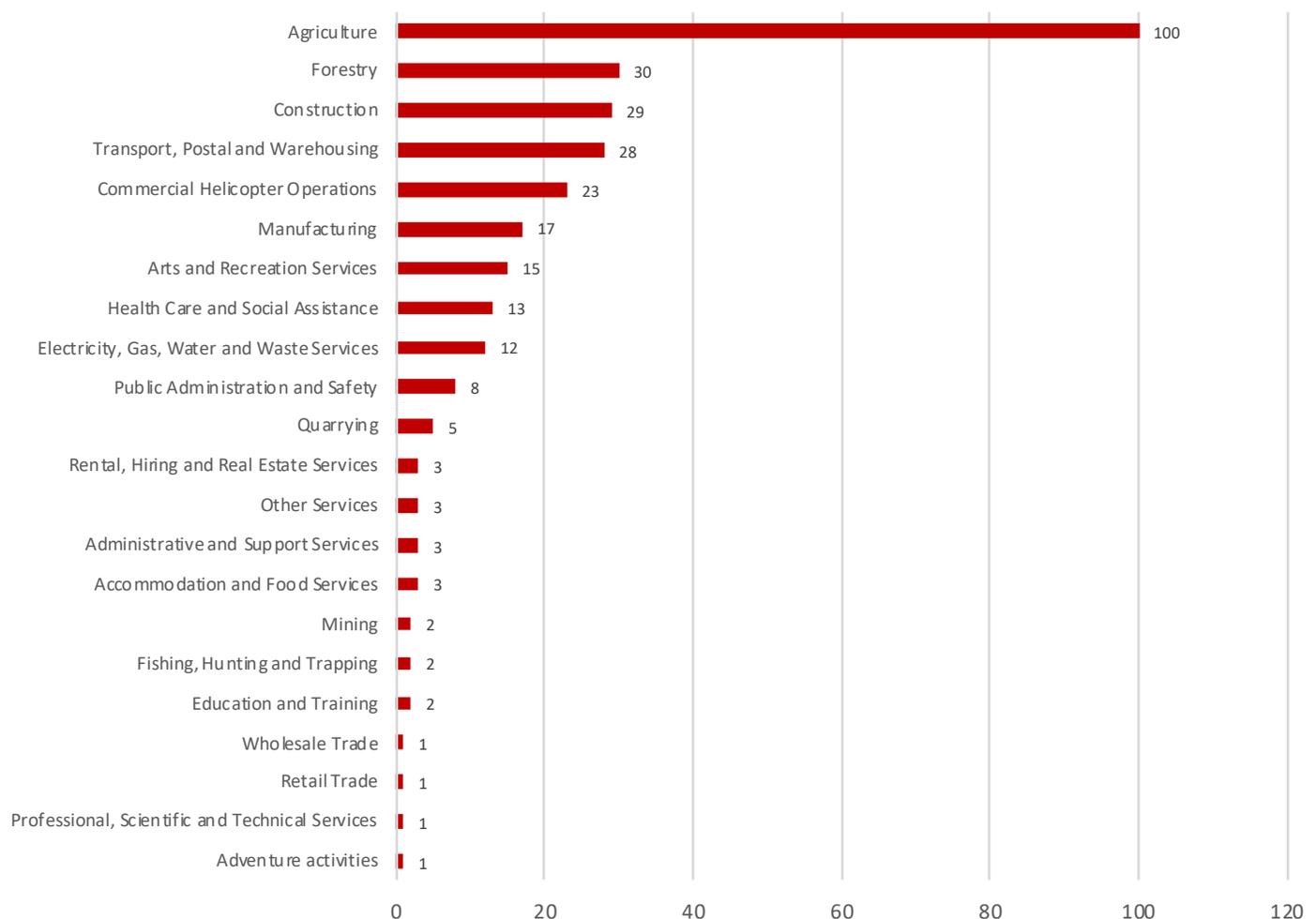
As a result it was decided that DOC would put up appropriate hazard notification in the hut regarding tents and other camping equipment, and would post signage around the helicopter pad identifying it as a hazardous area. The operator also included unsecured tents and other equipment as part of their hazard/risk assessment of landing at remote DOC hut sites. They also made it a requirement that any DOC personnel on board be required to perform visual inspections of landing sites and to advise pilots of any hazards.

