



**NEW ZEALAND AGRICULTURAL AVIATION
SAFETY UPDATE
2016**





INTRODUCTION

This is a safety update covering information about the agricultural sector including:

- Activity in the sector
 - *flight hours over time*
 - *agricultural product statistics*
- Safety performance information
 - *accident numbers over time*
 - *accident rates*

For the purposes of raising awareness and sharing lessons, it also covers information about accidents and incidents in the sector in 2016 and 2017.

There are currently 102 Part 137 certificate holders owning and operating 101 fixed wing aircraft and 287 helicopters. From the activity data that has been received to date it appears that there was a reduction in agricultural aviation activity in 2016. This reduction is also reflected in the agricultural product statistics. There is no doubt that the volatile weather over 2016 was a key cause of this. NIWA recently released climate summary information for 2016 and it was a year of extremes for some areas. Included on the next page is an infographic from NIWA showing some of these weather trends.

The long-term safety data shows, overall, declining accident rates for both fixed wing and helicopter accidents. Note however that in 2017 already there have been five accidents on agricultural operations – there were eight in 2016 in total. That means that $\frac{1}{4}$ into 2017 there have been over $\frac{1}{2}$ of the accidents in 2016.

If you can, then please take some time to have a read of the update. If you have any questions or feedback then contact me at

Joe.Dewar@caa.govt.nz.

Best regards,

Joe Dewar

Regulatory Intelligence Analyst, CAA



CLIMATE EXTREMES

2016

@NZWEATHER

196 km/h | HIGHEST WIND GUST
Cape Turnagain
10 March

350 mm | ONE DAY RAINFALL
North Egmont
17 February

2840 hours | SUNNIEST
Richmond
in 2016

-14.1 °C | LOWEST TEMP
Mt Cook Airport
8 August

35.5 °C | HIGHEST TEMP
Clyde | Alexandra
3 February

CLIMATE SUMMARY

2016

Temperature



2016 was NZ's warmest year on record

Record or near-record breaking warmth for many locations in NZ

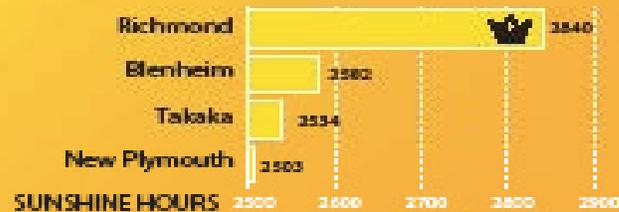
13.4°C Nationwide 2016 temperature

0.83 °C above average

Sunshine



Top 4 sunniest spots for 2016



Rainfall



Wettest year on record for Milford Sound
9259 mm (records began 1929)



