Agricultural fixed-wing and helicopter occurrence insights

Insights period: 1 January 2025 to 31 March 2026

Executive summary

The Civil Aviation Authority is working to share aggregated system-level risk insights in a way that supports greater awareness across the aviation sector. By highlighting key occurrences and trends, we aim to provide access to timely and relevant safety and security information that helps to meet safety obligations, strengthen collaboration, and ultimately contribute to a safer, more resilient aviation environment.

This agricultural occurrence insight report is giving the sector something it has historically lacked – timely visibility of emerging operational risk. Using real occurrence data across agricultural helicopter and fixed-wing operations, the report identifies recurring safety themes before they result in serious accidents or become normalised across the sector.

The latest report covering 1 January 2025 to 31 March 2026 analysed 177 agricultural aircraft occurrences and identified the risk profile for agricultural aviation is not dominated by in-flight accidents. Ground and public-interface risks are where severe outcomes are most likely to occur, even if flying itself is uneventful. These themes appear consistently, regardless of aircraft type and are largely shaped by:

- public-facing events such as low flying, overspray, livestock distress, and noise complaints
- ground-operation failures involving hooks, buckets, doors, loading areas and vehicles
- aging or fatigue-driven mechanical failures, particularly in heavily utilised agricultural aircraft
- commercial pressure, fatigue, task creep, and last-minute changes.

How to read this report

We highlight selected examples and patterns that provide the greatest value for understanding emerging system risks. These insights are indicative, not exhaustive, and are intended to support early awareness and proactive risk management.

The insights provided are high-level and may not yet be fully analysed. They are not shared to attribute blame, but to reinforce that aviation safety depends on shared responsibility and collaboration across the system. It is also expected that these insights may assist you in identifying or mitigating potential risks within your own aviation activities.

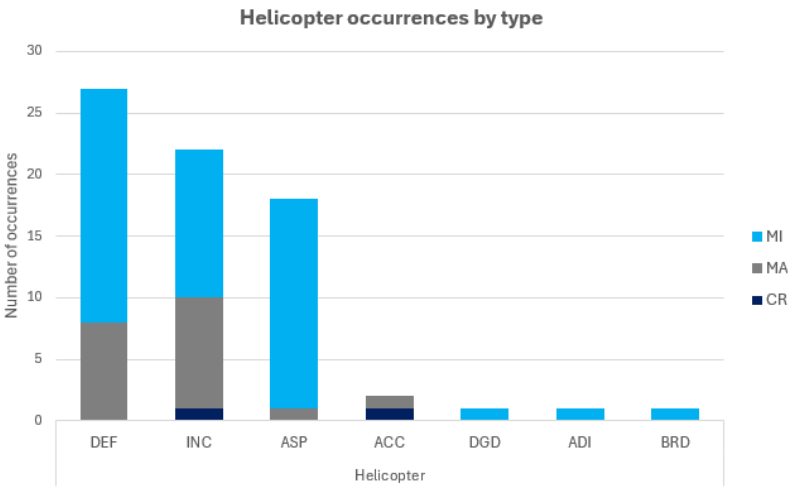
To support the provision of timely insights, the CAA is developing a dashboard to visualise occurrences reported for agricultural aircraft, including fixed-wing, helicopter, and remotely piloted aircraft systems (RPAS). This insight report includes selected graphs and information drawn from that draft dashboard. While RPAS are not a primary focus of this report, they are referenced later where relevant. It is anticipated that future insights reports will increasingly include all three aircraft types.

Please note that the data referred to in this insight report was pulled on the 1st of May 2026 and reflects the reported information available at that time.

