



NEW ZEALAND HELICOPTER

SAFETY UPDATE

MARCH 2018

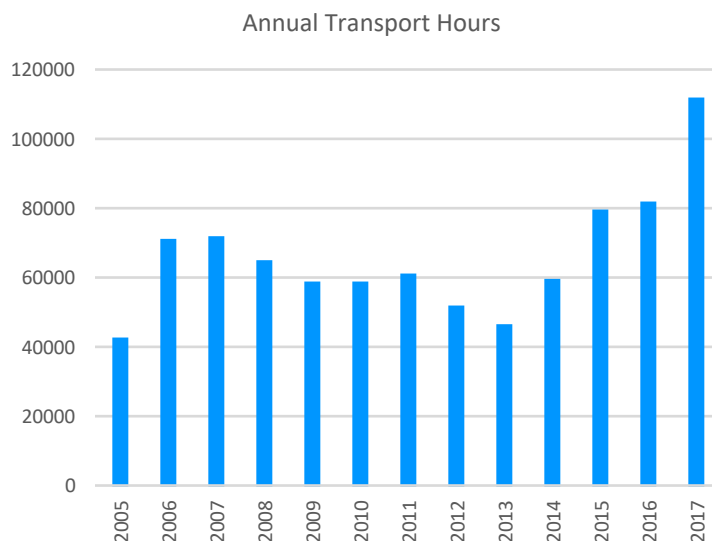
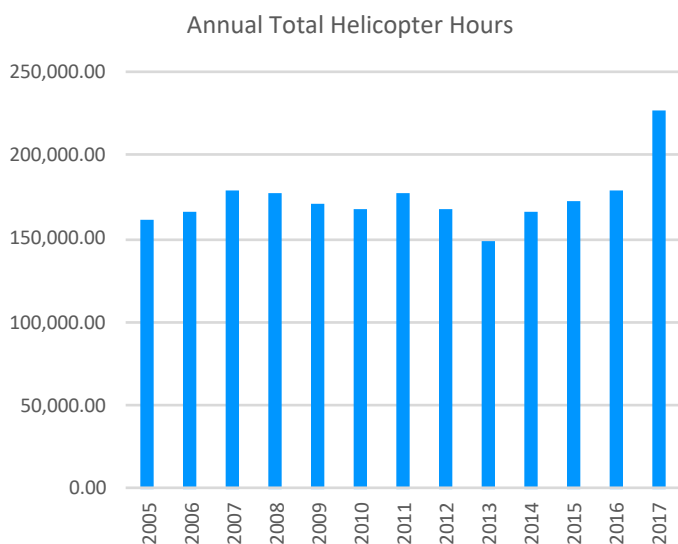


INTRODUCTION

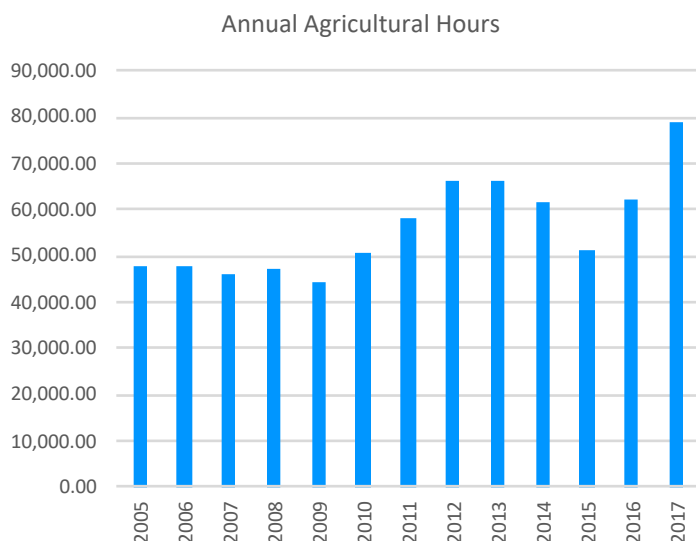
This is a further update on activity and safety performance in the helicopter sector, with activity and accident rate information current to the end of 2017. If you have questions or comments about the information then please contact me at Joe.Dewar@caa.govt.nz.

ACTIVITY TRENDS - HELICOPTERS

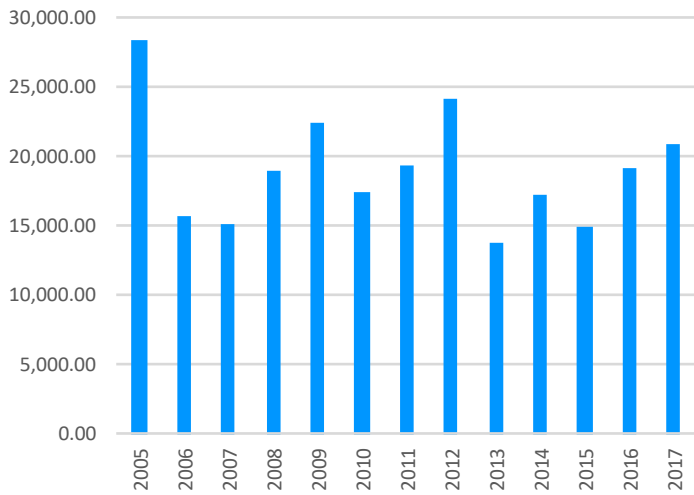
It is still early days for all of the 2017 activity data to be entered into the CAA database, but at this stage it looks like another exceptionally busy year in the commercial sector. Based on an estimation formula I have used for some missing fourth quarter data, the total helicopter hours flown in 2017 was 226,511 hours, a significant increase over the 2016 total. As more data are entered this number will reduce, but it is clear at this stage that 2017 was another record year for activity levels. The following charts below show the current estimated hours by sector:



