



NEW ZEALAND

AGRICULTURAL AVIATION SAFETY UPDATE

JUNE 2019



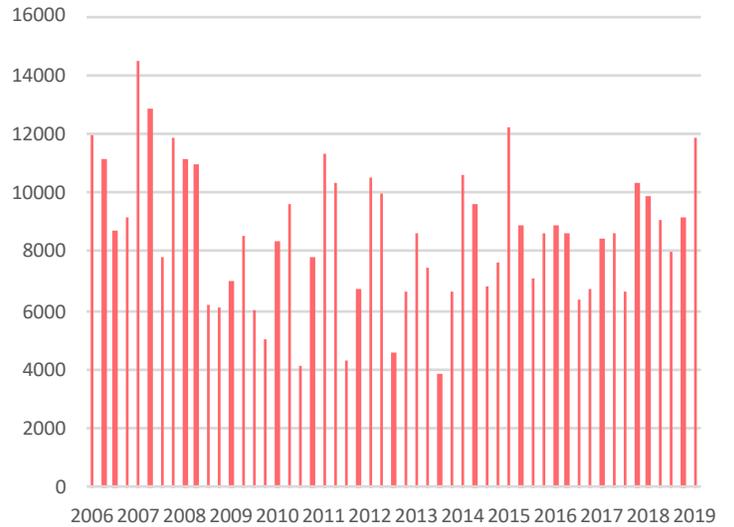
INTRODUCTION

This is a further update on activity and safety performance in the agricultural aviation sector, with activity and accident rate information current to the end of the first quarter of 2019. If you have questions or comments about the information then please contact me at Joe.Dewar@caa.govt.nz.

ACTIVITY TRENDS

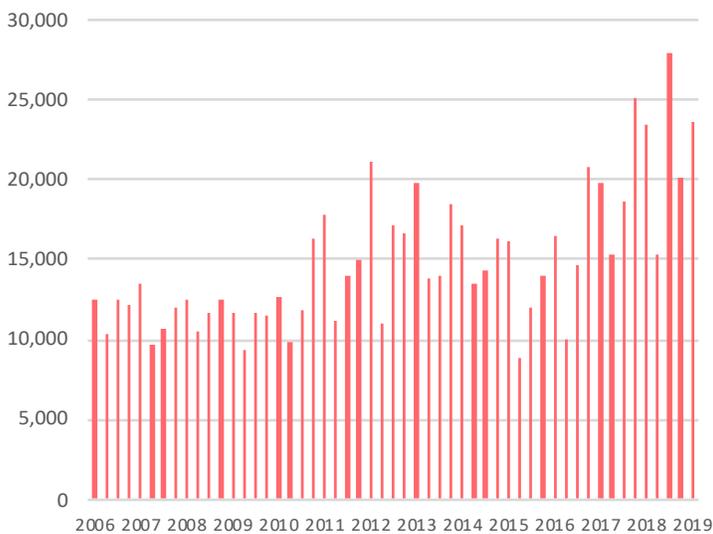
Activity data reported for the first quarter of 2019 indicate it was a busier first quarter than the previous year with slightly over 2,000 more agricultural hours reported.

Aeroplane Quarterly Agricultural Hours

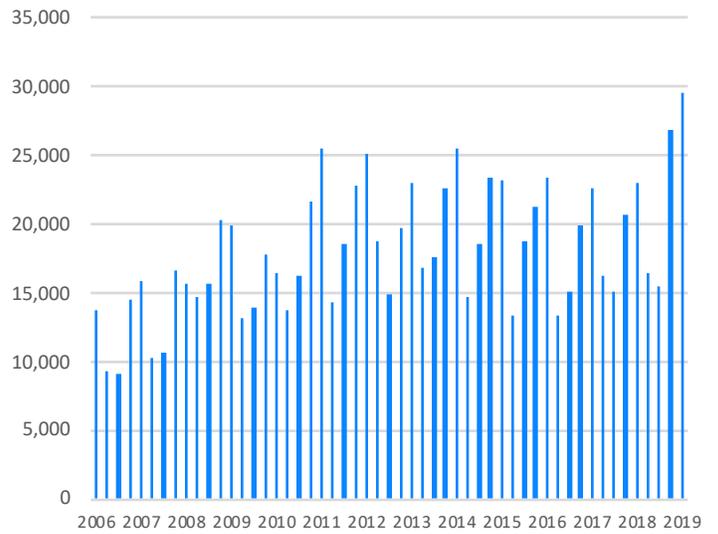


The agricultural product statistics also indicate a busier first quarter with 34,000 more tonnes reported than quarter 1 of 2018,