Key themes and insights

1. Helicopter

From 1 January 2025 to 31 March 2026 there were 82 occurrences involving agricultural helicopters. These occurrences are made up of 60 minor, 20 major, and 2 critical. The occurrences can be further broken down as:



Defect: 27 occurrences (33%)
Incident: a total of 22 occurrences (27%)
Airspace incident: a total of 18 occurrences (22%)
Aviation related concern (ARC): a total of 10 occurrences (12%)
Accident: a total of 2 occurrences (3%)
Dangerous goods: a total of 1 occurrence (1%)
Aerodrome incident: a total of 1 occurrence (1%)
Bird: a total of 1 occurrence (1%)

<u>System insights:</u>

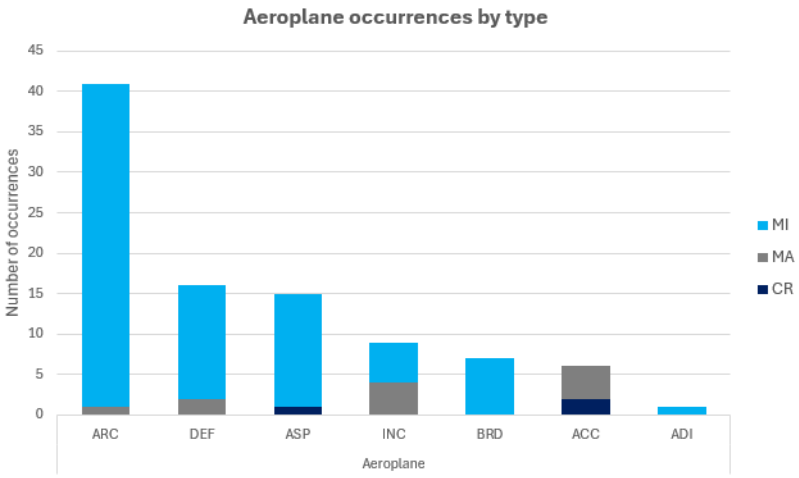
- Roughly one in three occurrences relate to defects rather than issues arising during operational flying.
- Underslung load systems (buckets, hooks, and release mechanisms) represent the dominant technical risk. There were multiple occurrences involving buckets dropping or hook releases (electrical, mechanical and human activation) with many of these events occurred in close proximity to people, roads, livestock, and infrastructure.
- Several ground operation occurrences indicated procedural drift (a gradual deviation from established procedures). Common patterns include:
    - lifting with hoses still connected
    - ground crew mis-coordination
    - pilots exiting aircraft with rotors engaged
    - strikes injuring ground crew.
- Powerlines remain a persistent hazard. Wire strikes are often linked to last minute plan changes, terrain illusion and changes in visibility (caused by sun/shade transitions).
- A number of occurrences involved airspace and ADS-B compliance issues including repeated reports of long-standing, unresolved equipment or manufacturer-related issues.

<u>Early 2026 insights:</u>

The insights for the first quarter of 2026 indicate that the data is directionally consistent with 2025. It suggests a shift toward fewer community complaints but more serious technical defect findings.

2. Aeroplane/fixed-wing

From 1 January 2025 to 31 March 2026 there were 95 occurrences involving agricultural fixed-wing aircraft. These occurrences are made up of 81 minor, 11 major, and 3 critical. The occurrences can be further broken down as:



Aviation related concerns (ARC): a total of 41 occurrences (44%)
Defect: a total of 16 occurrences (17%)
Airspace incident: a total of 15 occurrences (16%)
Incident: a total of 9 occurrences (9%)
Bird: a total of 7 occurrences (7%)
Accident: a total of 6 occurrences (6%)
Aerodrome incident: a total of 1 occurrence (1%)

<u>System insights:</u>

- ARCs dominate reported occurrences, with almost half falling into this category.
- The most frequent reports related to conflict at the public interface, including some instances with repeat locations and repeat aircraft. The most frequent issues included:
    - low flying over houses
    - fertiliser drift onto homes and water tanks
    - noise exposure over days or weeks.
- Mechanical defects reported largely reflect airframe ageing and high utilisation. These appear to be fatigue and cycle driven failures in heavily worked fleets, not maintenance negligence. The recurring defect types include:
    - flap actuators
    - nosewheel and tailwheel hardware failures.
- Airspace infringements were relatively common but have generally low impact. Occurrences tend to mostly be procedural (clearance timing and altitude overshoot), involve minimal traffic disruption, and are often linked to workload.