Second wettest year on record for South West Cape (Stewart Island)
1545 mm

Of the 6 main centres



Dunedin coldest



Christchurch driest



Wellington wettest



Auckland warmest



New Zealand Agricultural Aviation Activity

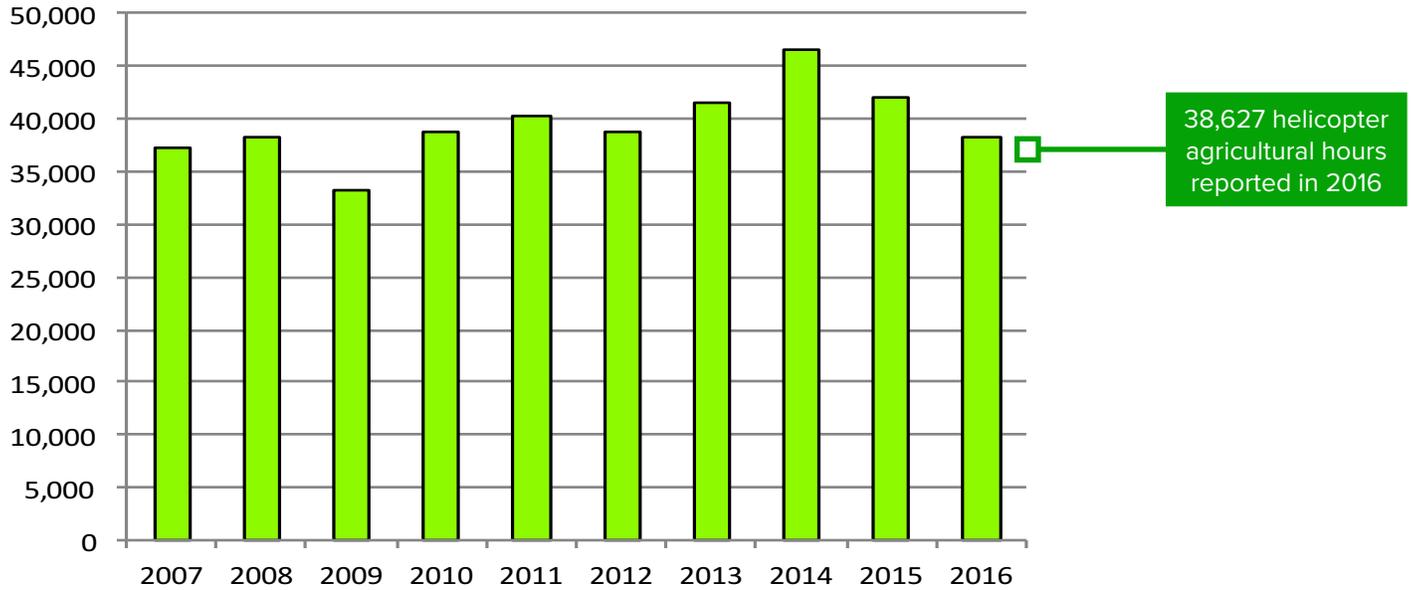