The current data indicate a total of 111,999 hours on air transport operations and 78,800 on agricultural operations.

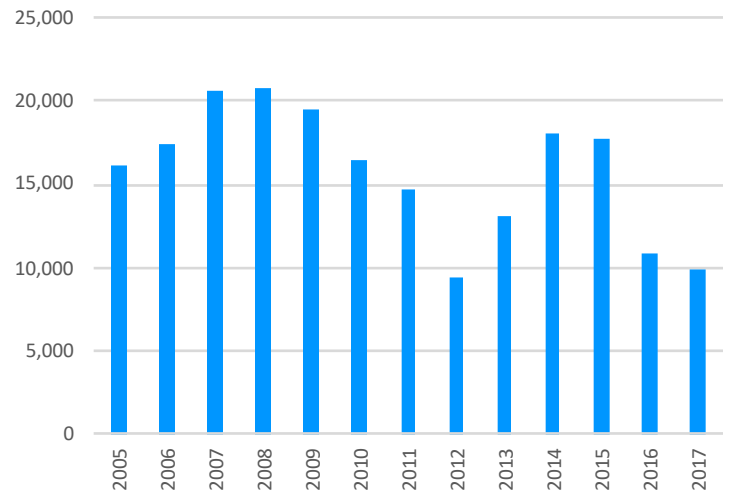


Annual Other Commercial Hours



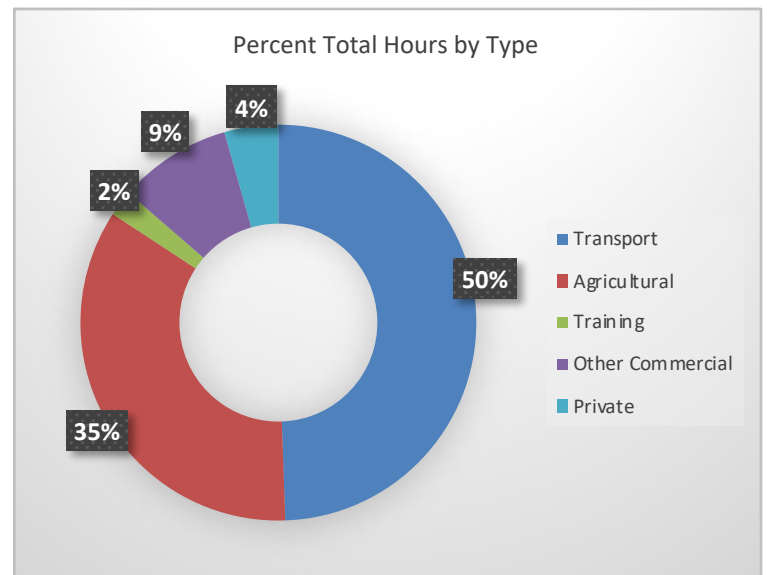
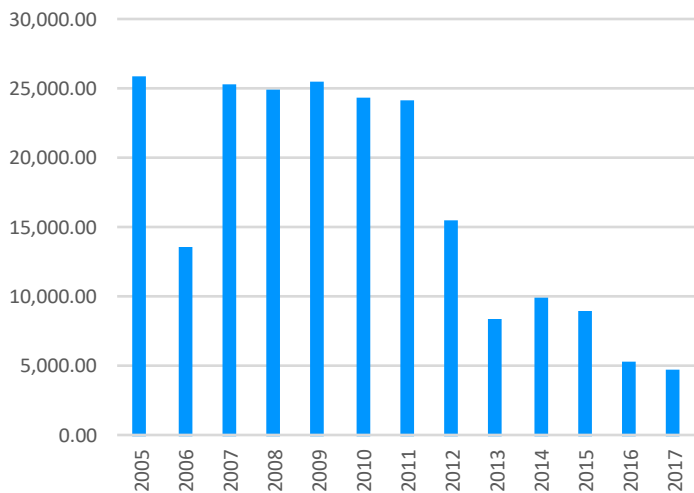
The total hours for other commercial operations in 2017 sits at 20,930. Training activity continues to decline, with 4,815 hours in 2017.

Annual Private Hours



There were 9,963 private hours in 2017. Transport flying accounted for 50% of total hours in 2017, followed by agricultural flying with 35%.