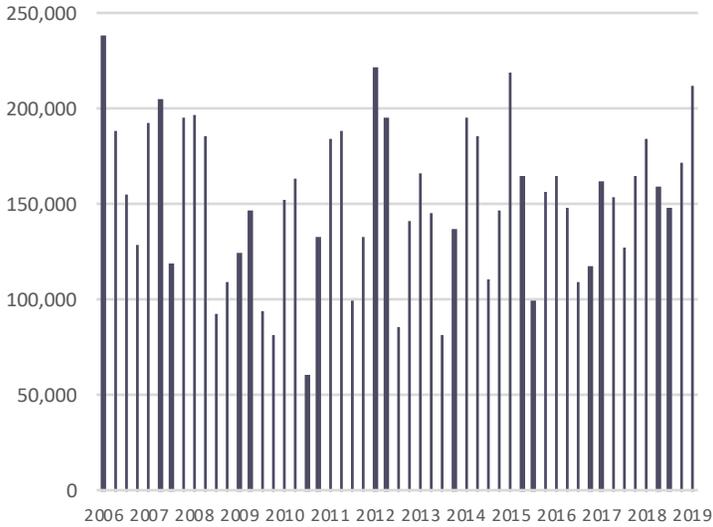
Helicopter Quarterly Agricultural Hours



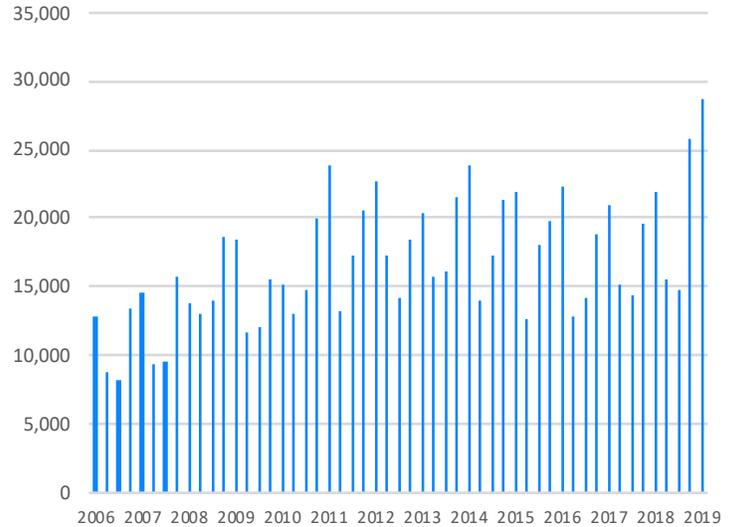
Total Liquid Tonnes Quarterly



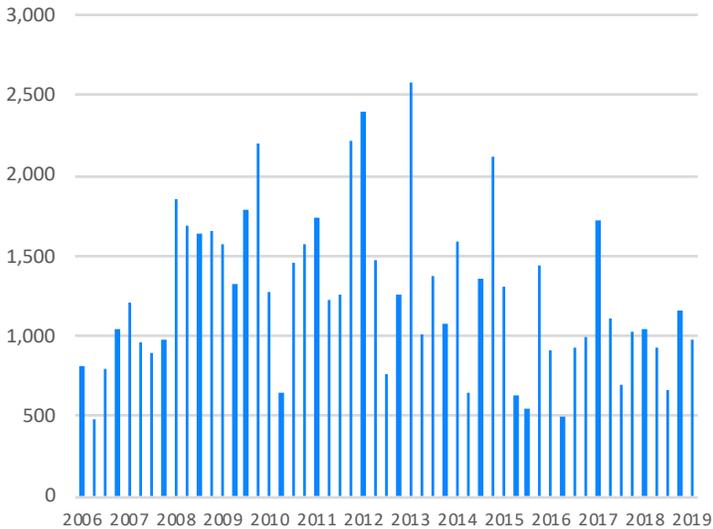
Total Solid Tonnes Quarterly



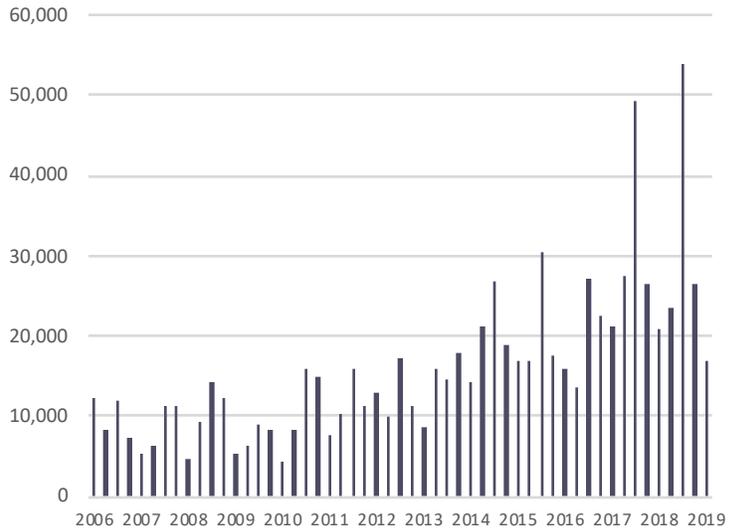
Helicopter Liquid Tonnes Quarterly



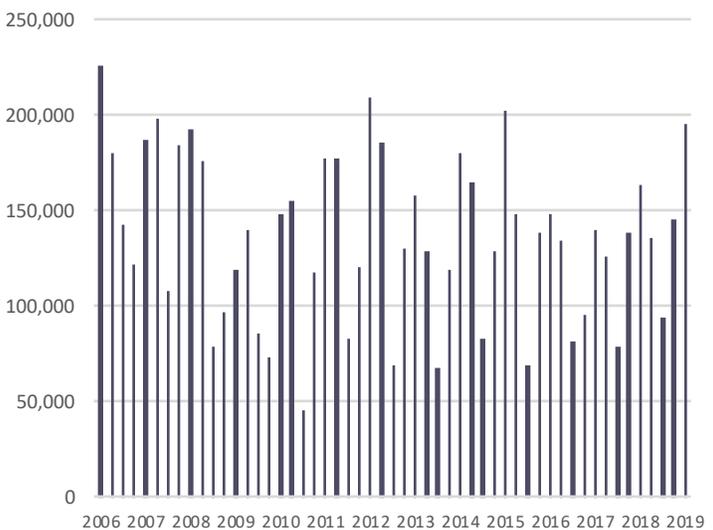
Aeroplane Liquid Tonnes Quarterly



Helicopter Solid Tonnes Quarterly



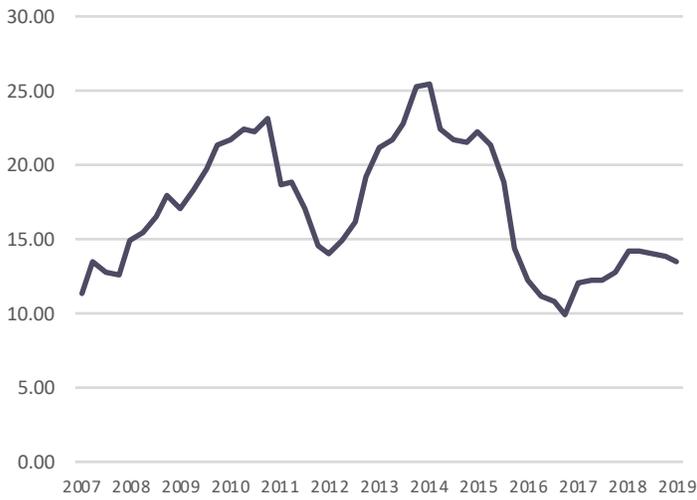
Aeroplane Solid Tonnes Quarterly



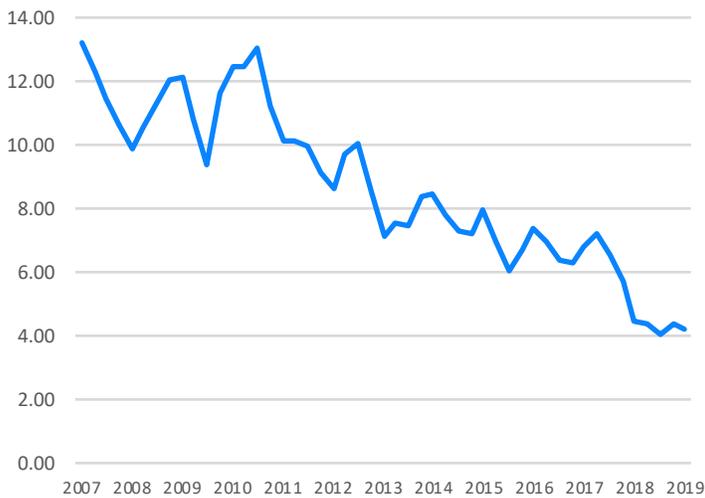
SAFETY PERFORMANCE

The 3-yearly rolling average accident rate per 100,000 hours is, as of the end of the first quarter of 2019, 4.26 for agricultural helicopter accidents and 13.50 for aeroplane agricultural operations. In 2019 to date there have been 3 accidents on agricultural operations, 2 of which have been helicopter wirestrike accidents. For the same period in 2018, there were 4 accidents on agricultural operations.

3-Yearly Accidents per 100,000 Hours - Aeroplane Ag Operations



3-Yearly Accidents per 100,000 Hours - Helicopter Ag Operations



The helicopter hit power lines and crashed while spraying. During the last load of the job and while searching for broom to spray, the aircraft contacted high voltage power lines. The aircraft rotors cut through the power lines, rendering the helicopter uncontrollable, and it subsequently impacted the ground.

