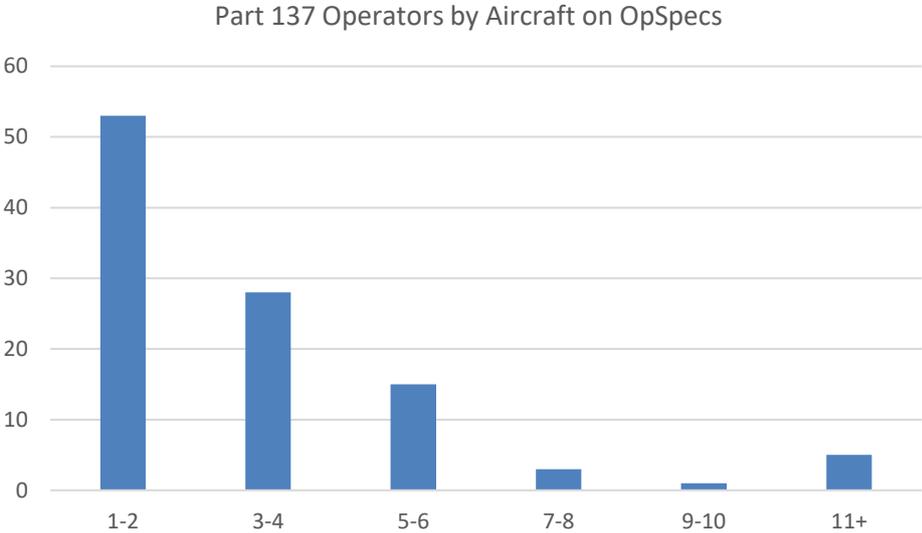


NZ Agricultural Aviation Update – June 2020

Sector Size

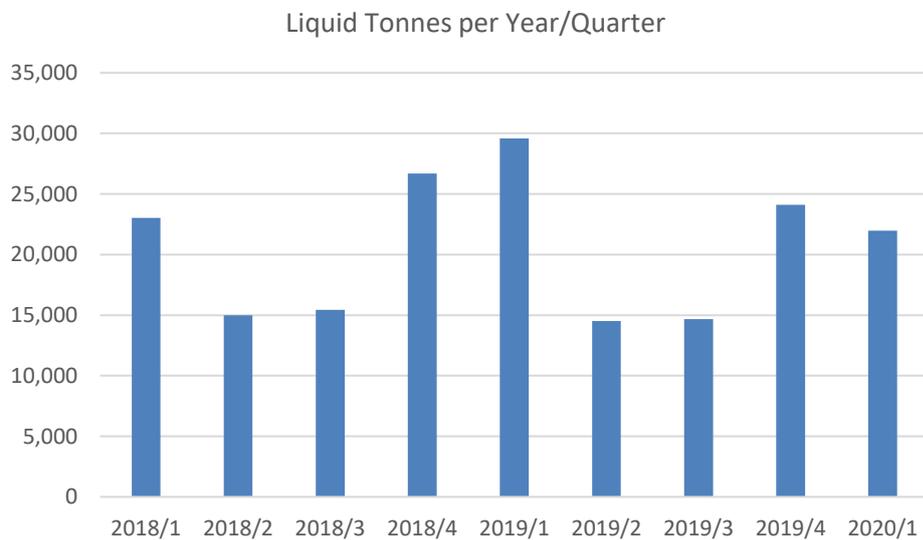
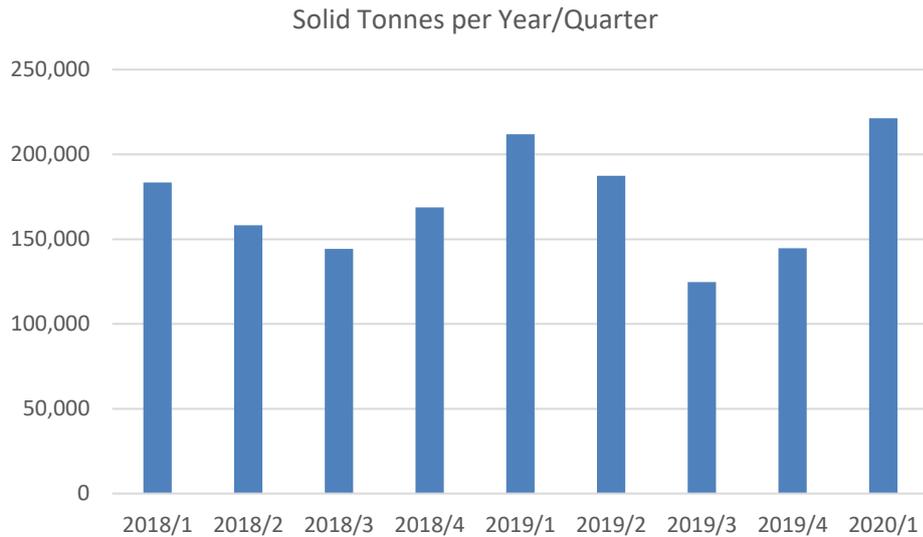
There are currently **105** active Part 137 operators. There are **376** aircraft on Part 137 OpSpecs – **276** helicopters and **100** aeroplanes.



