CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

New Zealand Helicopter Sector Safety Update

April 2021

New Zealand Helicopter Sector Safety Update – April 2021

This is a further update on activity and safety performance in the helicopter 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 lessons amongst the sector. Lastly, it includes a summary section with comments about risks and information gathered from surveys and operator assessments carried out in 2020 and the current and forecast operating environment, again for the purposes of risk awareness and safety management amongst operators. If you have questions or comments about the information then please contact me at Joe.Dewar@caa.govt.nz.

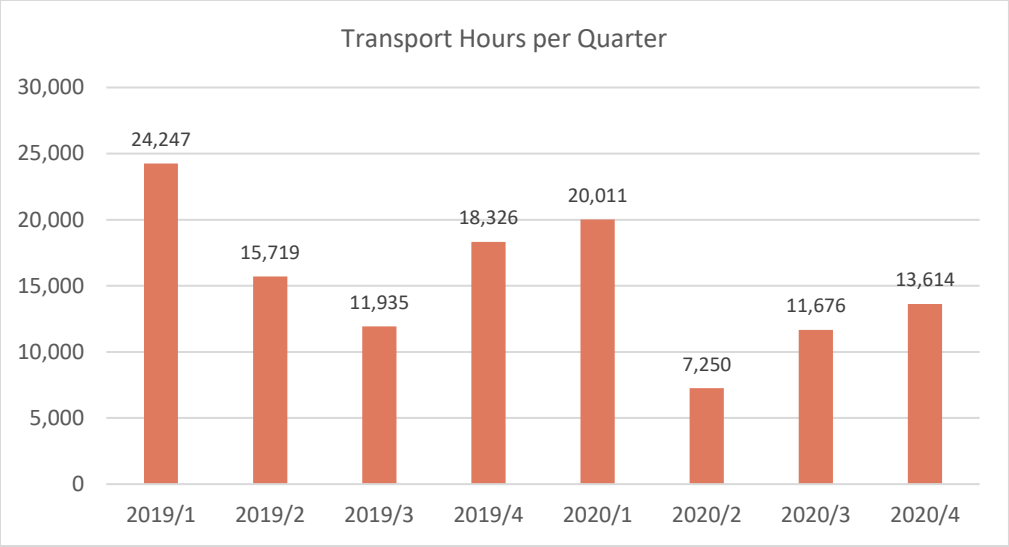
The update covers:

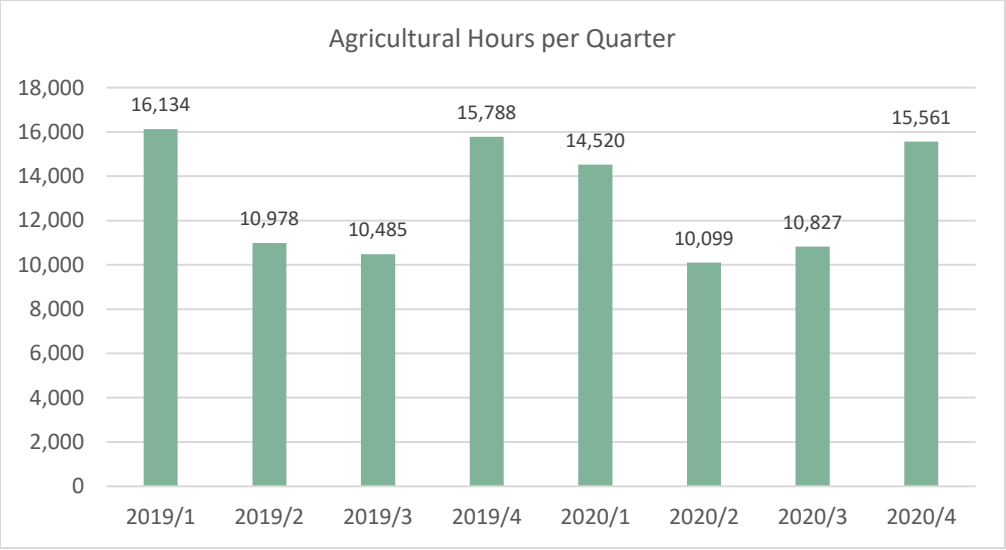
- Sector size and activity
- Fleet
- Safety performance – accident rates
- Occurrences and risk management/SMS

