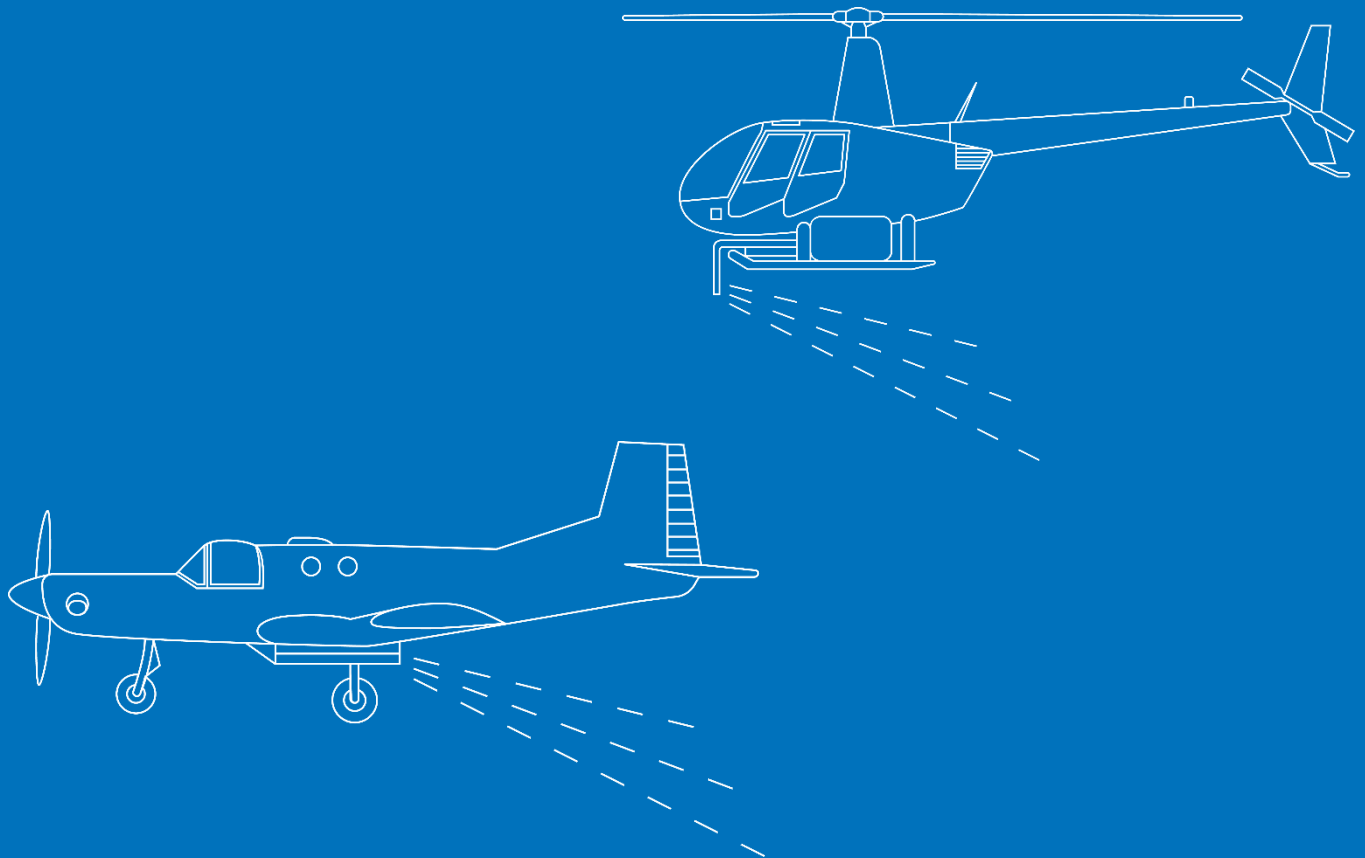


Sector Safety Update: Agricultural aviation

May 2021



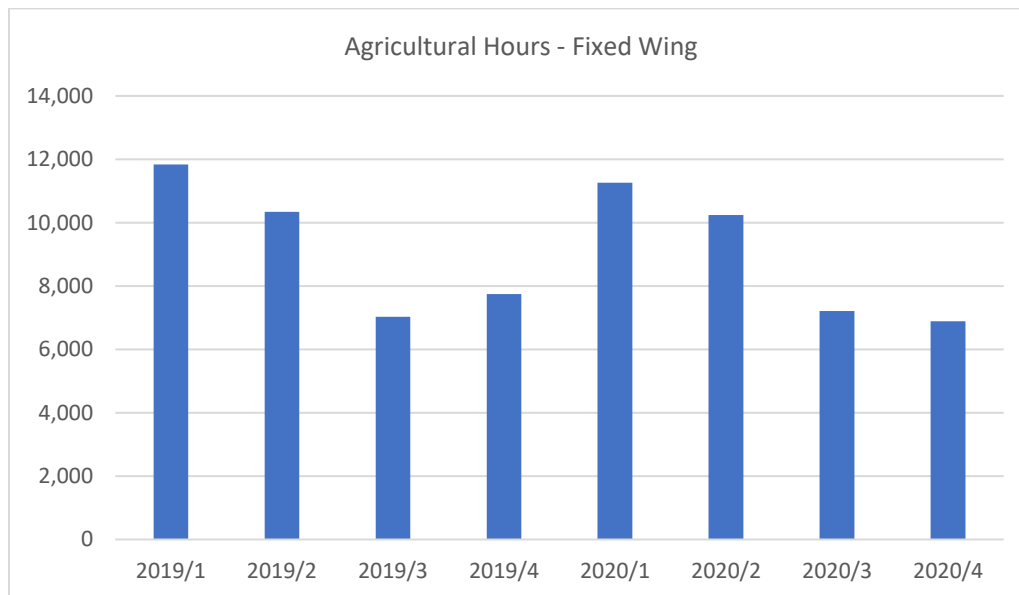
Sector Safety Update – Agricultural aviation

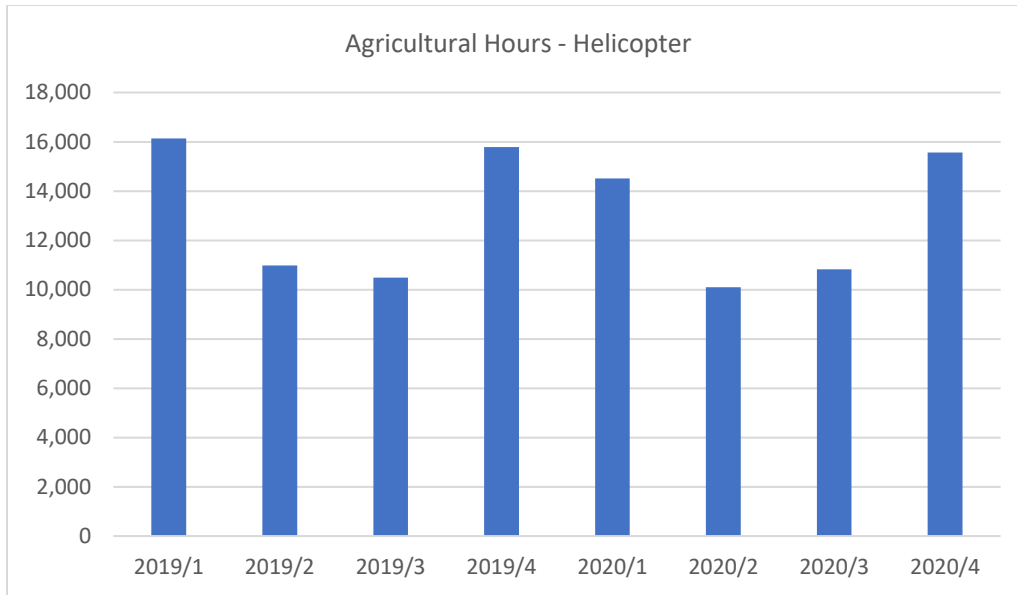
May 2021

This is a further update on activity and safety performance in the agricultural aviation sector, with activity and accident rate information current to December 2020. The report includes details of accidents and incidents for the purpose of raising awareness about risks and sharing safety lessons with the sector. If you have questions or comments [please contact CAA Intelligence Manager Joe Dewar](#).