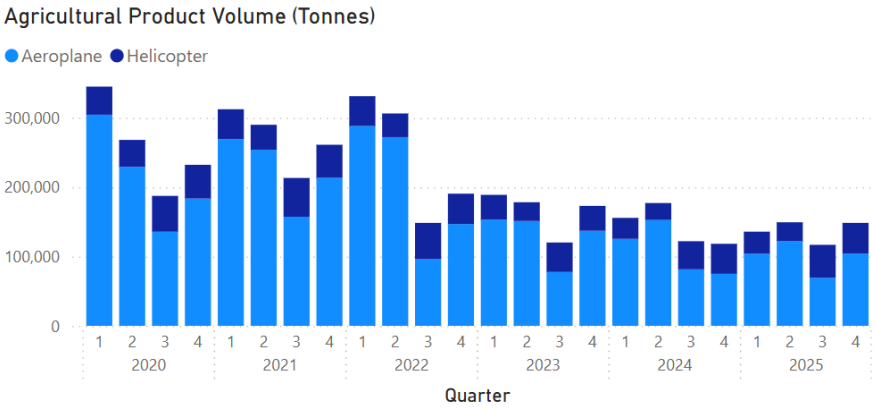
<u>Early 2026 insights:</u>

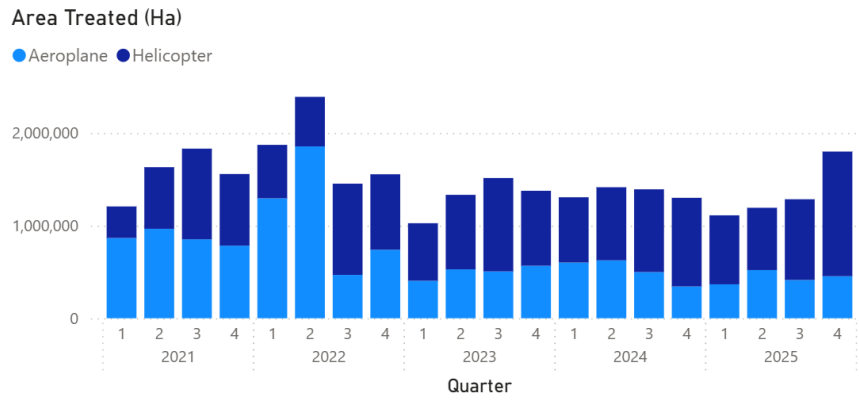
- There is a signal of commercial pressure as a system-level risk. One report notes intentional overweight operations, unrealistic pricing models, and systemic pressure on pilots. This indicates potential risk arising from business and operational models, rather than isolated individual actions.
- Ongoing complaints about low flying and load drift over houses, schools, and facilities (including hazardous sites such as a gas facility).

3. Agricultural loads and operational activity

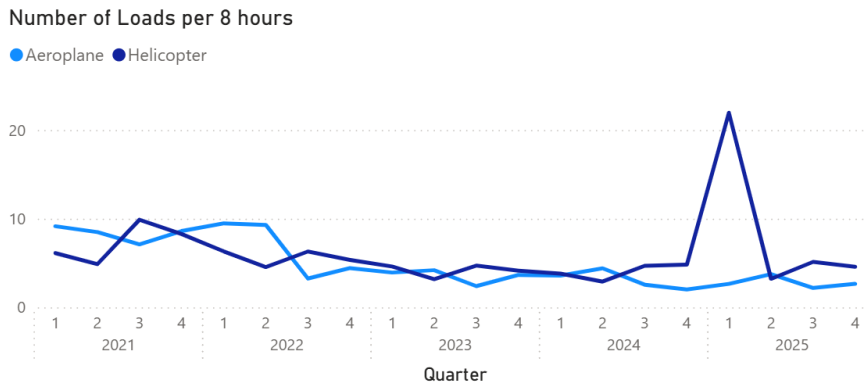
The graphs below show the agricultural product volume (tonnes) for both helicopter and fixed-wing aircraft as well as the area treated (hectares). While the product volume appears to be dropping, the area treated remains largely the same. It is assumed that the drop in volume can be explained by the increase in usage of RPAS.