The pilot indicated that although he was aware of the power lines, he lost situational awareness while focused on the search for pockets of broom.



April 2019



Manawatu



Robinson R44



Collision/strike - wire

The pilot was conducting aerial spraying work when the helicopter struck an electric fence wire while completing the third load of the job. The pilot was aware of the location of the wire and had avoided it during the other spray runs and on previous work on the block. He managed to execute an emergency landing, however the helicopter suffered extensive damage to the front canopy, a rotor blade and during the ensuing heavy landing.

2019 ACCIDENT DETAILS



January 2019



North of Taupo



Bell 206



Collision/strike - wire



May 2019



East of Te Urewera National Park



750XL



Takeoff accident

The aircraft failed to get airborne and crashed off the end of the airstrip, coming to rest inverted. The loader driver assisted the pilot from the wreckage, the pilot sustained minor injuries. The operator's initial investigation identified that, possibly due to distraction, the aeroplane's flaps were not set for take off on the take off roll. The operator's investigation into the accident is continuing.



February 2019



Canterbury



Robinson R44



Collision/strike - terrain (spray boom)

SAMPLE INCIDENT & DEFECT REPORTS



May 2019



Near Takaka



Bell 206



Ground handling - loading

A wheeled loader with the loading bucket raised was observed turning and positioning towards the spreading hopper and the helicopter, and not stopping where expected. Radio calls made from other ground crew and the pilot managed to prevent the loader driver from striking the spinning helicopter blades. In their investigation into the incident the operators identified that the key lessons learned from the near miss were:

- the importance of having good radio communications
- being aware of the perceived pressures placed on crews
- understanding and managing the limitations of individual crew members.

The pilot was spraying roundup close to a susceptible crop and so was concentrating on avoiding spray drift. As a consequence of this they were flying low to reduce the drift. During a low run the spray boom made contact with some wild oats that were growing above the crop. The damage sustained by the spray boom required it to be replaced. In their investigation the operator determined that they should document some further operational procedures around drift mitigation including not flying too low and ceasing spray operations full stop if drift is too much of a concern that it would significantly distract the pilot and reduce their situational awareness.