Activity – Flight Hours

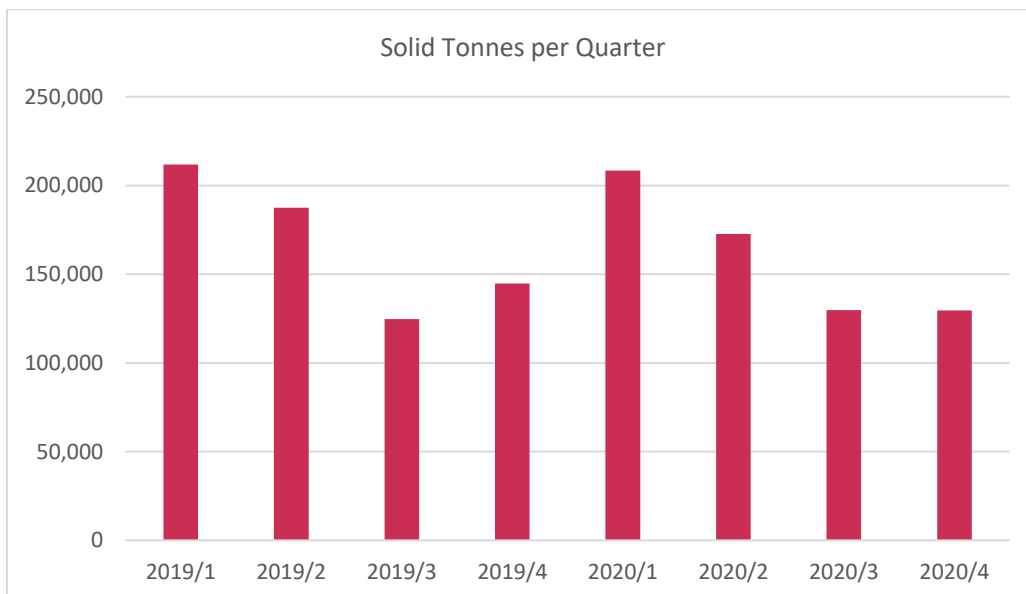
Overall the agricultural aviation sector saw a relatively small reduction in activity in 2020, with 86,600 hours reported overall, 3,730 fewer hours (or 96%) of the total hours reported in 2019. That slight reduction in hours was experienced evenly across both fixed wing and helicopter operations.