Chart: Reported **helicopter** agricultural flight hours 2007 - 2016

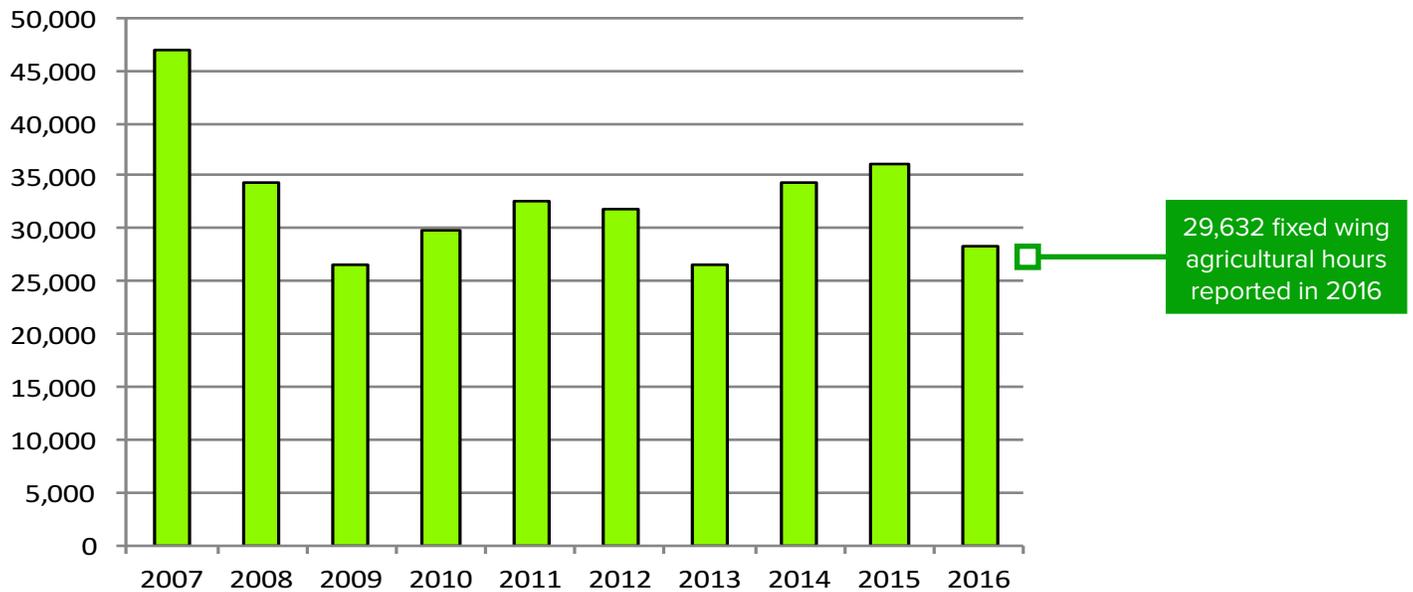


Chart: Reported **fixed wing** agricultural flight hours 2007 - 2016

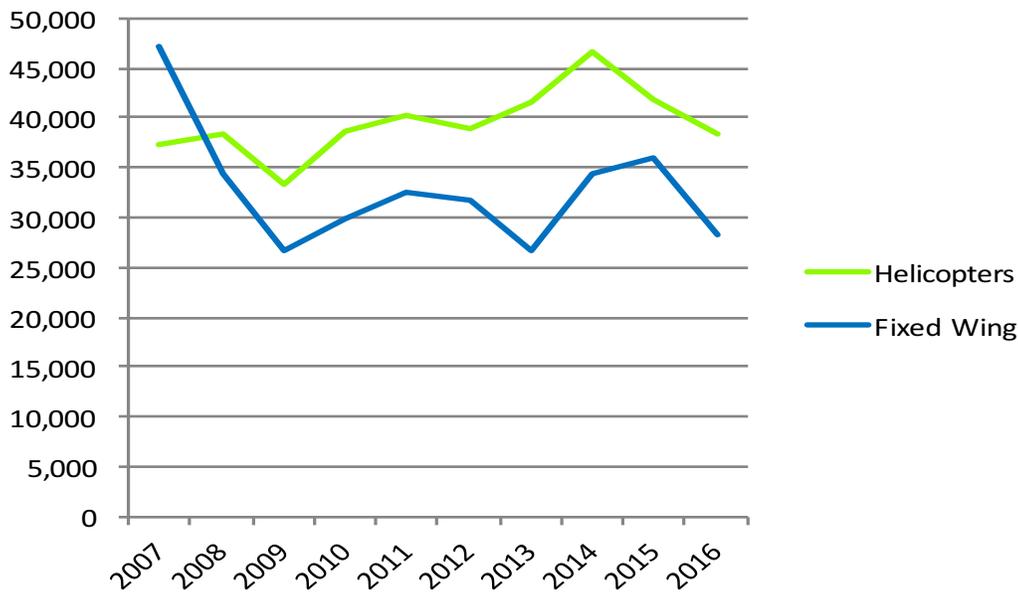


Chart: **Comparison** between reported helicopter & fixed wing agricultural hours 2007 - 2016