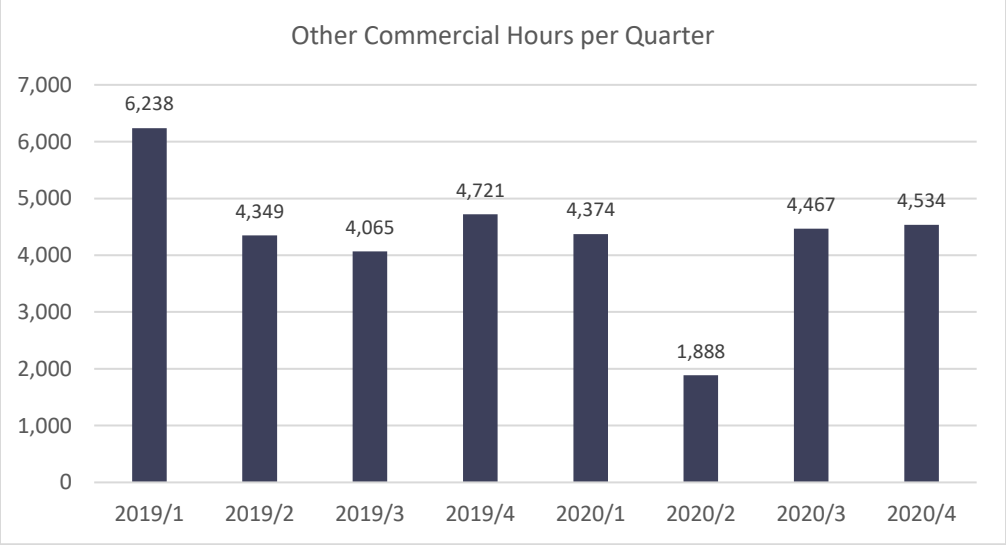
Activity – Flight Hours

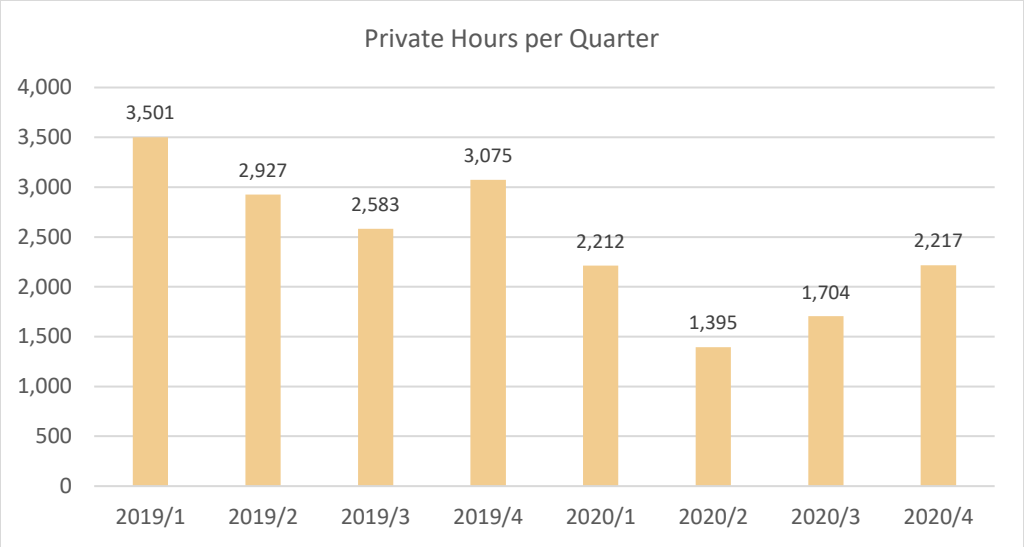
Based on the activity data returns for 2020, overall there was a net 20% reduction in flight hours, i.e. the sector flew around 80% of the total hours that it did in 2019. Air transport hours were the most heavily impacted, with a 25% reduction in hours, followed by other commercial operations with a 20% reduction. Agricultural hours only saw a 3% reduction. The reduction in hours varied by region and operator type. For multi-role operators it was evident in the reporting that CTO and agricultural operations were able to take up some (although not all) of the slack from the reduction in scenic and passenger transport work; Part 135-only operators in the lower South Island and the West Coast reported more significant reductions in activity than others.

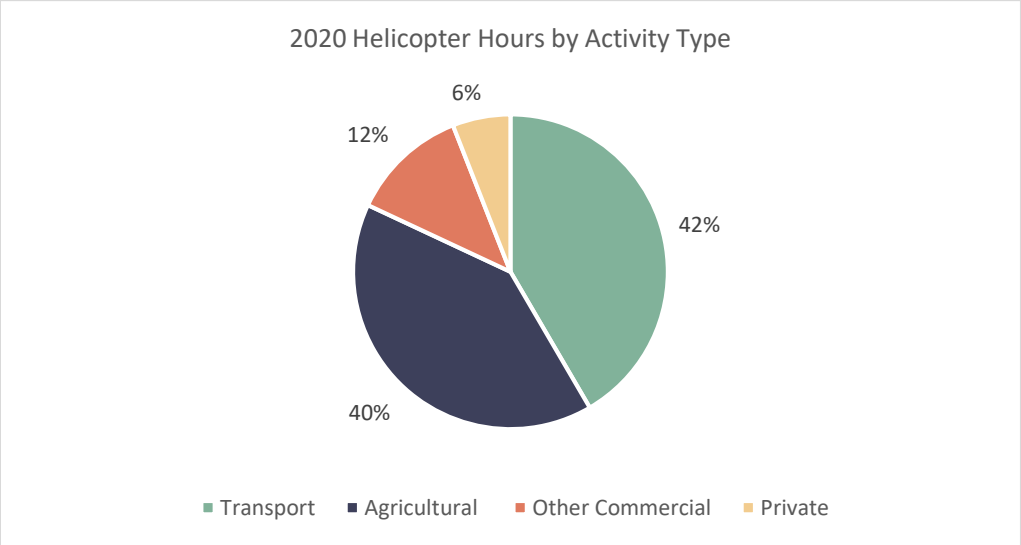
The charts below show the quarterly hours per sector by operation/activity type.