# FATAL WORKPLACE ACCIDENTS ON COMMERCIAL HELICOPTER OPERATIONS

Recent workplace safety performance comparisons, comparing WorkSafe data with CAA data, has reached some worrying conclusions. The WorkSafe data we are comparing our own with are their notifications - note that this data include *all* workplace deaths (regardless of whether the death was of an employee or not), so helicopter passenger deaths are included. Here are some key points from the analysis:

- In the five years from 2013, fatalities on commercial helicopter operations constitute 79% of all commercial aviation fatalities and 76% of total fatal commercial aviation accidents.
- With 23 fatalities the commercial helicopter sector is the fifth most dangerous in New Zealand, after Transport, Postal and Warehousing and before Manufacturing.
- Those 23 deaths make up 8% of all workplace deaths in New Zealand since 2013.
- If we look only at Commercial Helicopter crew deaths per number of workers killed, the average rate is 1.95 per 1000 workers per year. The next highest is Forestry with 1.12 forestry worker deaths per 1000.

Total Workplace Fatalities 2013-2018 by Industry



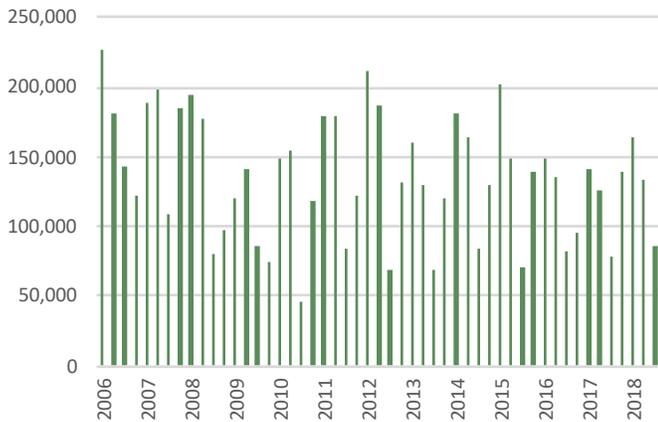


## ACTIVITY

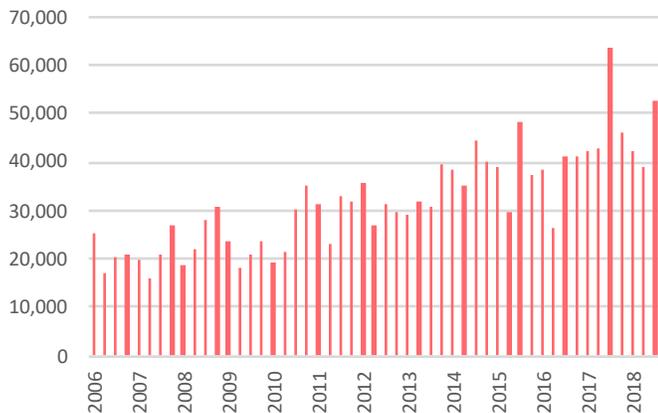
Agricultural aeroplane operators reported a total 86,805 tonnes of product in the third quarter of 2018, while helicopters reported 52,673 tonnes.

The proportion of overall tonnes spread by helicopters in quarter 3 was 38%, a continuation of an ongoing trend where helicopters' share of total product applied has been increasing over time.

Aeroplane Total Tonnes Quarterly



Helicopter Total Tonnes Quarterly



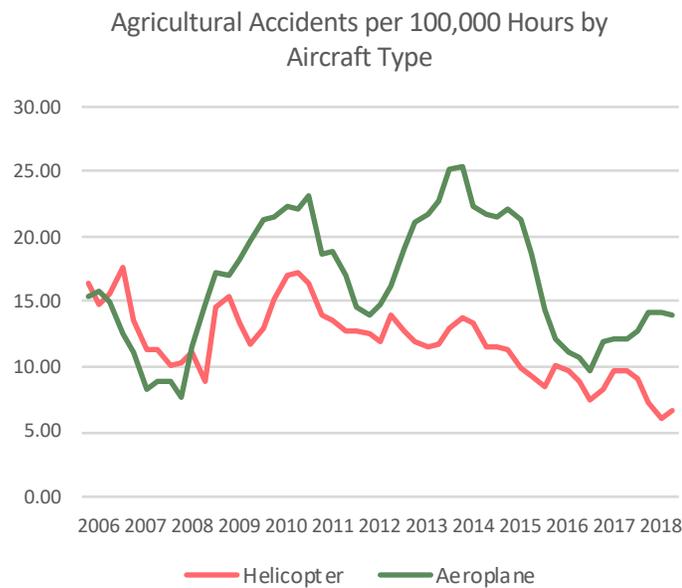
Share of Total Quarterly Tonnes by Aircraft Type



## SAFETY PERFORMANCE

There were a total of 7 agricultural aviation accidents in 2018 to date, 4 involving helicopters and 3 involving aeroplanes. The total in 2017 was 9. The agricultural

aeroplance accident rate sits at 14.03 per 100,000 hours while for helicopters the rate is 6.66 per 100,000 hours.