Sector Activity

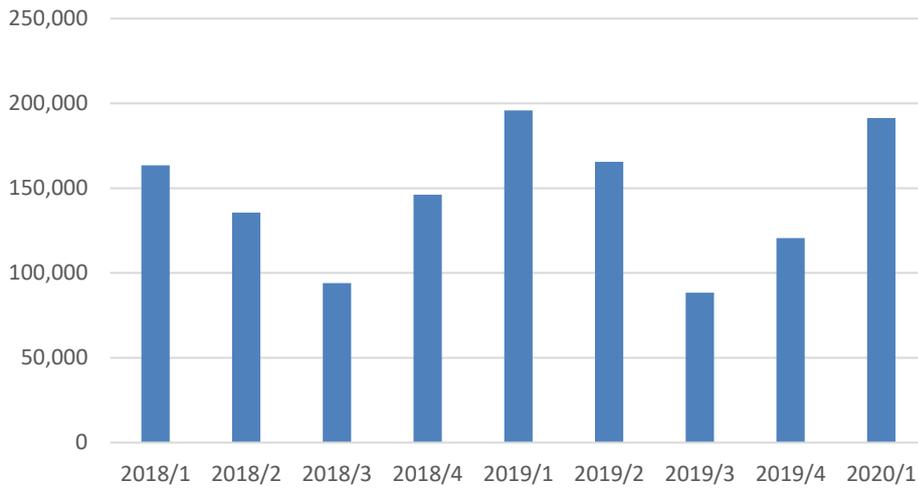
There were **243,183** total tonnes reported for quarter 1 of 2020, **1,705** more than quarter 1 of 2019. Helicopters reported **7,227** fewer liquid tonnes and **13,437** more solid tonnes than quarter 1 2019. Aeroplanes reported **4,504** fewer tonnes.

Year/Quarter	Liquid Tonnes per Year/Quarter	Solid Tonnes per Year/Quarter	Grand Total
2018/1	23,022	183,496	206,518
2018/2	14,997	158,214	173,211
2018/3	15,433	144,362	159,795
2018/4	26,698	168,830	195,529
2019/1	29,579	211,899	241,477
2019/2	14,516	187,446	201,962
2019/3	14,682	124,628	139,310
2019/4	24,111	144,639	168,751
2020/1	21,986	221,196	243,183