Transport Hours per Quarter
30,000
25,000
20,000
15,000
10,000
5,000
0
24,247
15,719
11,935
18,326
20,011
7,250
11,676
13,614
2019/1
2019/2
2019/3
2019/4
2020/1
2020/2
2020/3
2020/4


Agricultural Hours per Quarter
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
16,134
10,978
10,485
15,788
14,520
10,099
10,827
15,561
2019/1
2019/2
2019/3
2019/4
2020/1
2020/2
2020/3
2020/4

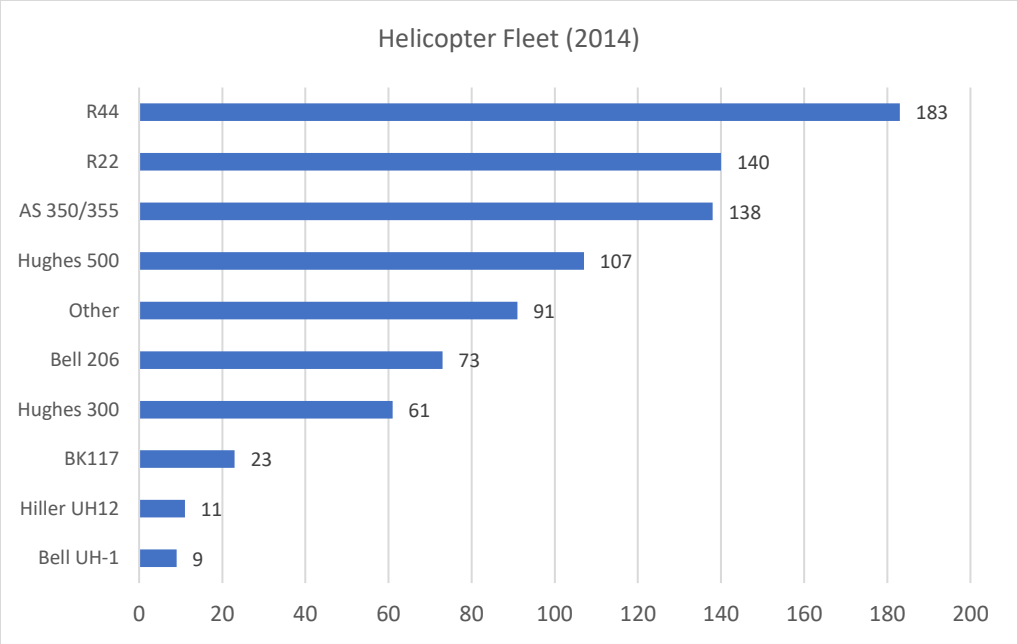

Other Commercial Hours per Quarter
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
6,238
4,349
4,065
4,721
4,374
1,888
4,467
4,534
2019/1
2019/2
2019/3
2019/4
2020/1
2020/2
2020/3
2020/4

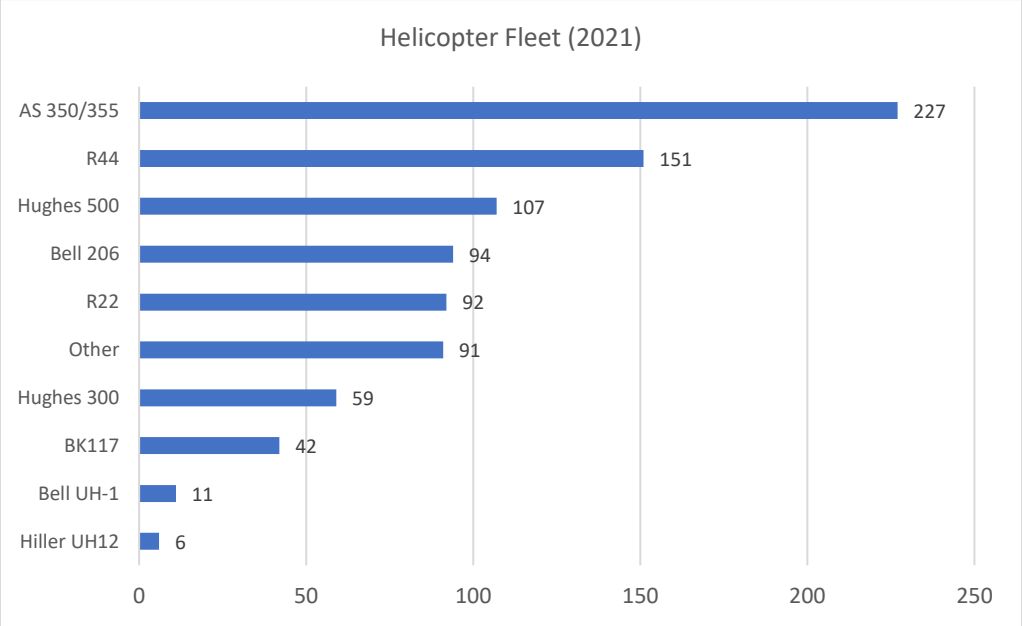




Fleet

The purpose of the fleet information below is to highlight changes to the helicopter fleet over time. The two charts below compare the number of active helicopters on the register in 2014 and then in March, 2021. There are some key points to note here. The first is the rise in the number of AS 350 machines, which now have become the main multi-role helicopter in New Zealand. Active Robinson Helicopter machine numbers have reduced, particularly the R22. Lastly, BK 117 machine numbers have almost doubled in the seven-year period covered.