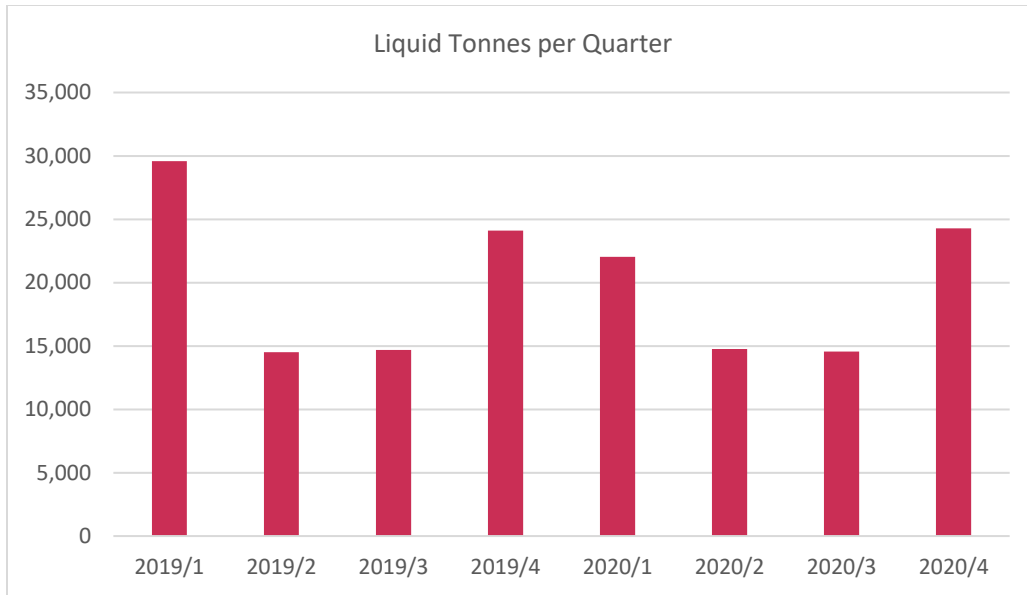




Activity – Product Tonnes

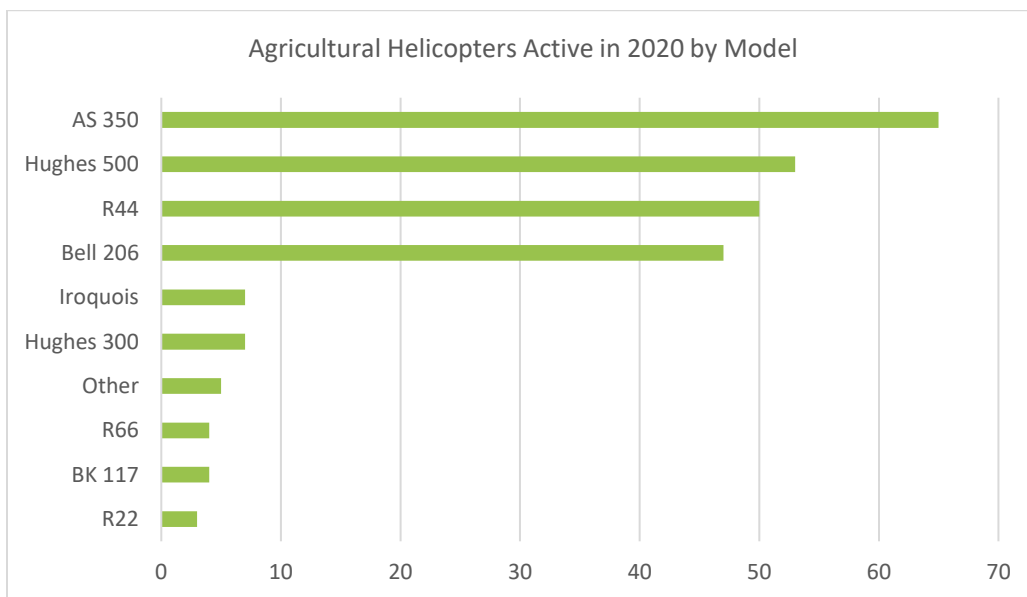
Reported amounts of product tonnes applied in 2020 tell a similar story to flight hours, with 95% of the 2019 product tonne amount being reported during the year. There was a slightly greater reduction in liquid tonnes than solid tonnes.

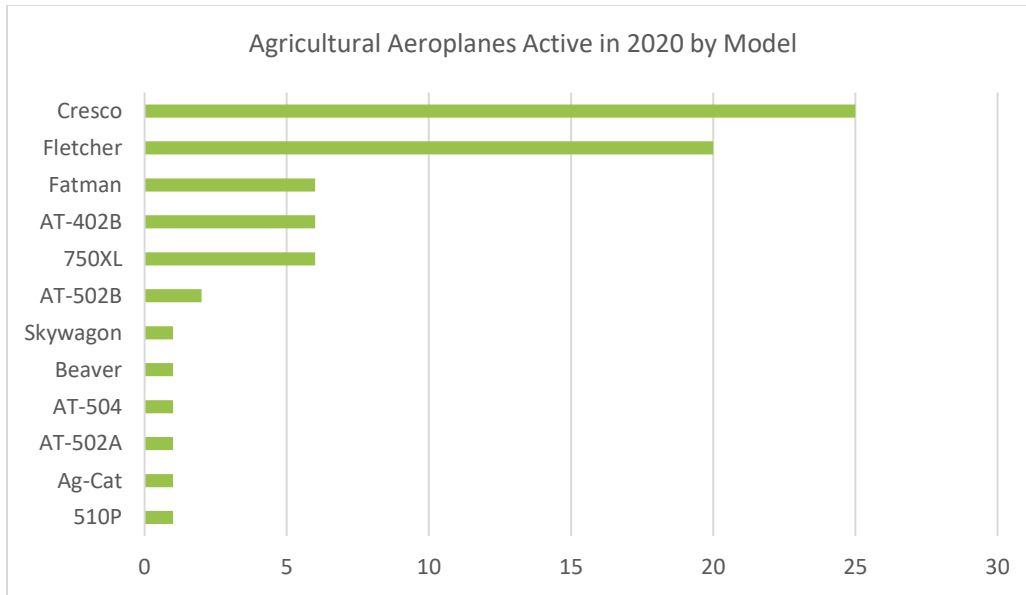




Activity – Fleet

Based on activity reporting, there were 317 aircraft used on agricultural operations in 2020 - a reduction of 13 from 2019. AS 350 machines are the most popular agricultural helicopter currently and Crescos continue to be dominant in the fixed wing sector.