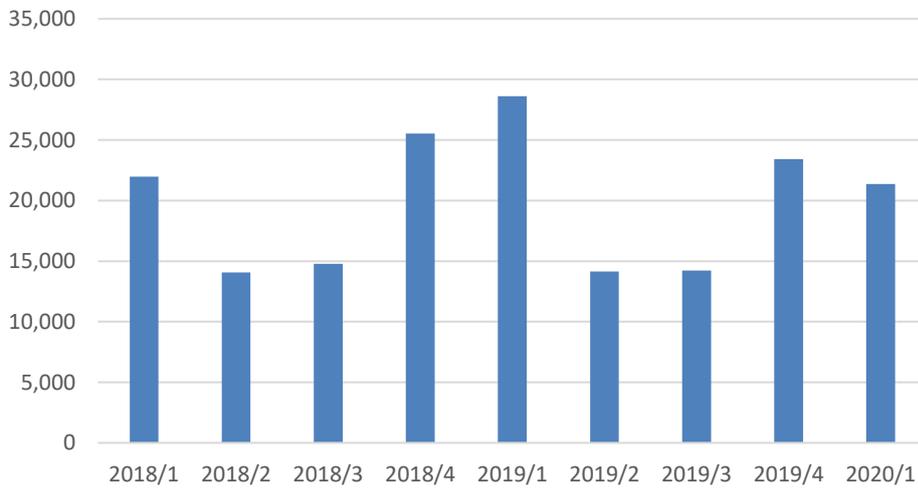


Year/Quarter	Aeroplane Tonnes	Helicopter Liquid Tonnes	Helicopter Solid Tonnes	Helicopter Tonnes
2018/1	163,549	21,976	20,993	42,969
2018/2	135,567	14,072	23,572	37,644
2018/3	94,060	14,776	50,960	65,735
2018/4	146,207	25,533	23,788	49,321
2019/1	195,850	28,604	17,023	45,627
2019/2	165,554	14,139	22,269	36,408
2019/3	88,464	14,218	36,628	50,846
2019/4	120,656	23,434	24,660	48,094
2020/1	191,346	21,377	30,460	51,837

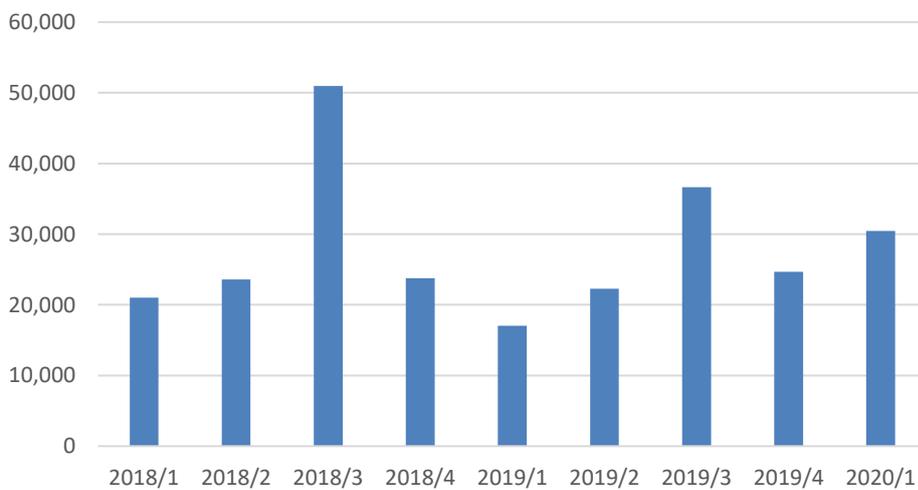
Aeroplane Tonnes per Year/Quarter



Helicopter Liquid Tonnes per Year/Quarter



Helicopter Solid Tonnes per Year/Quarter



Safety Performance

There were 6 accidents on agricultural operations in 2019 and there have been 3 in 2020 to date, one of which was fatal. Descriptions of the 2020 accidents are provided below.

January

Hawke's Bay

AS 350

Loss of Control – Performance Management

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, ending up on its side in a clearing with substantial damage.

April

Wairarapa

Cresco

Takeoff Accident

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 has hit a tree with its right wing and then impacted the ground shortly afterwards. TAIC are investigating the accident.

May

Nelson/Marlborough

Hughes 500

Main Rotor Blade Strike – Terrain

During wilding pine clearing operation, the main rotor blades came into contact with terrain. Following the main rotor strike, the pilot was able to safely land the helicopter.

Other Occurrences

February

Otago

Cresco

Ground Crew

While the aircraft was parked awaiting the second load of the sortie, the loader contacted the flap on the starboard side of the aircraft. The operation was ceased. The maintenance provider was contacted. The loader operator was new and had approached the aircraft from a non-standard angle. A replacement flap was fitted.

March

Southland

R44

Ground Handling – Pre Flight

During wandung operations the RH passenger door was not shut by pilot prior to takeoff. A precautionary landing was undertaken without incident and the door closed correctly. The pilot had neglected to undertake a final pre take off walk around.

March

Nelson/Marlborough

AS 350

Ground Crew

The pilot door of the helicopter was removed for the operation and placed on the ground. Subsequently it was run over by a vehicle. The operator identified a number of causal factors including:

Human Factors:

- Communication between pilot and ground crew
- Lack of formal policy on storage of doors when removed from aircraft in field of operation

Organisational Factors:

- Lack of formal policy on storage of doors when removed from aircraft in field of operation

Lessons Learned:

- Improved communication between pilot and ground crew
- Importance of situational awareness when in the field
- Requirement for formalization of a basic company policy on storage of doors when removed from aircraft in field of operation
- Large Hi-vis bag being manufactured to store pilot door when removed in field of operation

May

Southland

R44

Main Rotor Blade Strike

While on a boundary run on agricultural spray operations, the pilot inputted right cyclic to come on line. This input caused the right hand tip of the spray boom to contact a willow tree. The pilot landed and found that the carbon spray boom had cracked around the contact point.