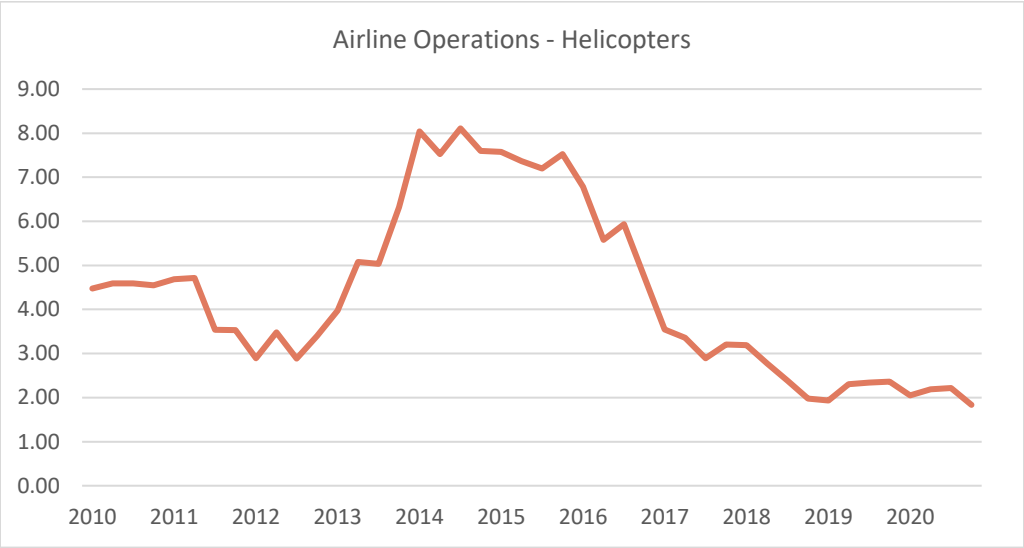


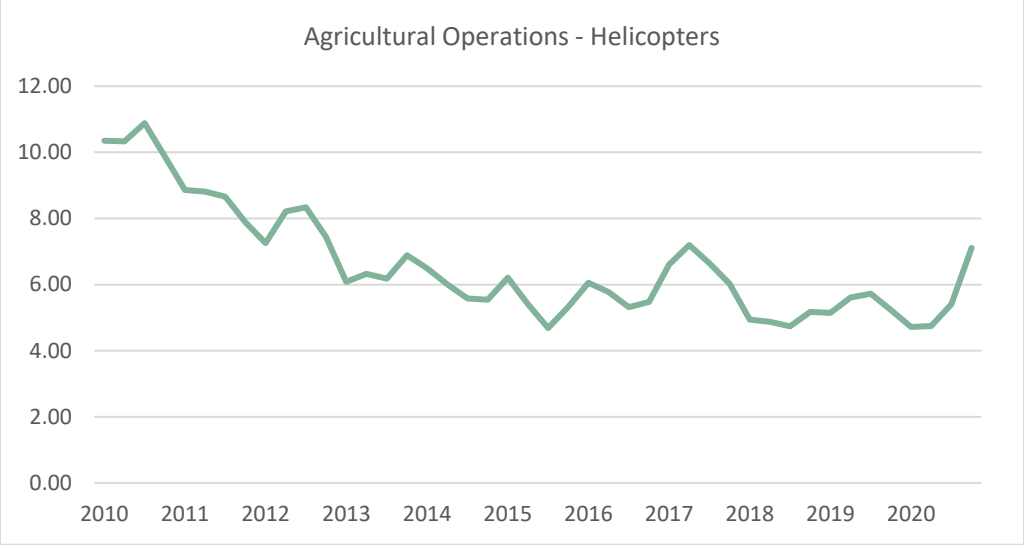
Safety Performance – Accident Rates

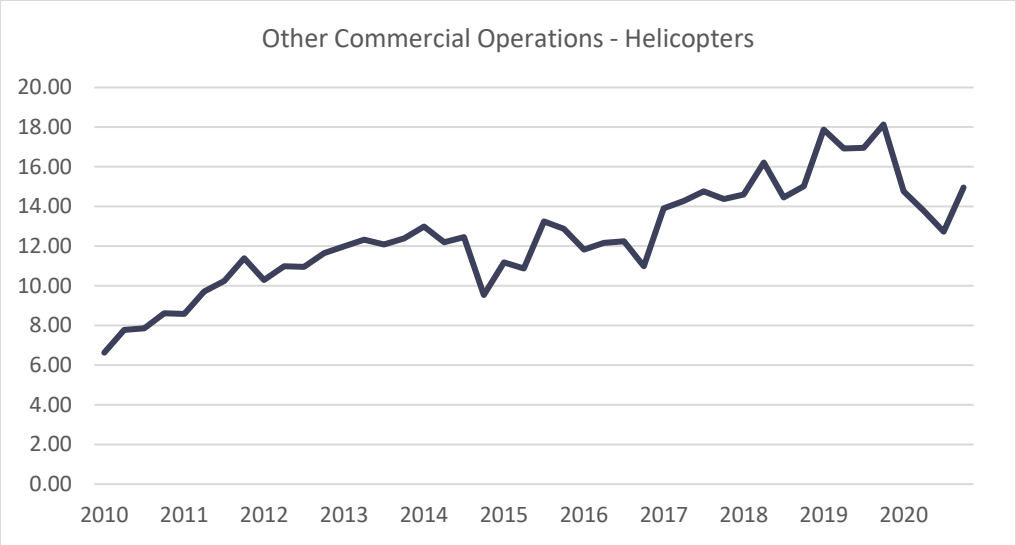
This section covers the accident rates and then the details of accidents in 2020. Despite the reduction in activity in 2020 the air transport accident rate continues to decline, while it is a different picture for the agricultural and other commercial sectors. Agricultural operations in particular have seen a sharp increase in the accident rate, with three accidents in the last quarter of 2020; two wirestrikes and one MRB strike with a loading vehicle.

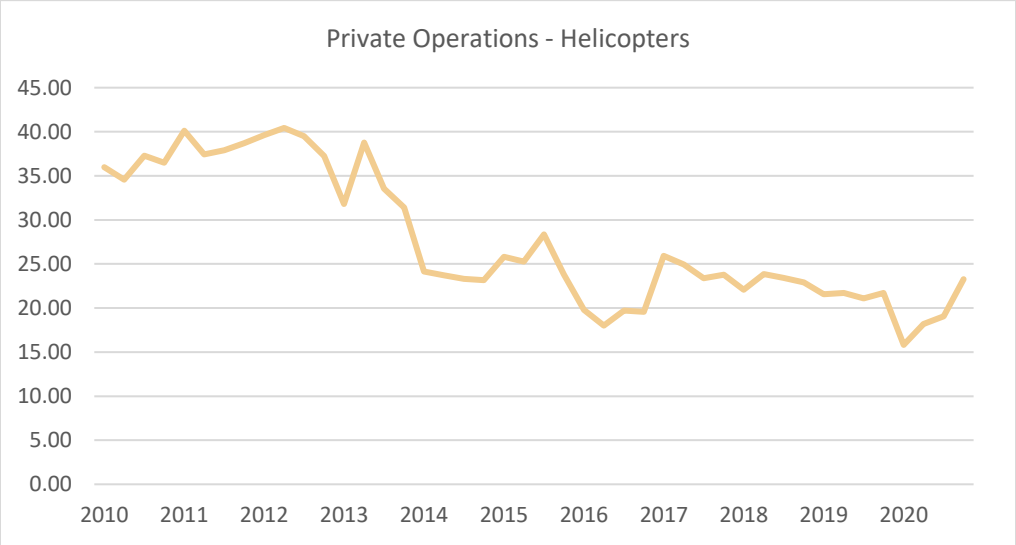
- Air transport operations: 1.83 per 100,000

- Agricultural operations: 7.11 per 100,000
- Other commercial operations: 14.96 per 100,000
- Private operations: 23.26 per 100,000 (preliminary - activity data for non-commercial operators is still being entered)









Accident Summaries

November	R22	Forced landing accident. Tail Rotor strike. T/R blades came in contact with a tree and departed the aircraft. Pilot put the aircraft onto the ground upright, but the Main rotor Blades struck a tree. There were no injuries, but damage to aircraft. Due to Covid-related delays on sourcing parts for repair the aircraft has not returned to service since the incident. Recurrent training in confined area operations and mountain flying carried out by the operator.
November	Hughes 500	Take-off accident. During a Part 91 deer recovery operation the helicopter lifted from the river bed, the right hand skid hooked under a small dead branch causing the aircraft to pitch forward and roll onto its left side destroying the main rotor blades and severing the tail boom. There were no injuries. The investigation report determined that "*Causation was virtually certain to be the result of pilot error resulting from a situational awareness failure.*" And further:

		"During the landing and subsequent take-off, the pilot failed to identify the hazard in the riverbed through a combination of failing light, limited colour/contrast definition (log against riverbed) and a lack of situational awareness – haste, failing to properly assess the landing site and placing both the landing and take-off area within a blind spot on account of the extended instrument panel found in that aircraft model."
December	R44	Wire Strike. During ag spraying operation the helicopter flew through a set of power wires. Precautionary landing carried out. There were no injuries but there was damage to the main rotor blades and mast. The accident is under investigation.
December	EC120	Fatal Helicopter Accident. The helicopter on approach was observed to turn and commenced a spiral descent impacting the beach/sea. There were two fatal injuries, three serious. TAIC are investigating the accident.
December	R44	Wire Strike. During spraying operations the helicopter skids made contact with wires, the helicopter landed heavily. The pilot sustained moderate injuries and there was extensive damage to the helicopter.
December	Cabri G2	Loss of power resulting in a Heavy landing near Tekapo.
December	Hughes 500	Main Rotor Strike. After approaching the fertiliser loader and maneuvering 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. The report concluded that the root cause was a loss of situational awareness with contributing factors of 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. 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.