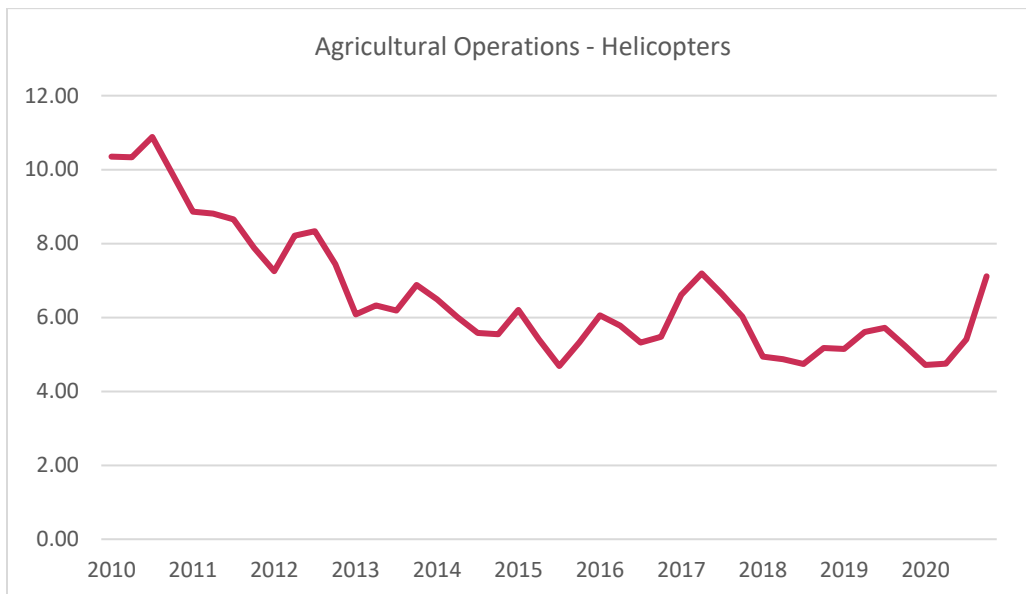
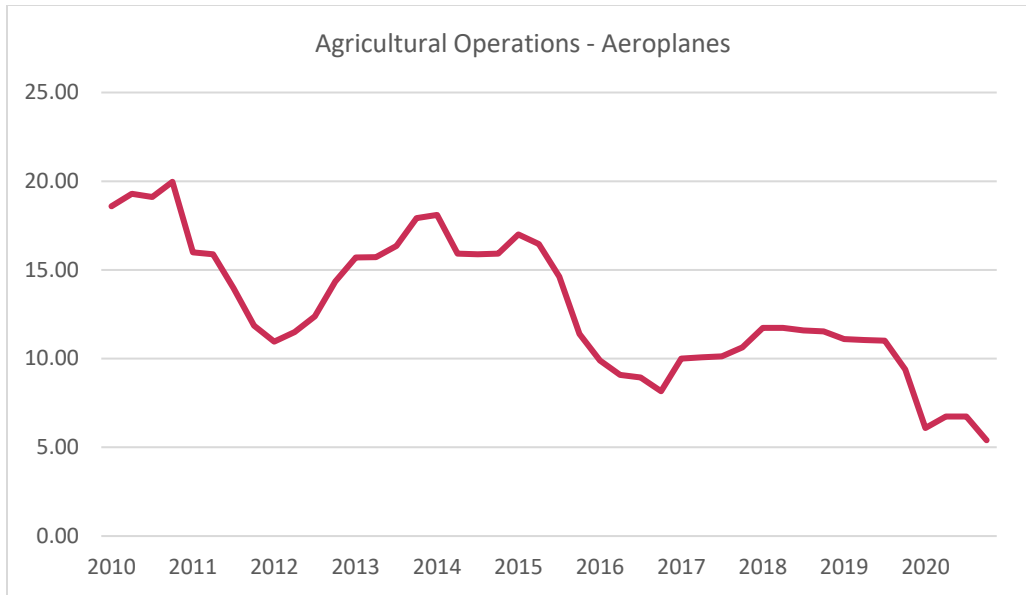




Safety Performance- Accident Rates

This section covers sector accident rates and then details accidents which occurred in 2020. The accident rates tell different stories by aircraft category, with the accident rate for fixed wing agricultural operations having decreased to an **all-time low of 5.11** per 100,000 hours.