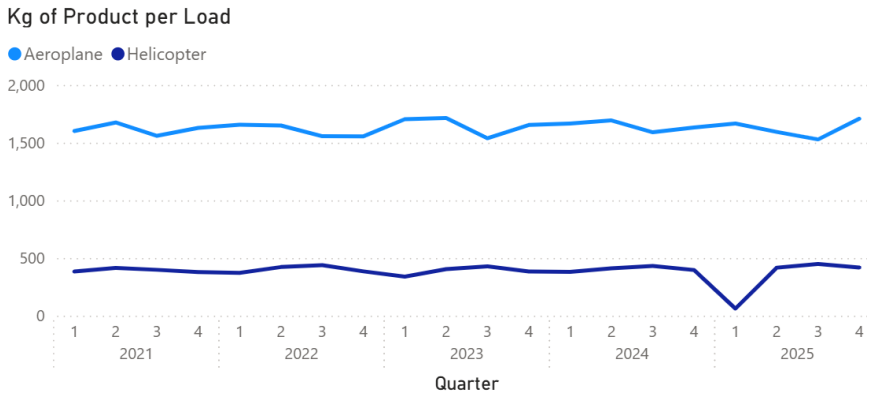
The CAA does not currently collect load information for RPAS which may indicate why there was a drop in total weight over time as the usage of RPAS has increased. Other factors such as cost of product or fuel may have also contributed to the decline in volume.





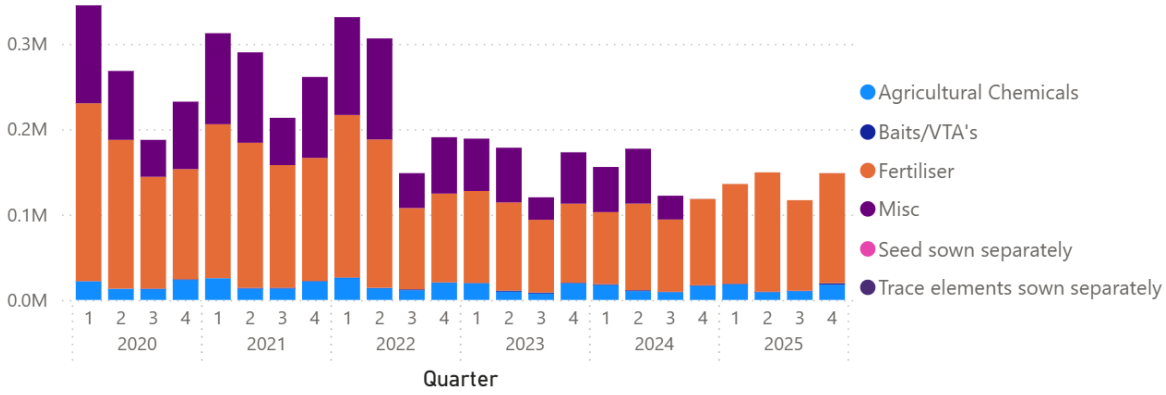
The graphs below show the number of loads and the number of kilograms of product per load. The most notable insight being the spike in helicopter loads in quarter 1 of 2025. Alongside this spike is the decline in the amount of product per load for helicopters. This signals that while there was an increase in flight trips, the amount being loaded per trip was small. It is not known why this spike occurred.