January 2019



Canterbury



Robinson R44



Ground handling - refuelling

The pilot had fuelled the helicopter with 2 jerry cans. They then took off and flew away to shut down. On landing they noticed that the fuel cap was left on the seat beside them.

-  February 2019
-  Whanganui
-  Robinson R44
-  Hard landing

Nearing the end of a spraying job, the pilot had just completed one “flush out” load and had returned to the loading site for another. On landing the pilot exited the helicopter and had a discussion with the loader, during this time the skid pump was switched off. Once airborne again over the spray area the pilot became aware that the skid pump was not operational and returned to the landing site to restart the pump. During the final landing sequence, a high rate of descent developed which the pilot did not completely arrest before the skids contacted the ground. The skid gear showed signs of damage to the tubes, and the rear crosstube appeared slightly bent.

-  March 2019
-  Central North island
-  Hughes 500
-  Collision/strike - tree (external load)

On the last load sowing seed while the pilot was following the fence line, he did not allow enough height to clear some poplar trees, and the bucket collided with the top of one of the trees. The helicopter was landing back at the loading site from an inspection of the bucket. Apart from a few twigs around the bottom of the bucket, there was no damage sustained.

The operator’s investigation determined that a key cause

of the incident was pilot distraction. There had been a sequence of events preceding the event which led to this, including the helicopter being returned from maintenance with a hot mic being constantly active, and the pilot’s headset jack failing (leading to no comms with ground crew).

Furthermore there had also been some minor bucket issues on the previous job, and there was not enough product to complete the job the pilot was working on. The farm manager had advised the pilot to go ahead with the product provided. The manager also called not long after to advise the pilot to change the spreading rate to allow the product to cover the area required. During this time the light bar in the helicopter failed resulting in the pilot not being able to see what lines he had previously taken. These factors set the conditions for the distraction and loss of situational awareness that led to the incident.

-  April 2019
-  Southland
-  Bell 206
-  Ground handling

On the final run for the job, which was a rinse spray run, the pilot took off without having secured the baggage compartment door. The pilot was notified on landing by ground crew whereupon he exiting the idling helicopter and secured the door. Prior to the flight he had removed the mixing jugs from the baggage compartment and positioned them away from the loading site.



January 2019



Southland



Hughes 500



Fuel system - other

During routine maintenance, engineers found a fuel nozzle cap and insulation tape in the belly tank of the helicopter. On further investigation it would appear that while hot refuelling the helicopter, the loader driver forgot to remove the makeshift fuel nozzle cover, used to stop dust build up in the fuel nozzle, before fuelling the aircraft. This resulted in the cap and insulation tape entering the fuel tank. The loader driver noticed the cap and insulation tape were missing however they were unaware they had gone into the tank. The operator has since advised staff to cease the use of a makeshift fuel cap. The operator SOP is to pump a small quantity of fuel onto the ground before commencing refuelling. Staff have been reminded of this procedure and re-currency training on the refuelling procedures has been conducted.



January 2019



Canterbury



AS 350



Cargo hook defect

During agricultural fertiliser operations the pilot took off on the final load, with a bucket carrying 500kg of urea. As the pilot went through translation, approximately 20 - 30 feet agl, an upwards surge was felt, with a subsequent

loud bang and tug down on the collective. The pilot took the pressure off the collective, looked in the mirror and saw that the bucket was no longer attached, with the hook dangling on its own cable. The pilot returned to land, keeping the hook in view at all times using the mirror. On shut down the pilot also found a 40cm rip in the belly cover caused by the hook cable being pulled during the incident. Upon further investigation it was found that the cargo hook universal joint had failed. Corrosion and fatigue cracking originating from around the bush on one side of the joint assembly has caused one side of the joint assembly to fail. The other side failed under the increased load.

The maintenance provider has replaced the universal joint assembly and a 12 month NDT inspection has been implemented.