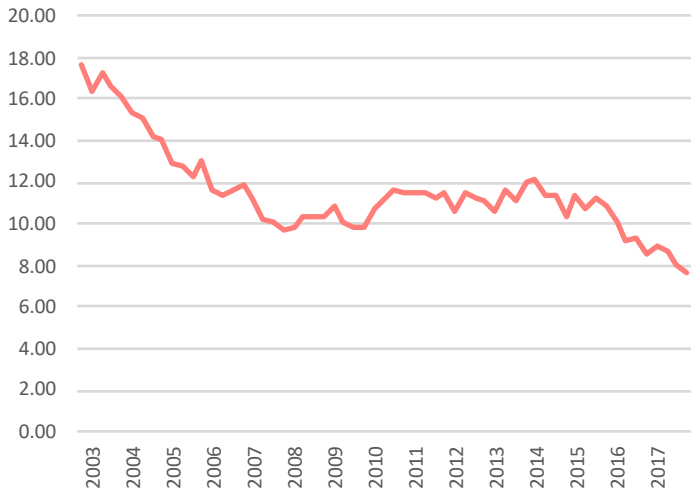
Annual Training Hours



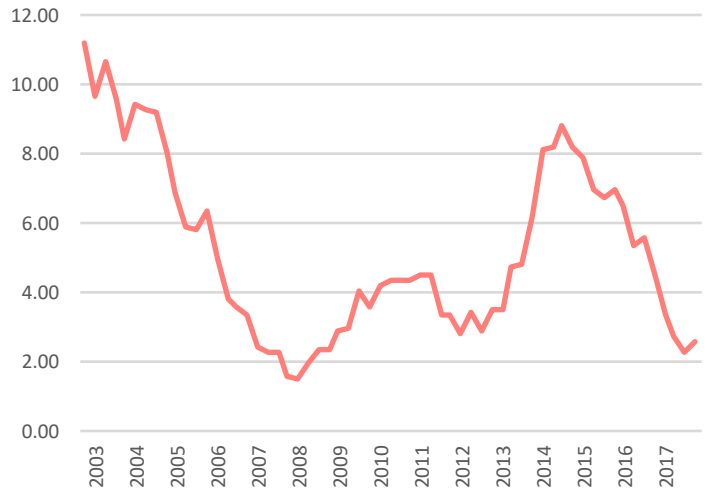
ACCIDENT RATES - HELICOPTERS

The overall New Zealand helicopter accident rate continues to decline, and at the end of 2017 it sits at 7.61 accidents per 100,000 hours. The fatal rate also follows this downward trend, currently sitting at 1.21 per 100,000 hours. As the subsequent charts demonstrate however, some sectors are not enjoying declining rates, namely flight training and other commercial work.

3-Yearly Accidents per 100,000 Hours



Air Transport 3-Yearly Accidents per 100,000 Hours



The transport accident rate sits at 2.55 per 100,000 hours while for agricultural operations it is at 5.74 per 100,000 hours.

3-Yearly Fatal Accidents per 100,000 Hours



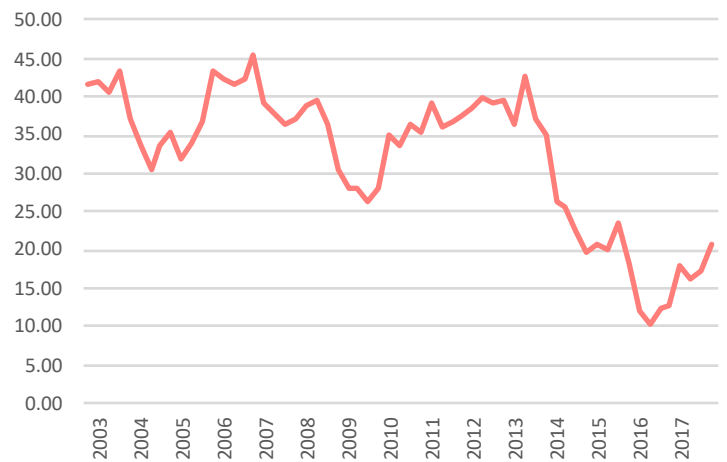
Agricultural Accidents 3-Yearly Accidents per 100,000 Hours



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



Private Accidents 3-Yearly Accidents per 100,000 Hours



In other commercial operations the accident rate is 19.99 per 100,000 hours, in training operations it is 36.67 per 100,000 hours, and in private operations it is 20.76 per 100,000 hours.