4. Product applied

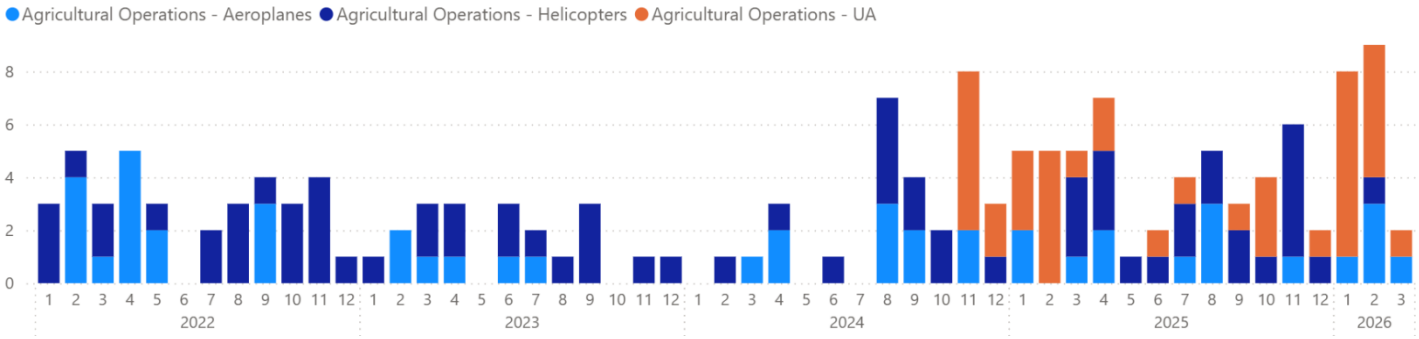
The graph below provides a high-level overview of the quarterly product volume by category. With the following table showing the figures for each slightly more expanded category. These figures are also inline with the decreasing product volumes noted in the section above.



	2020	2021	2022	2023	2024	2025
Agricultural Chemicals (including mixes with liquid	70,621	73,513	70,950	55,815	53,130	55,256
Baits/VTA's (non-toxic and toxic poison baits)	2,157	2,523	2,657	3,726	3,380	3,529
Dicalcic fertiliser	400				762	9,301
Fine Particle Suspension (non-liquid and non-solid, suspension product)	3,536	2,674	2,131	760	816	668
Lime	120,634	102,651	107,225	65,091	48,196	62,139
Liquid fertilisers (without herbicide/fungicide, etc in the mix and excluding slurry)	13	128	29	35	650	3,274
Misc	317,681	362,654	339,866	211,863	145,110	51
Nitrogen without Phosphate	5,538	5,682	4,424	3,489	22,041	70,885
Phosphate plus Nitrogen Including DAP	191,853	161,592	103,444	105,713	103,367	109,187
Phosphate without Nitrogen	319,442	364,336	342,369	212,572	194,962	235,253
Seed sown separately to fertiliser or lime	492	1,000	3,076	317	150	
Trace elements sown seperately to fertiliser	648	221	563	1,072	714	1,038
Total	**1,033,013**	**1,076,972**	**976,734**	**660,454**	**573,278**	**550,580**

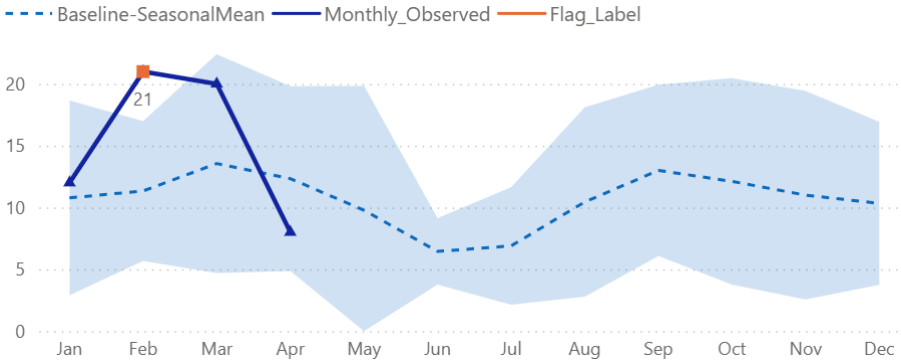
5. Accidents and incidents

The graph below shows the total number of accident and incident occurrences per quarter for each of the aircraft types within the agricultural sector, including agricultural RPAS. Following the introduction of the Civil Aviation Act 2023, it became mandatory for RPAS occurrences to be reported which can explain the sudden increase in these reports.



6. Occurrences forecast

The graph below shows the actual versus forecasted occurrence volumes for all aircraft types within the agricultural sector for 2026. The forecast shows the anticipated number of occurrences, including the potential upper and lower limits, based on historical volumes. The orange marker (flag label) showcases an outlier where more occurrences were reported above what was anticipated. This current outlier can explained by the large number of RPAS incidents. By the end of February 2026 there was a total of 33 occurrences with 16 of these being RPAS incidents.