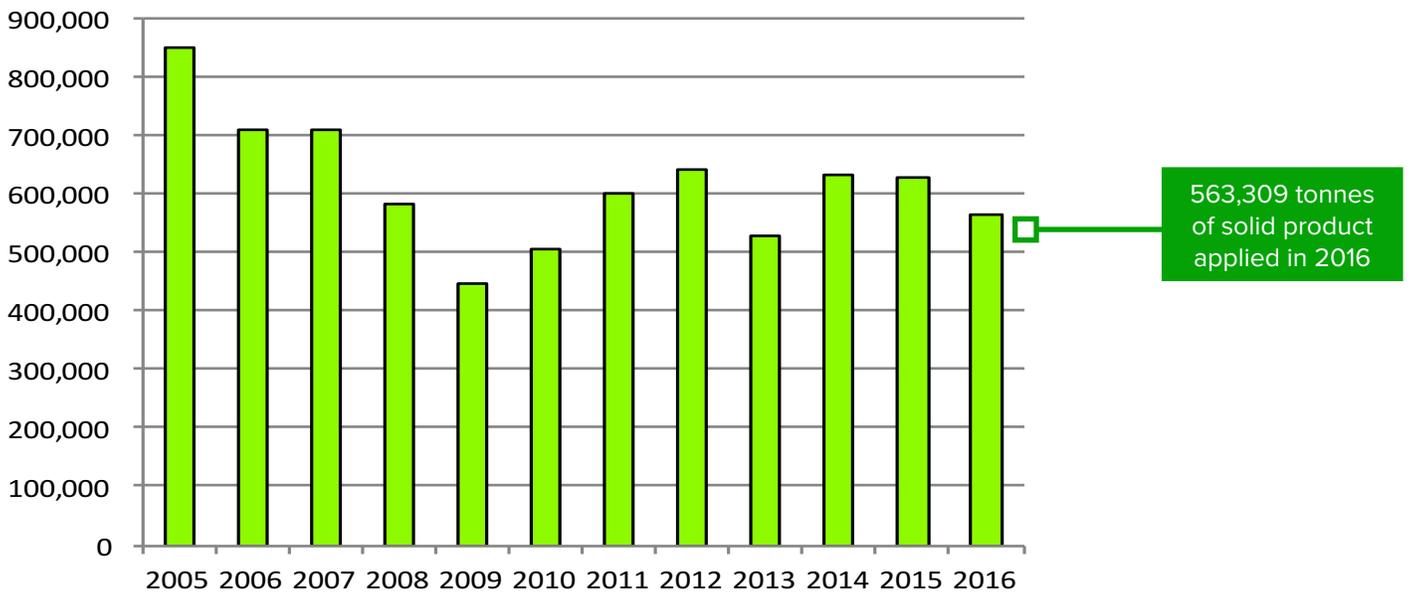


Chart: Annual reported **tonnes of solid product** applied 2005 - 2016

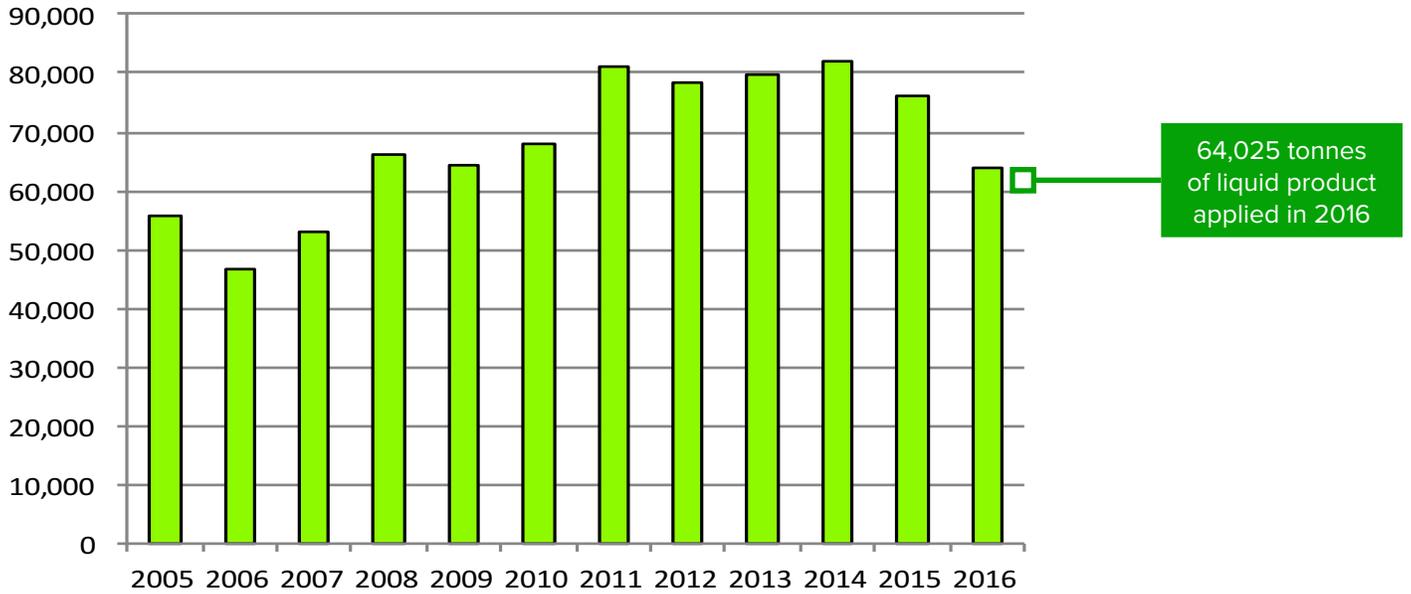


Chart: Annual reported **tonnes of liquid product** applied 2005 - 2016

Agricultural Aviation Safety: Total Accidents

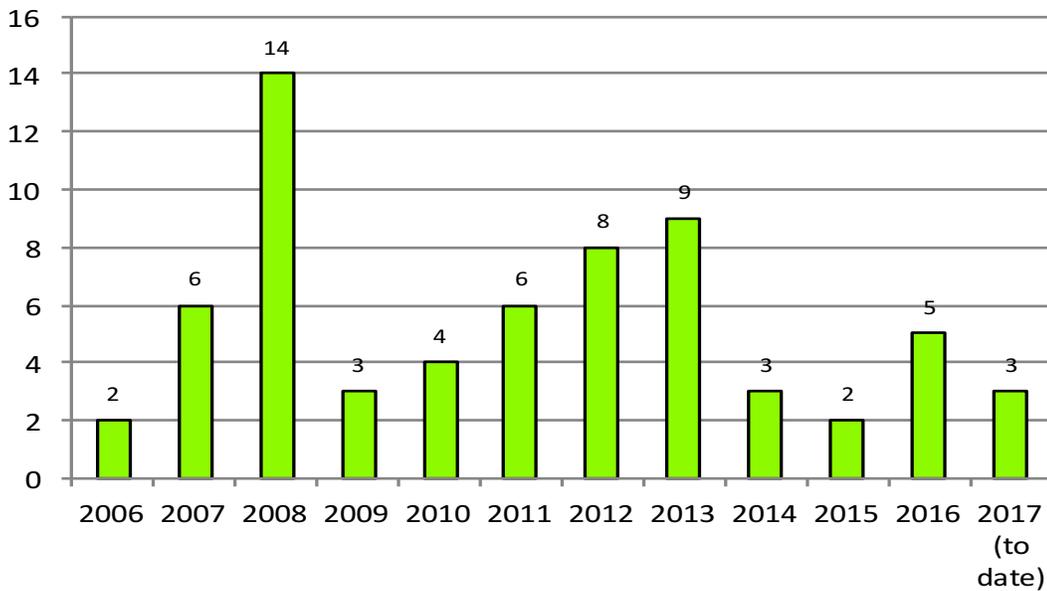