January

Northland

Fletcher

Elevator Cable Jam

The aircraft returned to home airport following restricted movement in pitch during topdressing operations. It was found that the elevator cable lower aft-most pulley was jamming intermittently. The pulley was removed and inspected, revealing a dried "brick" of fertilizer hardened in the pulley recess, with a subsequent cam effect causing the cable to jam against the keeper. Cable inspected and found bunched at contact point, cable removed from service. Further inspection revealed broken internal strands. Noted recess behind pulley filled with fertilizer.

January

Otago

AS 350

Cargo Hook

During preflight inspection the cargo hook was found to be stiff in operation. On engineering inspection it was found that the load beam pivot shaft had migrated through the load beam and became disengaged from the support bearing on one side.

January

Whanganui

AS 350

External Load

While conducting fire bucket operations the sectional steel ring at the top of the fire bucket became dislodged causing the bucket to behave erratically. The pilot gradually slowed the aircraft and returned to the staging area.

On inspection it was found the Velcro retention tabs, holding the top ring in place, had become unstuck in flight, resulting in the unstable flight characteristics of the bucket.

Further investigation determined that there are four possible scenarios that could result in such a failure:

1. Incorrect assembly of the bucket, or
2. General wear and tear of the Velcro retention tabs causing poor adhesion, or
3. The effects of the airflow in flight causing the Velcro to come apart, or
4. A combination of two or more of the above.

This particular incident was most likely caused by a combination of wear and tear and the effects of airflow in flight that caused the Velcro to come apart. The operator has since had the fire bucket upgraded by the manufacturer to incorporate a solid steel ring that is permanently fixed in place. This upgrade eliminates the possibility of a similar occurrence.

Furthermore, as a result of this incident the manufacturer released a Pre-flight Safety Checklist specific to the fire bucket with the steel folding ring and Velcro retention tabs to provide clear inspection criteria to ensure the safe operation and maintenance of the bucket. This was followed up with Continued Airworthiness Notice 05-012 from CAA and disseminated to all relevant participants.

The manufacturer also confirmed that this style of bucket, with steel folding ring and Velcro retention tabs, is no longer being manufactured and hasn't been for some time.

February

Waikato

Cresco

Elevator Trim System

During the take-off roll, the electric trim motored to almost full up without pilot activation. The pilot managed to pull the circuit breaker and then re trimmed with the manual trim to a neutral position. In the process ended up with a high torque and ITT due to not being able to reduce power because needed two hands to keep the aircraft straight and level due control forces.

During the maintenance investigation, the elevator trim C/B was reset and the system functionally tested - no faults found.

The trim switch was removed and the wiring/connections inspected with nil defects found. The system was operated through the range of movement multiple times without defect. In the interests of safety, the trim switch was replaced.

March

West Coast

AS 350

External Load

External spreader bucket operation. New strops (synthetic) with jacketed covers, velcro secured had been fitted to the spreader bucket and this was to be the first job with these new lines. The previous lines had time expired. On the first load out the front line was noted by both pilot and crew to be fluttering/vibrating. This sometimes happens with jacketed lines as they can catch the airflow and flutter. Carried on to the block but the bait would not sow so returned to the load site to rectify. Heading down the valley a thump was felt and looking at the mirror pilot could see that the jacket had ripped about 1m up from the bucket end. The velcro had undone and the cover was trailing back towards the tail. Aircraft slowed and continued back to the load site.

March

West Coast

Bell 206

Loss of Control – Performance Management

The helicopter was was conducting a spray run. Shortly after lift-off, the helicopter sank into the crop. The starboard spray boom came into contact with the crop and ground and was broken off.

The operator advised that a combination of factors led to the occurrence. The wind was reported as variable. The previous spray run had taken off to the north after a period of departures in a southerly direction. Prior to the occurrence spray run, the pilot had walked out into the paddock to determine the wind, which was reported to be a south-westerly of 3-4 knots. The pilot decided to take off to the southwest and did so, however, in the short time between making the decision and

taking off, the wind appears to have swung back to a more norwesterly direction. The takeoff was made in a tall crop paddock. Tall crops diminish ground effect. The combination of the small tailwind and reduced ground effect led to the helicopter sinking after lift-off.