Training Accidents 3-Yearly Accidents per 100,000 Hours



FLIGHT TRAINING & OTHER COMMERCIAL ACCIDENTS

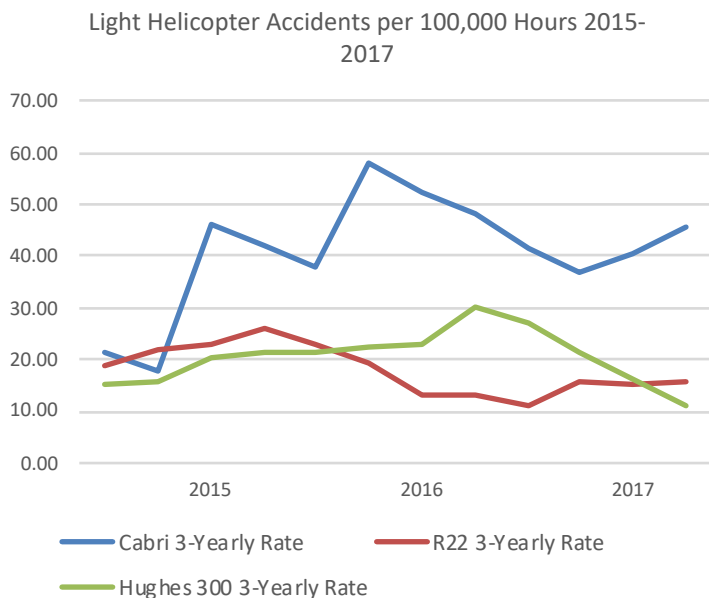
The accident rates in the flight training and other commercial sectors are obviously a cause for concern. A key feature of the 2017 other commercial accidents was that they occurred on external load operations: there were four in the first quarter of 2017. We promulgated advisory material about external load work in the [October 2017 update](#), with the hope that operators would revisit their SOP's around this. In particular we emphasised that work with short stops, external load jobs at low level, and airspeed limitations on external load ops need careful attention from all operators engaging in this work. The fatal accident during the Port Hills fire fighting mission in 2017 is a salient reminder of external load risks. Several of the other accidents that occurred could also easily have been fatal.

The flight training accident rate presents a more complex picture. For starters, far fewer helicopter training hours are being flown in New Zealand, a trend that is also reflected in the significant reduction in PPL and CPL helicopter licences being issued year-to-year. When

fewer hours are being flown, rates will inflate accordingly. Still, this doesn't mask the fact that there might be a problem. The table below shows total data for the main training models from 2014 to 2017:

Model	Training Hours	Training Accidents	Rate per 10,000 Hours
R22	11767.9	0	0.00
Hughes 300	3304.5	1	3.03
Cabri G2	4493.6	4	8.90

Investigating the Cabri's overall (across all flight types) rate against these two comparable models also shows a higher trend over time.



2017 ACCIDENT DETAILS

There were 14 accidents in 2017, two of which were fatal. Four occurred on external load operations, three on agricultural, three on private, two on transport, and one each on training and venison recovery operations.



January



Otago



Hughes 500



Collision/strike - wire

During the first spray run in a new treatment area, the aircraft contacted twin wires at the Eastern end of the spray area, resulting in damage to the machine. The wires, one of two sets over the spray block, had been noted in the safety briefing before commencing the operation. The pilot reported that on entering the new spray area he identified one of the two sets prior to making the first spray run. He believed the second set ran down a ridge line farther to the East of his present position. The wire was slung low over a gully with approximately 150 metres between the poles. They blended into the terrain.

On impact the wires damaged the bubble of the machine and became wrapped around the mirror mounted at the front of the aircraft causing it to become entrapped. Because of the roughness of the terrain below the pilot was unable to land the helicopter, so backed off the wire until the entangled mirror and nosepiece broke off. He then landed and shutdown.

The operator undertook a thorough investigation and identified the following factors that contributed to the occurrence:

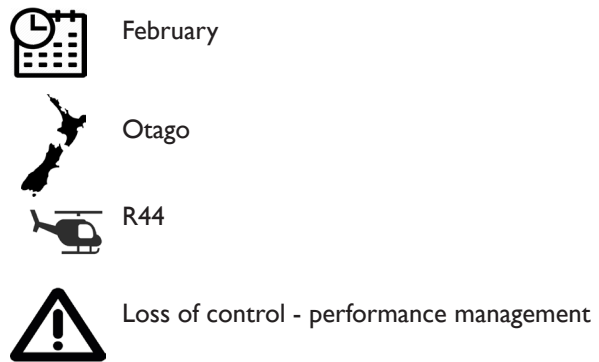
1. Decision-making: visible contact with both wires should have been confirmed before commencing spraying in the area;
2. Situational awareness: pilot believed the second set of wires to be one ridge further off the end of the spray run than they were.

3. Flat light conditions and the span-length of the low-strung wire were also noted as environmental factors. The investigation noted that situation awareness could have been improved by drawing a plan of the treatment area and having the operator identify the hazards, and stressed that hazards should always be checked and positively identified at every treatment area prior to spraying.



The helicopter was engaged on an operation laying out fenceline posts when they noticed the load line slip and witnessed the centre post spill out. The pilot lowered collective and pulled speed back in an attempt to put the load on the ground and secure it, however the remaining posts began to fall away. The pilot elected to jettison the load. When he did he felt a sudden bang and realized that tail rotor authority had been lost when the empty strop flicked up and wrapped around the tail rotor pitch links. The pilot attempted a run on landing but lost control and collided with terrain. The pilot was not injured but the helicopter was destroyed.