Meanwhile, the accident rate for helicopter agricultural operations has increased sharply to 7.11 per 100,000 hours, with three accidents in the last quarter of 2020; two wirestrikes and one MRB strike with a loading vehicle.



Accident Summaries

January	The aircraft was engaged on wilding pine spray operations. As a result of the helicopter's low speed and the variable wind conditions at the time, tail rotor control was lost and the machine crashed, rolling onto its side in a clearing with substantial damage.	AS 350
April	On the third load of the morning the aircraft failed to achieve take off before the end of the airstrip. The aircraft dropped over the end of the airstrip, banked to the right and whilst vertical hit a tree with its right wing and then impacted the ground shortly afterwards. TAIC is investigating the accident, Ref AO-2020-001.	Cresco

May	<p>While conducting wilding pine operations the main rotor blades contacted terrain. After assessing the flight characteristics, gauges and warning lights, the pilot returned to the load site.</p> <p>The aircraft was shutdown and inspected. On inspection it was determined that the damage required LAME inspection. After speaking to the relevant people, it was decided to ground the helicopter and transport it via truck to a maintenance facility for repairs the following day.</p> <p>An internal investigation was conducted by the operator. It was determined that the pilot was focused on the tree that was to be treated and ensuring the wand operator was appropriately positioned to carry out the task.</p> <p>It was also determined that it is possible that a build-up of dust/dirt on the windscreen may have contributed to the pilot not being able to see the rock clearly. As a result, a review of the window cleaning procedure will be updated.</p> <p>The operator is also going to conduct a full review of the SOP for wilding pine operations during their next amendment cycle.</p>	Hughes 500
September	While conducting ag operations, the helicopter turned downwind with insufficient airspeed to maintain height and struck terrain coming to rest upright, causing substantial damage to the landing gear and tail boom. The pilot was uninjured.	Hughes 300
December	Wire Strike. During an ag spraying operation the helicopter flew through a set of power wires. A precautionary landing was carried out. There were no injuries but there was damage to the main rotor blades and mast. The accident is under investigation.	R44
December	Wire Strike. During spraying operations the helicopter skids made contact with wires, and landed heavily. The pilot sustained moderate injuries and there was extensive damage to the helicopter.	R44
December	<p>Main Rotor Strike. After approaching the fertiliser loader and manoeuvring to place the bucket under the hopper the main rotor blades contacted the loader boom and destroyed the helicopter. The operator notified the CAA, supplied photos and received clearance to relocate the wreckage, and then conducted an internal investigation, submitting it to the CAA.</p> <p>The report concluded that the root cause was a loss of situational awareness with contributing factors of a lack of landing reference markers providing landing guidance, potentially some fatigue related influence as the pilot has a new baby at home with disturbed sleep patterns and a ute onsite creating a distraction.</p> <p>The operator instigated a review and instigated an amendment to the procedure for the use of landing markers and amended the hazard register with regards to Fatigue Management.</p>	Hughes 500
April	Upon lifting from a mobile helipad (located on top of the loading truck) the helicopter-mounted spray pump pull start cord got caught up on the helipad causing the helicopter to pitch down and collide with the ground just forward of the truck. There were no injuries.	R66

Recent Maintenance and Defect Reports

Below is a selection of defect and maintenance reports from 2021 to date.

November 2020

Cresco

Fuel tank sealant

New production wing supplied to customer, developed fuel leak less than 30 hours post installation. Fuel was found leaking around righthand Main Landing Gear attachment. Fuel was also detected in the cockpit by the pilot. Integral fuel tank sealant had dis-bonded at outboard lower corner of rear fuel tank. All sealant was removed from the affected area by maintenance provider. New sealant installed ensuring it had purged through to the external face of the integral fuel tank skin.