Chart: Total **fixed wing** agricultural aviation accidents 2006 - 2017 (to date)

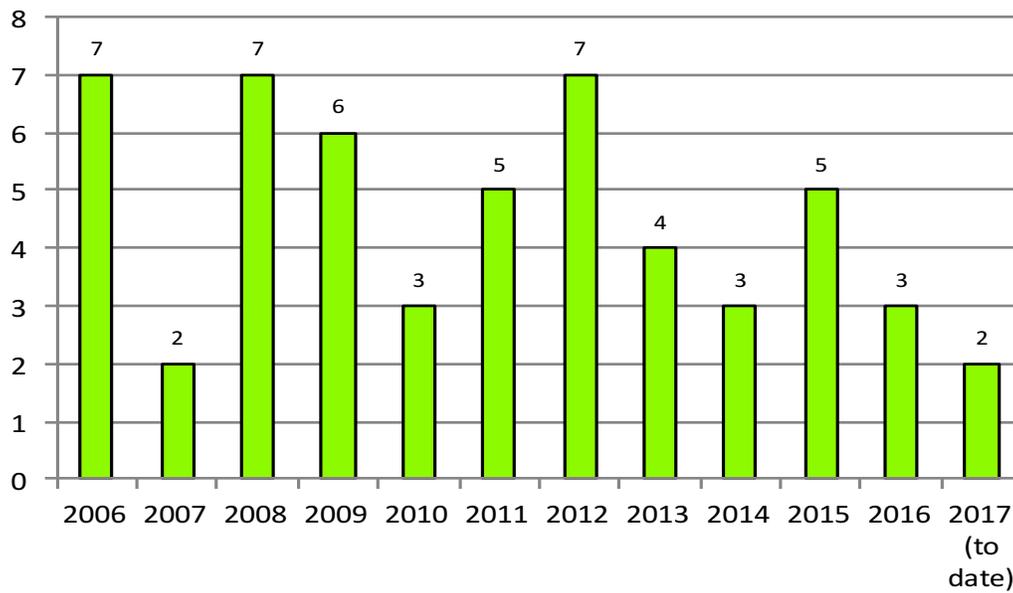


Chart: Total **helicopter** agricultural aviation accidents 2006 - 2017 (to date)

Agricultural Aviation Safety: Accident Rates



Chart: 2-yearly **fixed wing** agricultural aviation accidents per 100,000 hours 2002 - 2016