Following the accident the operator created a requirement for pilots conducting external load operations to be briefed by a pilot that had attended a load rigging course. Further controls were implemented in company lifting procedures including strop selection, rigging, and personal protective equipment use. Refresher training on external load rigging and lifting was carried out.



The helicopter was engaged on a spraying operation on a 30ha L-shaped block. A climb was required to reach the top of the block so the pilot down loaded the helicopter to ensure sufficient performance would be available to reach the top.

The up-and-down portion of the block was nearly completed when the pilot went to finish an area of the northern boundary. This involved a right hand descending turn into an uphill run. The pilot estimated there was close to 200 litres on board and he was at about 2000 feet.

Coming out of the turn a rate of sink developed which the pilot sought to counter by reducing collective resulting in a loss of RPM. The load was jettisoned immediately and an attempt made to fly forward out of trouble, however it was clear that there was insufficient height and power to recover. The pilot picked a spot ahead and attempted to run on, the helicopter ran 10-20 metres up the hill but rolled off a bank before coming to a complete stop. It rolled several times and stopped against a tree. The pilot was uninjured. The operator's investigation report identified complacency as the principle cause of the accident, as the pilot didn't properly consider the effect of the prevailing temperature and altitude on the aircraft's performance. The report noted also that the pilot was thinking about returning home at the time and was flying 'as if the job was already done'. The main lesson learned was that operators should be diligent to ensure that complacency does not creep up.



February



Christchurch



AS 350



External load - fire fighting

The helicopter crashed during a fire fighting operation over the Port Hills. From the TAIC interim report into the accident:

“The Helicopter crashed while the pilot was returning to the dipping pond to refill the firefighting monsoon bucket. Evidence showed that the monsoon bucket suspension cables struck the tail rotor, damaging the tail rotor and causing the loss of the entire vertical stabiliser from the tail boom. After the loss of the vertical stabiliser, the helicopter rolled to the right and descended until it struck the ground.”



February



Central North Island



Hughes 500



External load - beehive transport

The Hughes 500 was conducting external load operations moving beehives in the Raetihi area. For this operation, two company helicopters had been engaged, with both pilot’s electing to use a bee-wing, attached to the belly hook of the aircraft with a short 10 metre cable, to lift the pallets of beehives.

At approximately 0920 hours NZDT, the aircraft was on a return flight from the drop off location when the cable,

weighted only with the bee-wing, came into contact with the tail rotor. This resulted in the cable wrapping around the tail rotor hub and gearbox, causing the tail rotor assembly and cable with the bee-wing attached, to depart from the aircraft. As a result, the aircraft yawed to the right and the pilot was unable to maintain directional control. After several rotations, the aircraft struck the side of a ridge, rolled approximately 35 metres down the slope and came to rest on its right side. The pilot, the sole occupant of the helicopter, sustained significant injuries and was subsequently airlifted to hospital. The safety investigation was unable to determine conclusively why the cable contacted the tail rotor. It is most likely that the short stop, low mass configuration increased the risk of contact with the tail, particularly when combined with an airspeed at which the load may have become unstable.



Image of the tail rotor and entangled line.



February



Hawke’s Bay







R44



Collision/strike - terrain

Approaching a river flat to land, the tail rotor struck the ground and broke off. The helicopter spun a number of times and impacted the ground on its left side. During a private operation the pilot in command was approaching to land on a river bank. On landing the pilot flared the aircraft resulting in the tail rotor contacting the ground. This has caused the trail rotor to depart and the aircraft to spin a number of times before coming to rest on the left side.

There was substantial damage to the aircraft tail boom, main rotor blades, left side of the fuselage and firewall. The investigation concluded that it is important to make use of suitable landing areas and maintaining awareness of your approach profile to ensure you keep sufficient tail rotor clearance at all times.

-  March
-  Hawke's Bay
-  R22
-  Loss of control - dynamic rollover

The pilot reported that they had finished the flare for landing and levelled out. As they were applying power to enter the hover there was a strong wind gust that lifted the tail and pushed the nose of the helicopter forward and down. The situation could not be corrected with the application of power and aft cyclic so a run on landing was attempted. During this, the right skid dug into some soft ground and the helicopter rolled over onto its right side. The pilot and other occupant were not injured.

-  March
-  Fox Glacier
-  Hughes 500
-  Passenger/cargo

A passenger was injured while embarking on to the running helicopter. Before the passenger had completed embarking onto the aircraft, they extended their arm to full length and their fingers made contact with the main rotor blades causing an injury to their right hand.

-  March
-  Reefton
-  R22
-  Under investigation

The Rescue Coordination Centre received a distress beacon from the aircraft, which had been on a venison recovery operation on the West Coast. Searchers on the subsequent search and rescue helicopter found that the pilot had been fatally injured in the accident. A TAIC investigation into the accident is currently underway.



The crashed helicopter at the site.