December2020

Cresco

Horizontal stabilizer

Horizontal stabilizer removed for 2 yearly inspection. Found both rear attach holes cracked on the frame. The frame was installed on an angle, horizontal stabiliser had a tapered packer fitted between the horizontal stabilizer and frame, which has caused undue stress on the rear attaches and thus the frame assy. Frame assembly removed, new frame installed. Images of the cracks below:





December 2020

AS 350

Tail rotor blade spar

Cracked Tail Rotor blade spar discovered during routine maintenance. Tail Rotor blades were Installed 208.7hrs previously, pilot had reported possible tail rotor vibrations. Decision was made to c/o DCA/AS350/23F (part 2) due current 600hr Airframe inspection. Blades returned to Airbus for report, tail rotor blade assembly replaced. OEM could not determine the cause, and said although it was uncommon the spars sometimes suffer from 'splinter' cracks with no direct link to the type of operations. Blade was exchanged.

December 2020

AT-502B

Control quadrant friction assembly

During flight the engine control quadrant friction assembly became loose, making it difficult for the pilot to use the engine controls. Aircraft safely returned to base and inspected, friction shaft screw found loose

which allowed knob, shaft, spring, bushing, and washers to migrate and restrict control movement. Quadrant friction assembly reinstalled, shaft screw tightened and locktite applied.

December 2020

R44

Spray boom

Returning to load site pilot heard a pop/bang sound then noted pilot's side spray boom fold back and hang straight down. At the load site farm manager was able to hold the boom up as the helicopter descended to land.

February 2021

Cresco

Prop bearing failure

Metal flakes spotted in prop grease during scheduled inspection/lube. Prop link pins removed and blades rotated - very notchy movement indicative of bearing failure. Prop removed and sent for repair, replacement installed. Prop has 233 hrs until due o/h. Image below:



February 2021

Cresco

Battery installation

During flight the pilot noted the starter/generator required a reset, investigation revealed voltage drop to 12.4V so flew to maintenance. Found the battery had come out of the battery box and punched a hole through the belly skin. Repairs carried out to belly skin as required. New battery installed, battery box lid retaining pins installed and lockwired.

February 2021

R44

Cylinder failure

While on the take off / climb phase of flight from the load site in paddock, conducting spray ops. The pilot heard a bang followed by high frequency vibration through the a/c accompanied with a loss of power. The pilot jettisoned spray load and made an emergency landing in the paddock in front. The a/c once on ground was running very rough although the temps and pressures were all in the green. Maintenance found #1 cylinder inlet valve had failed at the collet groove. The valve was struck by the piston, bending and jamming the valve in the guide.

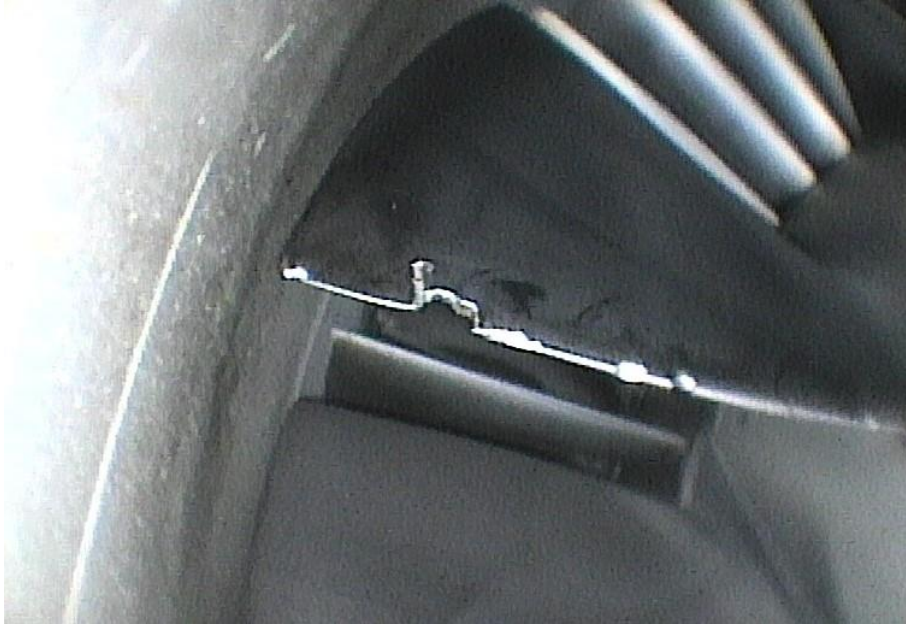
March 2021

Cresco

Compressor blade damage

Upon borescope of the engine's Hot Section, chips were found on the leading edge of several Compressor Turbine blades. Carried out a borescope of compressor section and found major FOD damage to 1st stage and 2nd stage compressor. Removed the engine and sent to Pacific Turbine Brisbane for repair. Images below:





March 2021

Fletcher

Fuel line connection

The pilot reported to the maintenance provider that the engine fuel flow was higher than expected in flight. Maintenance investigation found a fuel leak from a loose fuel line connection at the fuel control unit.

During earlier maintenance carried on the aircraft, a fuel flow test had been carried out. Following this test, the fuel line connection was not tightened sufficiently. The supervising engineer had also failed to identify and check all components disturbed during the maintenance.

A meeting was held between the two engineers involved, the company CEO and company Safety Manager to discuss the maintenance error. The importance of having critical systems double checked after being disturbed was discussed.

A meeting was also held with all staff reiterating the processes for assembling critical parts to prevent 'temporary' installation in an incorrect manner from being overlooked.

Recent Operational Incident Reports

November 2020

Hughes 500

External load- strops

After landing back at base from baiting, a dent was found on the underside of a blade. Rang Engineer and measured the dent and he deemed it serviceable, also aircraft is due for check in 4hrs. Ground Crew noticed on the day that the bucket was flying tail end low. On inspection of the ropes they were all the same length but one was a newer one that allows more stretch. Learning from this is check all strops are of the same type.

Helicopter on 100 hour check and blade will be changed. All 3 strops changed to be of the same type. NOTOPS gone out re the learnings from this incident.

December 2020

Hughes 500

Ground handling

Whilst the helicopter was on the ground reloading with product the skid mounted pump was switched to the off position and the ground crew proceeded to refuel it with petrol. There was no filler spout utilised on the 20lt can and subsequently petrol was splashed on the hot exhaust of the skid pump. This splashing caused the fuel to ignite and then the petrol can to catch fire. Fire extinguished.

January 2021

Bell 206

Ground Handling

Helicopter spraying operations commenced with the helicopter taking off to the North. The site had an uphill slope on the East side and the grass was long. The machine was being loaded with a portable mixing unit from a creek. As operations progressed, the forecast southerly wind change arrived so the helicopter started taking off to the South. During the 2nd T/O the outer port boom picked up the 35mm canvas loading hose. The loader driver saw this and immediately called the pilot using his helmet VHF, and said 'Stop.' The pilot spotted the hose and quickly yawed the machine to the left at which point the hose fell clear. The helicopter had only travelled 4-5 metres when the hose was spotted.

The loader driver would have normally been standing at the boom end on the left hand side signalling a thumbs up (all clear) to the pilot but on this flight he wanted to check the load size on both sight glasses (one on each side) so he was standing on the right as the machine took off.

The spray gear was inspected and no fault found. The helicopter was flown to base. The operator's investigation reported noted that: *"In Agricultural Work, flight safety relies on routine. When the routine changes the operator requires the crew to "take five", reset and reassess the risks before continuing. The SOP requires that the loading hose is positioned behind the booms. Neither of these procedures were followed after the wind change."*

January 2021

Hughes 500

Loose Items – Cockpit

The pilot reported that as they were flying to a block to apply fertilizer they felt something hitting their leg. They looked down and noticed their hat spinning from the air flow as the door was off. Before they had a chance to react it caught the air and blew out of the cabin and made contact the Tail rotor. Knowing it had made contact due to the smallest vibration felt in the pedals the pilot immediately landed and shut machine down. The pilot's investigation report noted that: *"Prior to the incident I was on the ground and was making a phone call. As I got out of the helicopter I tucked my hat between the seats in the front and forgot about it. As I did the I must have poked it through far enough that it either went all the way through or when I re-sat back down that a gap opened up between the seats where it fell through to the ground in the cabin where remained un noticed. Ensure when having left the helicopter to do a re-check for loose items when re-entering the aircraft prior to starting up."*