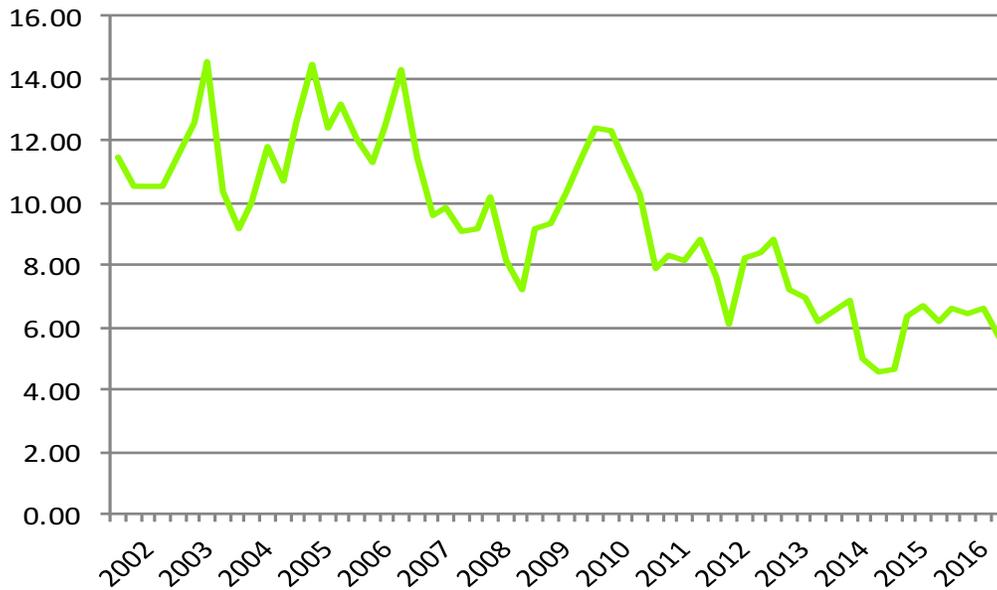


Chart: 2-yearly **helicopter** agricultural aviation accidents per 100,000 hours 2002 - 2016

Agricultural Aviation Safety: Accident Details



September 2016



Near Taupo



Air Tractor



Take off accident - FOD

During the take off the aircraft ran over a loose piece of wood, which flicked up into the LH brake hydraulic line, leading to total brake failure on that side. The pilot needed to apply full right brake to maintain directional control, as the aircraft yawed into the crosswind. There was a loss of ground speed and the pilot jettisoned the load near the end of the

strip, however this was not sufficient to take off and the aircraft touched down heavily on a paddock ahead before getting airborne. After making several passes over ground crew to inspect the undercarriage damage, the pilot successfully flew to Taupo for an engineering inspection. This revealed that along with the damaged LH brake line, there was damage to one main undercarriage leg and the tailwheel assembly that required replacement.

On a subsequent inspection carried out as part of the investigation, further pieces of wood were identified laying amongst the grass around a centre section of the strip. The site itself was on an ex-forestry block that had been converted to a dairy farm over

the preceding 19 months. Evidently the sections of wooden debris had been buried for some time but had worked their way to the surface. Prior to commencing the job the farm manager had inspected the strip on his bike to check its condition. The pilot was familiar with the strip, having conducted 15 separate jobs on it from when the forestry block was first converted to farmland.

The operator undertook to update procedures for working on substandard airstrips, such as those on “Forest-to-Farm” land, by requiring crew to walk the airstrip themselves and remove any debris prior to, and during, operations on it.



November 2016



Southland



Robinson R66



Under investigation

The pilot was completing a final run to flush the spray tanks out. On a descending right hand downwind turn to begin the run the low rotor RPM horn sounded after the pilot pulled back power to slow the descent rate. The pilot lowered collective and initiated a flare.

At this point the RPM stabilized. The pilot continued the flare slowing to 40-35kts. Near the start of the run the pilot lowered collective to come out of the flare, seeking to enter the run at 30-35kts ground speed. The rotor RPM horn sounded again. Unable to regain RPM the pilot attempted a run-on landing into the paddock below. The left skid contacted sloping ground and the helicopter bounced once and rolled. The tail boom was severed and the main rotors came away from the rotor head. The pilot was uninjured.

The TAIC are investigating the accident.



Image of wooden debris from the airstrip



October 2016



Near Whangarei



Robinson R44



Under investigation

Helicopter crashed during a forestry spraying operation, fatally injuring both on board. The TAIC are investigating the accident.



December 2016



North of Wairoa



750XL



Collision/strike - wires

The aircraft collided with a set of 110kv power lines while on a ferry flight to a job. Both occupants were fatally injured in the accident. The accident is under investigation currently.