May



Wellington



BK 117



External load - under investigation

The helicopter was on an external load operation relocating power poles from the northern side of the Pauhatanui inlet to the southern side. The pilot reported that during the cruise at approximately 300ft the aircraft started an un-commanded yaw, at which point he released the sling load and entered into an auto rotation. The aircraft impacted the water and the pilot managed to exit unharmed. A TAIC investigation into the accident is currently underway.



The helicopter being lifted out of the harbour.



May



Northern King Country



AS 350



Ground handling

The helicopter was engaged on a spraying operation when it proceeded to takeoff with the loading hose still attached to the spray tank. On feeling the tug of the hose the pilot landed. During the course of this sequence the farmer, standing some 30 metres away but near the ground pump hoses, suffered some damage to his knee when he was swept of his feet as the loading hose tightened. The operator identified several lessons learned in their report including the need for visual acknowledgement between the pilot and ground crew prior to each lift off and the need to ensure visitors to the site are kept away from hazards associated with the operation.



August



Near Otaki



Guimbal Cabri



Loss of control

The helicopter was on a dual training flight when there was a loss of control. While on approach to a hover, the helicopter developed a rapid left yaw as translational lift was lost. The pilot was unable to arrest the yaw rate and regain control of the helicopter, and the aircraft struck the ground in an adjacent paddock. One pilot received a serious injury and the other recieved a minor injury.



The accident scene.

WARWICK SMITH/STUFF



November



Bay of Plenty



Guimbal Cabri



Loss of control - unattended helicopter

The pilot landed the helicopter and exited it to shut a farm gate. While he was out of the machine a gust of wind caused the helicopter to roll onto its side.



December



Otago



Hughes 500



Engine power loss

While in the cruise, the pilot heard a loud bang followed by a 'low rotor' warning. The pilot entered an autorotation, making an emergency landing on sloped ground. The aircraft pitched up upon landing and 3 of the blades contacted the front windscreen and centre pillar support. When the pilot had exited the helicopter it rolled over on to its side. An engineering investigation into the accident is underway.



January 2018



Canterbury



Hughes 300



Loss of RPM

The pilot reported that on the final approach, approximately 150 metres from the landing point and at around 100ft altitude, the helicopter's RPM decayed. Unable to recover the situation, the pilot performed an autorotation onto sloping ground. The helicopter slid 5-6 metres down the slope, breaking the tailboom and skid.



February 2018



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.

-  February 2018
-  Wanaka
-  Guimbal Cabri
-  Heavy Landing

The operator reported that the helicopter landed heavily and rolled over following a practice auto-rotation. An investigation into the accident is underway.

RECENT INCIDENTS

-  December
-  Canterbury
-  AS 350
-  Component/system failure

During a flight with a sling load the pilot had difficulty maintaining height. He thought this was due to conflicting winds from two different valley systems. The same happened on short final to land which required power being set to maximum NG limit and placing the load on the ground and releasing it short of the intended site, then flying away to regain RRPM.





A subsequent engineering investigation resulted in the FCU being replaced, and there have been no problems since.

-  September
-  Taupo
-  AS 355
-  Other

During a pre-flight inspection of the #2 engine, the pilot received a phone call. The pilot seated the engine cowl into position and answered the phone. On ending the call the pilot resumed the pre-flight inspection. The engine cowl was not latched after the phone call was dealt with. A short flight was conducted and the aircraft was shut down. When the pilot exited the aircraft it was discovered the engine cowl was sitting proud and unlatched. A post flight inspection was conducted with no damage or abnormalities found.

It was determined the cause of this incident was due to distraction and the failure to resume the task where it was left off.

The operator took the opportunity to remind all pilots of the need for vigilance and focus in the conduct of their duties, particularly in the face of distraction. Highlighting that if a distraction is unavoidable, once removed, resume the inspection three steps from where you thought you were up to. It was also mandated that all pilots conduct a walk-around as a final check before all flights.

-  September
-  Northland
-  R44
-  Component/system failure

During an agricultural operation the operator reported that the helicopter suffered a sudden violent yaw with a rough running engine, loss of engine power and RPM. The pilot managed to land the aircraft in a paddock with no damage to the airframe. It was found that the #5 cylinder intake valve had broken around the valve key location and that the piston had also contacted the valve. A new Con Rod assembly, piston and cylinder assembly, plunger, rocker and push rod were all installed. All other valves were inspected for any damage or wear with no other faults found.



The helicopter pilot had to take avoiding action in the cruise to avoid an unmarked wire that was strung across a gully providing power to an antenna on the righthand peak. Initially they thought the manoeuvre had been successful however on shutdown one main rotor blade was found damaged. The damage consisted of the upper and lower skins being punctured at approximately 3 feet outboard of the blade root and a tear in the trailing edge with the inboard tab missing. The incident investigation determined that distraction was the key causal factor, specifically discussion with others on board that led to the pilot not being adequately focused on the likelihood of wires leading to the antenna. A key lesson learned was for vigilance: where there are antennas, masts, or other structures on peaks, pilots must consider the possibility of wires being connected to them.