Maintenance and Defect Reports

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

January 2021

R44

Clutch

Pilot felt a 'Bang' through the airframe while pulling power at the end of a downhill spray run. Subsequent power changes could not replicate the 'Bang'. After consultation with engineering, spray job stopped, and helicopter ferried to maintenance with no abnormalities. At maintenance clutch oil flush

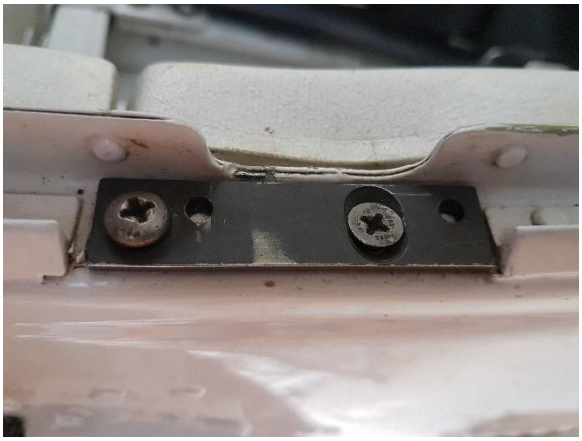
carried out and significant metal contamination found. Clutch Assembly replaced with PWS item. The engineer determined it was likely from possible sprag break up.

January 2021

Hughes 500

Door striker fault

Co-pilot door found to be not latching on all strikers. Lower striker found to have loop missing, possibly knocked off by passenger disembarking. Lower striker replaced with new striker. Image below:



January 2021

EC 120

Door fitment

During pre-flight it was noted the pilot's door had been incorrectly refitted after maintenance (involving ATSB installation). The hinge mechanism had been incorrectly routed in such away the emergency release mechanism would have failed to jettison the door if selected. Door refitted correctly.

January 2021

R44

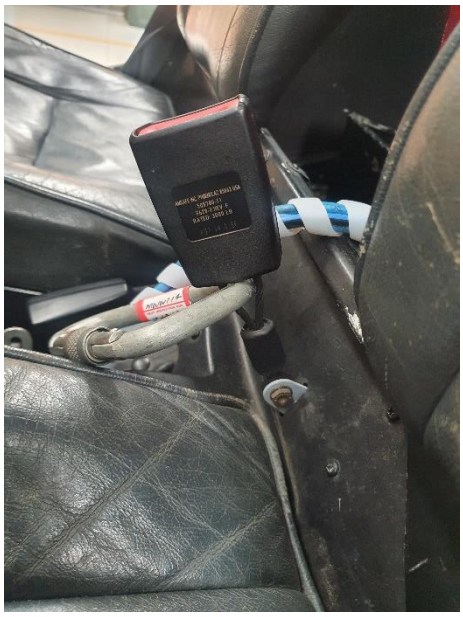
Seat harness

Shooters Improvised harness failure. The shooter had his harness hooked to 2 carabiners attached to the bottom seatbelt and was undoing them to get out of the helicopter when the seat belt came away from the metal attached to the aircraft.

The carabiners were hooked through the wire of the locking mechanism of the seat belt, the connecting side of the seatbelt was hooked up out of the way. The co-pilot buckle was used outside of its intended purpose. Defective item replaced. The shooter's seatbelt (front left) broke away from the aircraft due to apparent fatigue caused by repetitive use in a manner that wasn't fit for purpose.

The initial response was to rig up a harness restraint utilising the rear seatbelts. This was identified as not being an acceptable measure because of airworthiness/design issues with the usage of seatbelts outside of their intended scope.

Image below:



February 2021

Hughes 500N

Clutch assembly

During routine maintenance, it was noted the Overrunning Clutch oil level was zero. The clutch assembly purchased through Maintenance Company 3rd August 2020, which was supplied via MD Helicopters

from O/H supplied on 8130 # W18-030. Found the upper housing O' Ring missing from clutch assembly. Missing part caused the clutch to dump its oil, leaving it running dry for 100hrs. Clutch removed and sent to Maintenance Company for warranty claim. Images below:

February 2021

R44

Cylinder failure

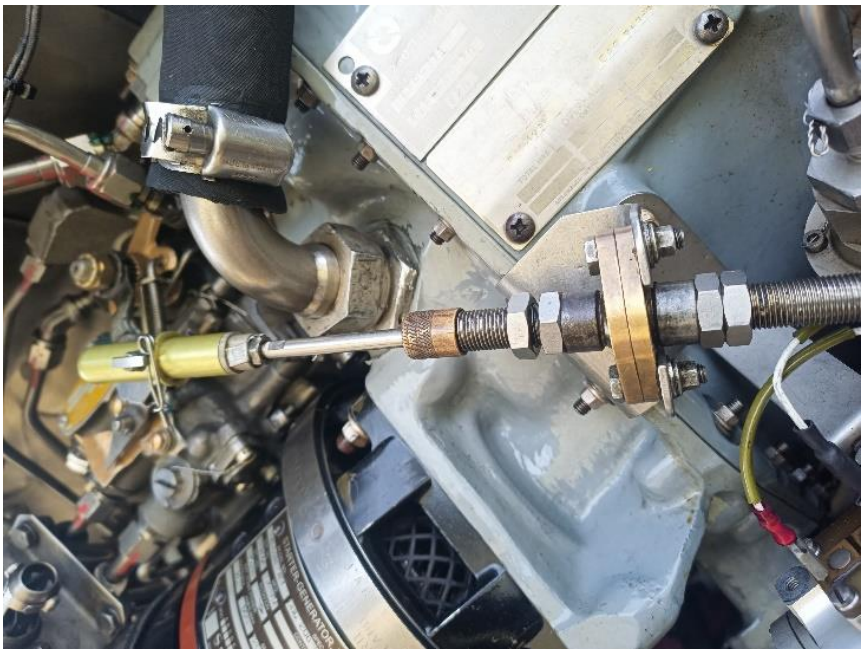
While on the take off / climb phase of flight from the load site in paddock, conducting spray ops. The pilot heard a bang followed by high frequency vibration through the a/c accompanied with a loss of power. The pilot jettisoned spray load and made an emergency landing in the paddock in front. The a/c 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

AS 355

Loose cable jam nuts

During pre flight inspection the pilot noted #2 FCU input cable jam nuts were loose – this was a maintenance and duplicate inspection failure. A safety card was raised, Maintenance provider notified and both sides checked. Meeting with maintenance provider to be carried out. Image below:



March 2021

As 350

Droop stop supports

Upon shut down the pilot detected a metallic noise coming from the rotor system. On inspection found two of the M/R droop stop supports broken. The damage was likely caused by continued operation from a sloped landing site causing blade droop stop contact with M/R blade droop stops. Defective parts removed, area inspected IAW the manufactures recommendations and new parts installed. Image below:

March 2021

BK 117

Door hinge fasteners

Both BK117 cockpit doors (LHS and RHS) have delamination and corrosion around door hinge fastener around carbon fibre repair. Fasteners "pulled through" carbon fibre doubler patch. Preliminary observations show potential doubler thickness "jamming" at the hinges adding loading to the door hinges.

March 2021

AS 350

External load equipment

While undertaking a gravelling job the pilot experienced an uncommanded hook release in flight. After delivering a load of gravel to the walking track the pilot began to move forward to return to the staging area. In the turn to the right they noticed they noticed the load swing out to the left and then felt it release, falling approx. 25 feet, 50 metres away from the work site. The bucket sustained minor damage – one bent leg.

On inspection the pilot saw the barrel housing going into the hook had sheared off. This caused the internal manual release cable tensioned resulting in the hook opening.

April 2021

AS 355

Rag ingestion

Power Loss During Maintenance Flight. On a maintenance fight, departing from Ardmore Airport at approximately 500 ft & 80 knots # 1 engine spooled back to idle. Returned to Ardmore and carried out OEI landing. It was found a rag left in the engine bay had been sucked into the #1 engine intake grill but had also snagged on a cable attachment and pulled the cable which led to the engine power rolling back to idle.

Ground Handling/Flight Discipline Occurrences

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."*

March 2021

Hughes 500

Passenger occurrence

While ferrying ground crew passengers onto Mid Dome the helicopter landed and the crew foreman unloaded the front passenger and then was about to unload the rear passenger, when pilot noted the front passenger was walking upslope so he lifted into the hover while she was guided by the crew foreman in the right direction. They had been briefed prior to the op about not walking upslope.

February 2021

R44

Ground handling

The pilot went to take off before the loader had removed the filler tap. The pilot saw the loader move away from the helicopter and thought he had finished, however the pilot did not see loader tell him to stop. The filler tap slipped out of the spray tank.

The investigation determined identified that both the loader and the pilot were relatively inexperienced and hadn't worked together a lot which may have impacted their communication and adherence to the SOPs.

A change of wording was made to the SOP to highlight the "Pilot get visual okay prior to each lift off" step and to check "tap out, feels good" pause before lifting.

External Load Operations and Third Parties

January 2021

AS 350

Rigging

Whilst lifting old Mesh/Matting off the hillside at SR42 for Geovert the mat that was manufactured by Geovert came away from the main load attached to the helicopter longline and subsequently fell into the sea adjacent to site, the helicopter carried on safely to the destination point and safely and deposited the load at the intended laydown area.

The investigation identified that the material being lifted was different from what was usual or expected and was more fragile resulting in it breaking up during the lifting process.