The operator advised that the occurrence was discussed by all staff and management immediately afterwards, and again at the March safety meeting. It was agreed by all that the wrong loading site had been chosen due to the height of the crop at the time. Due to the reduction in ground effect that occurs in this situation, the operator determined that future operations would not occur out of loading sites where this may be a factor. The Safety Manager also advised that they have diarised a reminder for January 2021 to ensure all personnel maintain an awareness of this.

March

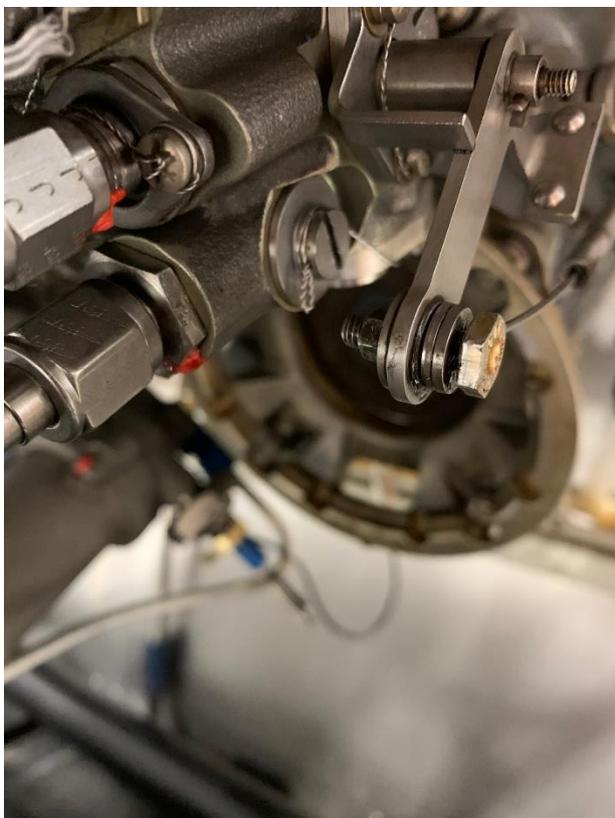
Wellington

R66

Engine Fuel System Rigging

Engine FCU fuel cut off and throttle found at 100hr//12m Airframe inspection to be rigged incorrectly resulting in the control cables having next to no protrusion through the control bolts. This is caused by not following the correct procedure when installing the FCU/Engine which was installed at airframe TSN: 1603.80 on the 04/12/2019. There was also no compass swing carried out post engine installation IAW NZCAA AC43-7 Part 1. Engine FCU fuel cut off and throttle re-rigged IAW Robinson R66 M/M section 76 to have correct cable protrusion IAW Figure 76-3.

Compass Swing carried out IAW NZCAA AC43-7 part 1 using Tooling RST-76 Due calibration 30-Aug-20 calibration card fitted to helicopter.



April

Waikato

Cresco

Hopper Lever

After takeoff the pilot was unable to move the hopper lever to release the load of fertiliser. The pilot landed at another airstrip where he was able to jettison the load with external assistance. Found that the port hopper lever pivot block on the aft lower cockpit was very loose. 1 bolt had fallen out and the other 2 were very loose. This allowed the pivot block to move up and down approximately 1 inch which moved the hopper lever sideways more than 1 inch jamming the lever in its quadrant. 3 new bolts fitted tightly. The other 3 bolts on the starboard side check tightened. The hopper box control system inspected for function and security.

May

Tararua District

AS 350

Cyclic Friction

Pilot reported leaving the helicopter running at ground idle to inspect the fertiliser bucket. Heard an unusual noise, looked up and saw rotor disc had tilted back. Pilot re-centred the cyclic, insufficient cyclic friction. Engineers called to inspect. MR Droop Stops took majority of the force, and found bent, one cracked. Droop stops and all main rotor hub bolts to be replaced.