While on a spraying run the aircraft struck a single-strand electric fence wire strung across a gully, resulting in an emergency landing. The operator reported that the pilot had not been made aware of the wire on the briefing flight and noted that the critical lesson learned was to ensure that farmers and land owners are aware of all wire hazards and that this is communicated to pilots.



The inboard front seat passenger dropped their mobile phone between the collective lever and the fuel flow lever. The pilot heard the phone drop and turned to see passenger reach down to retrieve phone. The pilot grabbed the passenger's forearm and prevented interference with controls. Noting that passenger behaviour could be unexpected, the operator undertook to reinforce aspects of the safety briefing, in particular 'holding on to all loose items inside and outside the aircraft' and 'avoiding contact with aircraft controls'.



January



Fiordland



AS 350



Other

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 helicopter 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 and an additional helicopter to collect passengers and deliver an engineer was ferried to the location. It was determined that 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.



February



Mount Aspiring



AS 350



Other

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 of the incident, it was decided that the Department of Conservation 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.

ACTIVITY STATISTICS REPORTING FORMS

Some operators will have noticed that the CAA changed the aircraft operating statistics form to one that only allows data for one aircraft per form.

To make reporting easier for operators with multiple aircraft we've developed a spreadsheet-based form that allows you to submit your quarterly hours, and your agricultural statistics, for your full fleet using one form.

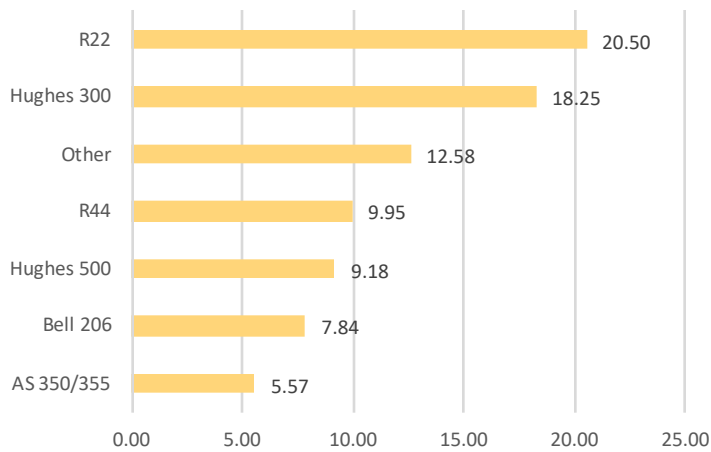
The spreadsheet can be found on the [General News page of the NZHA site](#) saved as 'Aircraft Operating Statistics Form - Helicopter and Agricultural Operators'. Feel free to save it to your computer for later use. The form is easy to use - just fill out the data for each aircraft (and your ag data if required) save the file, and attach it to an email to stats@caa.govt.nz.

Of course, if you prefer the existing CAA form or have your own accepted means of reporting then just stick with these.

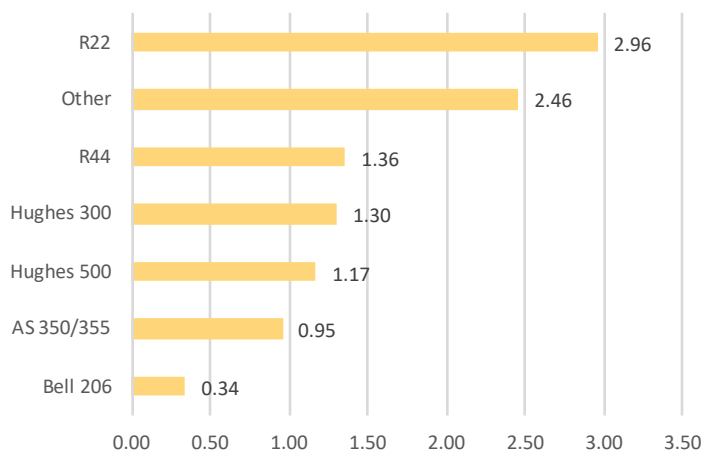
ACCIDENT RATES BY MODEL TYPE

We recently prepared a detailed dataset on the safety performance of different helicopter model types. The charts below show the overall results, which are the accident and fatal accident rates based on all data (all flying activity and all accidents) occurring from the beginning of 2000 to the end of 2017.