December 2016



Ashburton



Air Tractor



Landing accident

The operator reported that the aircraft had suffered a minor landing accident. On landing at the airstrip the aircraft drifted about 7 metres to the left due to the greasy surface conditions. The pilot straightened the aircraft however the left wingtip impacted a building on the edge of the strip. This spun the aircraft around into a ditch and some trees that were also on the edge of the strip. There was some damage to both wings, one landing leg, and one tube in the aft fuselage.



October 2016



Near Whangarei



Hughes 500



Collision/strike - wires

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. Situation 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.



February 2017



Otago



Robinson R44



Loss of control - performance management

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, regardless of how routine or familiar the task is.



February 2017



Near Woodville



Air Tractor



Landing accident

The aircraft experienced sink on final approach and made a heavy landing prior to the start of the strip, damaging the landing gear.



February 2017



Near Clevedon



GA 200C



Takeoff accident

On takeoff there was a sudden wind change that caused excessive sink. The aircraft impacted heavily with the ground in the paddock ahead. The pilot was uninjured but the aircraft sustained significant damage.



March 2017



Near Te Kuiti



Cresco



Aircraft collision

Two Crescos collided when operating off the same airstrip. One was taking off and the other was landing. The pilots were not injured. The investigation into the accident is underway.

Significant incidents

 August 2016

 Southland

 Hughes 500

 Collision/strike - fence

The pilot was flying over a fence on approach to the landing area when the hook on the bottom of the strop contacted the top wire of the fence. The wire was pulled away, while the helicopter continued to land without damage.

 November 2016

 Northern Hawke's Bay

 Hughes 500

 Collision/strike - wire

As the helicopter was pulling up at the end of a spray run the LH skid hooked under a 2mm wire that supplied power to a house. The wire broke, while the helicopter was undamaged and landed safely. The wire was one of two in the spray area, and the pilot

reported that they were concentrating on the larger set of wires. In addition the prevailing light conditions made the thin wire invisible.

 December 2016

 Near Kaitaia

 Robinson R44

 Collision/strike - wire

The helicopter struck an electric fence feeder wire while taking off to depart the job site. Over the course of the job (conducted over two days) the farmer had taken the wire down, however unknown to the pilot, he re erected it before the helicopter departed, while the helicopter and load site were being cleaned by the pilot and ground crew.

 January 2017

 Otago

 Cresco

 Airstrip incursion - livestock

Before landing the pilot made a run down the airstrip to check for stock, noting four lambs on the side of the strip. Commencing the approach the strip appeared clear however on landing one lamb came up over the side. The pilot was unable to avoid the lamb and it hit the propeller resulting in minor damage to two blades.



January 2017



Pahiatua



GA 200C



Airstrip incursion - livestock

Late into the take off roll a bull got through a gate on the side of the airstrip and ran on to the runway. The take off was continued however shortly after becoming airborne it struck the bull. The pilot flew to Fielding aerodrome for an inspection: there was some damage sustained to the undercarriage.



January 2017



Gisborne



750XL



Component/system failure

On take off the pilot heard a loud bang at the point of rotate, that sounded to have come from the undercarriage. After spreading the load the aircraft landed successfully however during a turn in the loading area, where the pilot was going to inspect the undercarriage the LH main leg slowly collapsed.

The engineering inspection revealed that the attachment bolts had failed. The failed bolts have been sent for analysis.

Significant defects



October 2016



Cresco - manufactured January 2000



Under carriage cylinder

The main undercarriage cylinder was removed to carry out a repair to the wing at the 4-yearly inspection. Corrosion and pitting was evident on the outer face around the bottom clamping position. After measuring it, the cylinder was found to be 0.006” undersize, which allowed it to move within the clamp and chafe the protective coating away. A properly-sized replacement cylinder was fitted.



December 2016



Cresco - manufactured July 2003



Flap handle

The flap handle cracked due to fatigue. The crack had initiated from the front of the slot in the lower rear section of the flap handle. The handle was removed and replaced. An image of the cracked handle is included below.



Image of the cracked handle



February 2016



Hughes 500 - manufactured January 1979



Tail rotor blade

While the pilot was carrying out a pre-flight inspection of the helicopter they identified that the leading edge of the newly installed tail rotor blade was delaminating. The cause of the delamination was failure of the adhesive used to attach the leading edge. The blade was replaced and the helicopter was returned to service. Image included below:



Image of the delamination of the leading edge