May

Central North Island

Hughes 500

Oil System

Pilot landed to find oil splatters over the cowl doors. The helicopter had flown approximately 3 hours since return to service from a compressor change. On opening of the cowl doors the pilot found two nozzles that were meant to be lock wired not completely closed which allowed the oil to leak. Engineer confirmed this was the cause. Pilot refilled oil and closed nozzles. The investigation report identified several human factors elements relating to maintenance. The report noted:

“Human factors weigh in heavily with this incident. One of the engineers would normally carry out the work, and the senior engineer would check it afterward, this time the senior helped to speed up the turnaround time and they both missed the drain blanks being correctly fastened. There was no apparent oil leaking during the ground run and no leak on post flight check.

Normally one engineer would carry out the work, while a senior engineer would check this work. In an attempt to speed up the turnaround time (stress factor) both engineers worked on the aircraft at the same time. Subsequently both who had been working on the aircraft missed the drain blanks being correctly fastened”.

Wirestrikes

In November and December 2019 there were three wirestrike incidents reported on agricultural operations.

November

Rotorua

R44

Wirestrike

The pilot was spraying steep paddocks with distribution lines running through them. While doing a boundary run and spraying uphill, the pilot was avoiding spraying some trees - these trees were obscuring the power pole. The pilot report that once the wires became visible it was too late. He saw them clear the helicopter bubble, then the wires hit the mast of the helicopter. The wires separated from the nearby joiners and sprung free. The pilot landed the helicopter and contacted the company management.

November

Nelson/Marlborough

Bell 206

Wirestrike

The pilot was conducting spot spray operations on a station in Nelson/Marlborough. On the fourth load of the morning he was working a face on the south eastern side of a river on the station where both the main hydro line and the Marlborough Lines network run parallel to one another off the top of the saddle, down the slope in an East/West direction and across the river, with a smaller network line being on the North side of the main transmission line. While spot spraying broom on the South side and up slope of the main transmission line the pilot spotted two plants close to the wires. A short high recon flight was carried out to determine whether there was enough room to get alongside the wires or whether it would be necessary to spray from above the wires.

The pilot determined that there was enough room to get lower alongside the big wire to spray the plants. Once the plants had been sprayed another plant was spotted downslope on the other side of the big wire. After spraying the plant the pilot turned away from the big wires and started to descend down slope into the small wire. He did not see the wire until it contacted the machine. The wire struck the front stays of the spray booms and the chin of the helicopter, missing the lower wire cutter and the toes of the skids. The helicopter backed off the wire and was landed. There was minor damage to the aircraft.

December

Hawke's Bay

Hughes 500

Wirestrike

Wire Strike. During the first spray load of the day, at the end of a spray run an earth wire on a set of power lines came into contact with the helicopter skid. Flaring the helicopter to a hover as the wire broke at the power pole, the pilot was able to back away from the wire and land back at the load site. The helicopter was shut down and inspected for damage. Only some scratches were found on the skid fairings. All else was fine. Within 24 hours the helicopter was inspected and cleared by the aircraft maintenance contractor.

An internal investigation by the company Safety Manager has found human factors to have contributed to the occurrence happening. While the client was an existing client, the block being worked on had only been taken over by the client a fortnight before. A pre-job 'recce' was done with the client on board but as the paddock was only looked at from one side, the wire concerned was not viewed up close. The wires were described as being on the road, which they were, however it was not identified that they actually swung over one corner of the paddock to be sprayed.

Lessons Learned

A team discussion was had around the best actions going forward. Everyone agreed that this was simply a random incident, the job had been approached just like any other and the appearance of the lines was a major contributing factor, as was the fact that the client had only just taken on ownership of the property a fortnight before. The pilot was incredibly lucky that their evasive action resulted in no injury and no damage to the helicopter.

Wires are a danger every day for ag pilots and the PIC during this incident has a current CRM course and just under 3000 hours experience in a Hughes 500. They were fit to work on the day of the incident. There is no feeling in the team that the Pilot concerned needs extra training in the area of wire identification or that they had behaved in a way that increased the risk of the incident occurring.

The team does agree, however, that the pre-job "recce" is the key way to identify wires in a new block and so going forward it will be company policy that a new paddock will be flown around twice before a job carried out. For this particular property – the wires have been recorded for any future work.

We will also be placing an increased emphasis on wire identification with clients, particularly new clients or clients that have acquired new blocks. Where possible we will require maps of lines on the property, especially from forestry clients who have purchased farms to convert. Wires have always been part of the pre-job hazard ID but this incident has made us realise how much we rely on the client to be informed. It's a "team" approach to wire identification – we need the client to do their complete due diligence before we come to a job to ensure the pre-flight "recce" is completely informed.