Accidents per 100,000 Hours by Model 2000-2017 Overall

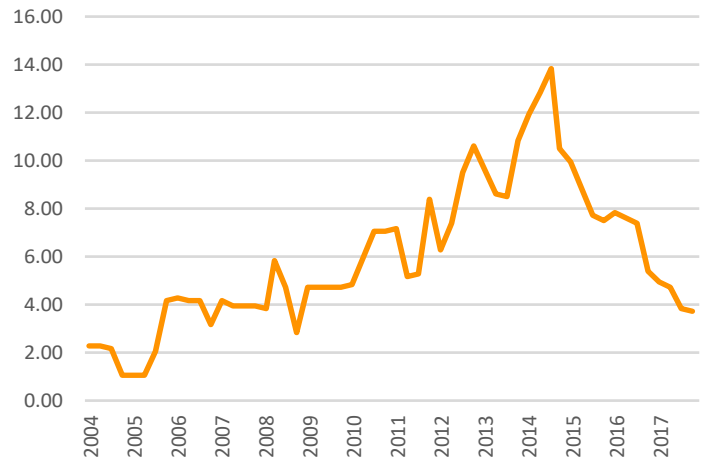


Fatal Accidents per 100,000 Hours by Model 2000-2017 Overall



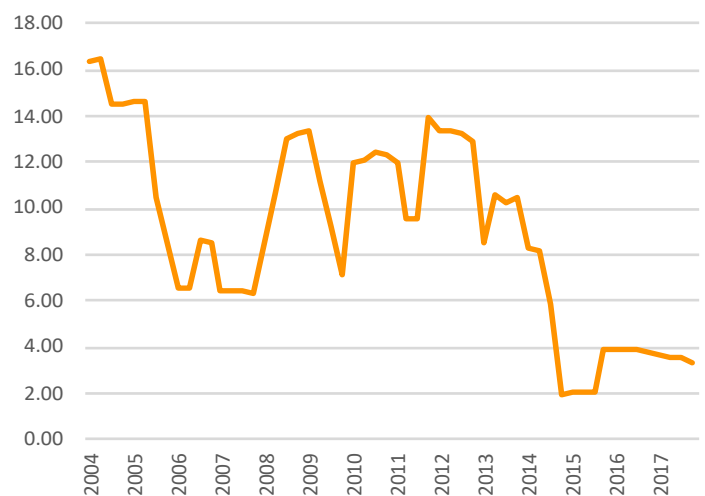
The data also allows us to drill into the rates of different model types over time. We will be looking to promulgate more analysis of this in upcoming updates.

AS 350/355 - 3-Yearly Accidents per 100,000 Hours



The current rate for AS 350 and 355 helicopters is 3.71 per 100,000 hours while for Bell 206 machines it is 3.74 per 100,000 hours.

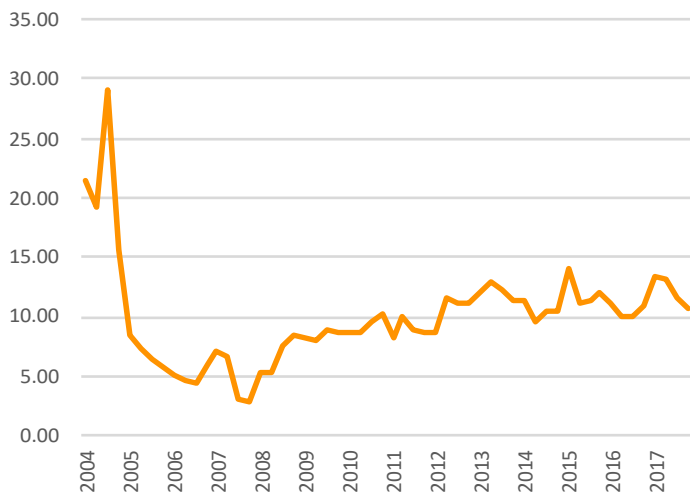
Bell 206 3-Yearly Accidents per 100,000 Hours



Hughes 500 3-Yearly Accidents per 100,000 Hours



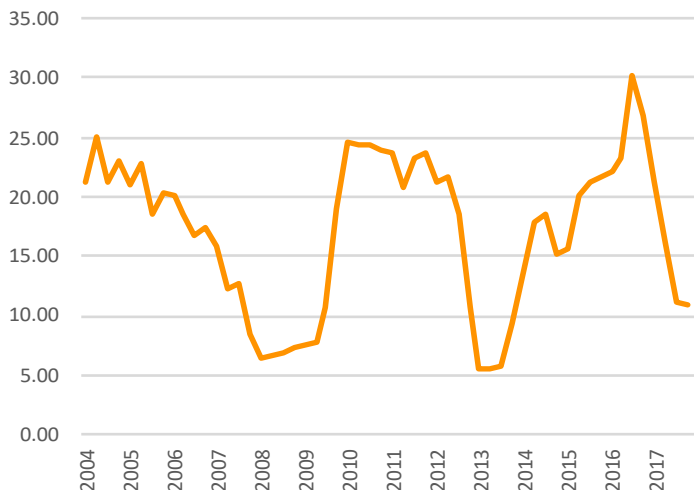
R44 3-Yearly Accidents per 100,000 Hours



For Hughes 500 helicopters the rate is 6.45 per 100,000 hours. For the 300s it is 11.01 per 100,000 hours.

For R44s the current rate is 10.78 per 100,000 hours. For the R22s it is 15.74 per 100,000 hours.

Hughes 300 3-Yearly Accidents per 100,000 Hours



R22 3-Yearly Accidents per 100,000 Hours