## 2018 ACCIDENT DETAILS

-  January
-  East Coast
-  Cresco
-  Take off accident

The aircraft encountered sink just after take-off forcing the pilot to jettison the load. The environmental conditions at the time were hot humid conditions, increasing temperature during the day, a light South-Easterly tailwind and an airstrip altitude of 1200 feet ASL. The pilot realised the aircraft climb performance was not as expected so he jettisoned the load. The product being spread was Dicalcic which is known not to jettison as quickly as granular fertiliser. Consequently the aircraft's tail-plane struck a fence

post at the end of the airstrip. The pilot still had limited control and was able to circle back and land safely. The tail-plane assembly was replaced and the aircraft returned to service. The Operator has introduced several operational changes to help mitigate future re-occurrence of this type.

-  January
-  East Coast
-  750XL
-  Collision/strike - wire

While turning during of a sowing run the aircraft struck three 50Kv power lines which penetrated the leading edge of the left wing then broke. The aircraft remained airborne and dragged approx. 70m of power lines back to the operating airstrip. On landing the wires snagged on a fence and caused the aircraft to be dragged into a drain next to the airstrip. The aircraft was substantially damaged but the pilot was not hurt.

-  May
-  Nelson/Marlborough
-  AS 350
-  Collision/strike - tree

On an operation spraying a forestry block, during a turn coming back to start another spray line the helicopter struck a tree with the main rotor blade. The strike damaged one of the blades significantly and put the aircraft out of balance. The pilot landed the helicopter on an old forestry skid site a 100m away.

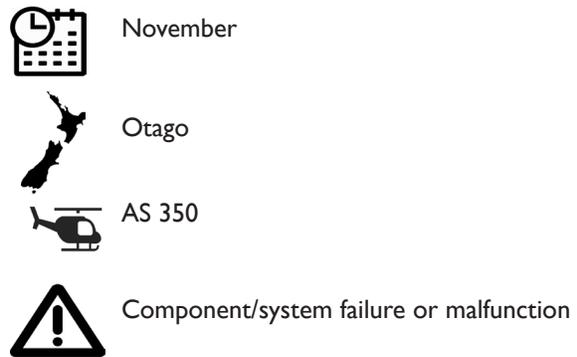
Cloud cover and poor light were identified as key causal factors for the pilot not identifying the tree.



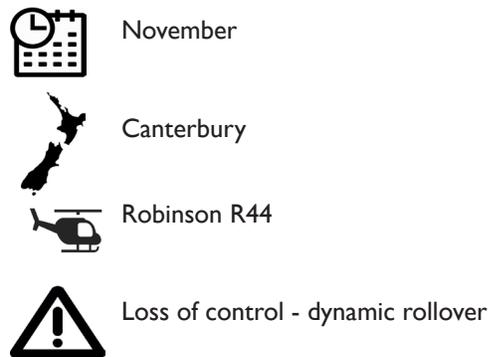
After touchdown, directional control was lost. The aircraft ground looped and incurred some rear damage when coming to rest down a slope on the edge of the airstrip after veering to the left. The investigation determined that the tail wheel spring securing bracket bolts had failed causing the rear spring to lose directional control of the aircraft, with the situation exacerbated by the slippery surface of the airstrip caused by dew.



During a forest spraying operation, taking the weight while lifting with another load, at approximately 40ft there was a load bang from the engine, immediately followed by a loss of power. The pilot used the remaining rotor energy to reduce the rate of descent but landed heavily in the upright position. There were no injuries but the aircraft sustained some damage.



Forced landing accident. While on approach to conduct a spray run, the engine failed at approximately 60 feet AGL. The pilot manoeuvred the aircraft to land on a nearby track during the autorotation. Upon impact the tail boom failed and one of the skids bent. There was damage to helicopter but nil injuries. The engine had suffered an internal failure causing the turbine assembly to move rearwards severing the Py sense line and shutting down the engine.



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