January 2019



Whanganui



Cresco



Fuel system

The pilot reported low fuel in the forward fuel tanks during a ferry flight. The aircraft was landed on a farm airstrip under power with near full rear tanks and low fuel in the forward fuel tanks. Inspection confirmed there was a failure of the main power feed wire from a relay in the Fuel System Relay Box, as the cause of the rear fuel tanks not feeding fuel from the rear collector tank to the forward collector tank.

-  February 2019
-  Canterbury
-  Cresco
-  Hopper lever

As the pilot applied pressure to the hopper lever to open the hopper doors, the lever broke off in the pilot's hand. Fortunately, the doors had opened a small amount and the pilot was able to spread the lime before landing safely. The lever broke around the butt weld originally carried out at manufacture. The weld had very poor penetration significantly reducing the strength of attachment. The operator's safety investigation determined that when using certain products, additional force was required to be applied to the level. As a result of the safety investigation the manufacturer have modified their manufacturing drawings, requiring the entire circumference of the tube to be welded and the strengthening blade has been enlarged so there is additional material around the tube. The operator has also utilised aircraft with hydraulic actuated hopper doors, for products that induce increased hopper door actuation forces.

-  March 2019
-  Canterbury
-  AS 350
-  Spray equipment

During spraying operations, the spray valve failed to shut off when commanded. The pilot's turn was tightened up

to stay as close to within block boundaries as possible and the aircraft spray pump was shut off manually. After returning to the load site to investigate the pilot found some water in the pneumatic control lines. These were cleared and tested.

-  May 2019
-  Raglan
-  Fletcher
-  Undercarriage

The crew reported that on take off with a full load the aircraft settled and then recontacted the airstrip. The contact was quite hard so the pilot continued the take off, dumped the load and returned to the strip. On inspection of the undercarriage it was found that the L/H main landing gear upper torque link bolt was found to be missing the bolt head. A new upper torque link bolt was installed and the lower torque link bolts inspected visually.

-  March 2019
-  Northland
-  Fletcher
-  Throttle cable

The throttle cable failed (snapped). During climb power reduction after take off MP and Fuel flow remained at full power indication although throttle had been retarded. The fertiliser load was sown then at a safe height the mixture control was used to stop / control power for a landing back on the airstrip. The cable was replaced.

-  March 2019
-  Whanganui
-  Fletcher
-  Undercarriage

While taxiing past the loader driver, the left-hand main landing gear leg was noted to be sitting at a different angle. The loader driver contacted the pilot and the aircraft was shut down as a precaution. Closer inspection confirmed the leg had rotated outboard and rearward resting against the aircraft skin. Engineering inspection revealed that both forward bolts had sheared, the top bolt approximately 30mm from the head and the lower 60mm from the head. The rear bolts had bent and were required to be cut to facilitate removal.

The operator's investigation determined that the incident occurred due to failure of one main landing gear attachment bolt. The bolt failed as a result of bending fatigue which led to the overload and eventual shearing of the second bolt. The aircraft's data monitoring system confirmed that the aircraft had not been subjected to any additional or unusual loads associated with operating on the short and potentially rough strips.

The correct parts were installed but had not been installed correctly leading to the bolts being slightly thread bound. Due to the reduced clamping force able to be applied when torquing the bolts slight movement was able to occur.

-  April 2019
-  Nelson/Marlborough
-  Cresco
-  Flap torque tube

While on a refuelling stop the pilot noticed a cracked flap torque tube end that appeared very close to parting off. The crack extended almost the entire width of one side of the lug – see image below. The aircraft underwent a check servicing so the torque tube was removed and paint stripped. A visual inspection of the entire torque tube was been carried out with nil defects detected. The torque tube was repainted white to aid in visual inspection/defect detection for the future.



-  March 2019
-  Gisborne
-  Robinson R44
-  Cylinder push rod

While preparing a spray load the loader driver noticed a small amount of smoke. On closer inspection there was found to be a slight tapping noise in the number 4 cylinder. The helicopter was shut down and a bent push rod was identified. The cause was carbon build up between the exhaust valve and the valve guide. All exhaust valves were cleaned and inspected and the push rod replaced.