Procedures put in place to increase level of communication about the product being lifted and the required rigging technique.

February 2021

AS 350

Rigging

A third party reported an item possibly a short length of timber coming free from underslung load and falling into the ocean. Pilot was not aware of this happening and the client who was receiving the loads is yet to confirm if any items are missing.

DOC have released an internal safety report as a result of this occurrence stating that plastic strapping tape shall not be the sole method of strapping loads such as packs of timber. One of the arguments being that this method cannot be readjusted in the field very easily - as a result the operator has amended their lifting procedures (SOP).

Staff reviewed DOC's safety report in conjunction with current lifting SOP and associated Hazard areas and risks. New procedures to use of pallet wrap where short or low friction items are required to be stacked for a load and secondary strapping methods such as truck strops to support the function of plastic strapping.

January 2021

Hughes 500

Landing site

The helicopter was being operated on a Commercial Transport Operation (CTO) transporting Department of Conservation (DOC) workers from Lake Taylor to the Harper Bivvy at the head of the Hurunui River.

On arrival at Harper Bivvy the pilot observed that the normal landing site, adjacent to the Harper Bivvy, was overgrown with vegetation. Overhead the area the pilot completed an aerial reconnaissance and selected an alternative landing site. The pilot completed another aerial reconnaissance circuit and then landed on the selected site. Pilot disembarked helicopter and offloaded passengers. Pilot then departed back to Lake Taylor to uplift another load of passengers.

On returning to the Harper Bivvy the pilot landed at the location used previously. Following landing the pilot again depowered (ground idle) the helicopter and disembarked to offload passengers. Following passenger disembarkation, the helicopter tipped back onto the tail stinger. The pilot who was standing beside the helicopter immediately jumped onto the front of the skid and the helicopter returned to a near level state. Pilot shutdown helicopter and a passenger then stood on the front of the skid whilst pilot completed an inspection.

On inspection the pilot observed that that the area of ground the tail rotor had contacted was soft moss with no visible rocks or stones and that the tail rotors showed no sign of damage.

The pilot identified that the rear of the helicopter skids (predominately right) had sunk slightly into the ground.

Department of Conservation (DOC) are responsible for maintaining the vegetation around the Harper Bivvy, including the vegetation around any area used by a helicopter as a landing site for the transportation of their workers and/or equipment. Given the number of huts, DOC do not actively schedule maintenance on all landing sites. Whilst DOC had previously completed maintenance on the Harper Bivvy landing site, given its low usage, it was not part of their scheduled maintenance programme. DOC advised that they are reviewing future hut helicopter landing site vegetation maintenance requirements.

Maintenance controller decided to have maintenance provider carry out an inspection IAW MD Helicopters CSP-HMI-2, 05-50-00 Pg6 to add assurance. Nil defects were observed.

Summary Section

This section offers some final comments about risks and safety management, based on analysis of recent reports and developments in the aviation sector. Two key developments affecting the sector are the opening of the Trans-Tasman Travel Bubble (TTB) and increased funding for work relating to the conservation estate including wilding pine and pest control. I want to repeat a comment from one of the investigation reports summarised (above) in this safety notice, which applies to **ALL** types of helicopter operation:

"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."

For some operators, routines may be about to change. With Australian travellers allowed to enter the country, it is reasonable to expect that scenic and passenger air transport operations may increase for some, particularly South Island operators over the winter season. Routines may also be changing for operators looking to undertake more work for agencies like DoC. Regardless, if routines are changing, the advice above should be followed: ***reset and reassess the risks before continuing.*** Below are some key ones:

Passenger Transport Operations

- Ensuring currency for all staff and crew on operating procedures, passenger briefings, and helicopter performance (IGE/OGE) and handling characteristics under maximum passenger load. Many hard lessons have been learned in the past about things like passengers having loose items in the cabin, or not following embarking and disembarking procedures, or exceeding weight and balance limits for the conditions, just as three examples.

Operational Type, Tempo, and Planning

- Over the last 12 months a number of operators have moved into different types of operation, each of which will have its own routine, procedures, and tempo. One noticeable feature of several incident reports over the last 12 months has been changes of plan, or completing a job faster than expected and then 'doing something further' for the customer. We've seen this in particular with external load operations. As an example:

  An operator doing fencing work on a track was told en route that the drop zone location had shifted some 100 metres or so. The bucket was on a 50ft strop. Clearance at the *planned* drop zone was more than adequate; clearance at the *new* drop zone was not – the helicopter clipped trees and ended up rolling over near the track.

Reset, reassess the risks, check the tempo, work with third parties and contractors to ensure that everyone is on the same page when it comes to the hazard identification and risk management of each mission.

Landing Sites

- In addition to the incident above relating to the overgrown DoC landing site, there has also been a recent report relating to a loose chilly bin being swept up into a tail rotor. If you are operating into sites that you haven't been to for a while, or picking up customers from anywhere new or novel, remember the risks of FOD and dynamic rollover. Ensure landing sites are safe and procedures are clear about controlling loose items on the ground.