Sample of occurrence narratives

Note: occurrences have been amended to remove identifiers such as names, dates, and locations.

<u>Helicopter</u>

1. *While hovering over an underslung Topdressing Bucket the Generator light came on followed by a loud bang from the engine area. The helicopter yawed slightly due to the engine not maintaining full RPM. The helicopter was landed immediately and shut down. When the engine hatches where opened it was noted there was a lot of copper metallic metal in the bottom of the engine bay. It appeared some of the internals of the Starter/Generator had let go.*

2. *Incident Report - Dropped Fert Bucket. A second inadvertent release occurred a few days after this original incident involving the same helicopter, hence the delay in getting this reported. Job was*

spraying and then seeding, once spraying was completed, spray gear was removed to commence seeding. Ground crew and pilot did a hook check, x2 electrical release and 1 cable release. Pilot flew both ground crew and the crop seed to the paddock and then flew back to pick the bucket up by himself. Pilot hooked the bucket on, the grass in the paddock was long and when he pushed the D shackle onto the hook, he had trouble getting it past the keeper. He parted the grass and looked and thought he had put it on properly. Pilot then lifted off, made a right hand turn, and as he turned a gust of wind hit the helicopter. He felt the machine lurch and looked down to see the bucket falling to the ground. Pilot considered what may have happened - haven't put the D shackle past the keeper or more likely the D shackle was too big and able to flick over the keeper and release. This particular bucket was heavier than others and the helicopter was full of fuel. The pilot wanted to get the job done but wasn't rushing. Bucket was being retrieved (date) so we will be able to check the size of the D Shackle. Another incident occurred morning of (date) with the same helicopter inadvertently releasing a bucket. Further detail has been attached in a document as cannot fit all this text into the Occurrence Description.

3. *Whilst on an agricultural topdressing operation, completed applying fertiliser to one paddock and pulled out of the final run to an altitude of approximately 100 - 150AGL to line up on next target area. Within this motion, went to depress a cyclic switch which will reset the agricultural GPS to align with a new run and in this motion inadvertently depressed the cargo swing release button which released the fertiliser bucket from the helicopter. Bucket landed on a farm track resulting in damage beyond repair.*

4. *Spraying operation. While on the ground filling up for a spray load, the ground crews mixing tank pump stopped (ran out of petrol) half way through the filling up process, the ground crew walked away from the helicopter giving no hand signals to stop and wait, I lifted into a hover with the filler hose still sitting inside tank I started to creep forward about a metre before the ground crew quickly said on the radio wait wait and then I landed. **The helicopter was being filled from the port side tank, (the blind side) to make it simple for the ground crew to walk from the mixing tank to the helicopter for the preferred direction of takeoff and water location etc.** The first problem is the ground pump ran out of gas. For some reason the ground crew forgot to watch the petrol level in the ground pump even though he was regularly checking the helicopter skid pump during that morning and there was lots of time between loads. The ground pump stopping caused a distraction which made him walk off without getting my attention to hold by putting his hand up to signal stop and wait, which is an agreed hand signal, temporarily forgetting his surroundings. The last two barriers me as the pilot did wrong was assume it was all clear to lift because he was back at his pump and looked like he was turning levers and filling his mixing tank back up and so I started lifting without the last two checks ticked off in my head which was thumbs up and visually see filler hose placed on the ground, and it being on the blind side makes the filler hose harder to see and must be placed much further away on the ground away from the skids so its seen properly from the pilot seat. Complacency and flight discipline were factors for me the pilot on the day.*

5. *Approximately half way through a 10 Ton fertilister job, the rear cargo door on ZK-… was seen by the ground crew to come open while the aircraft was inflight, approaching for another load. Aircraft landed immediately, and the pilot inspected the door and locking mechanism. Pilot did his pre-flight check, which included checking all doors prior to take off, however may have missed the cargo door not being fully latched. If the latch wasn't completely secured, the normal airflow may have contributed to popping the cargo door open.*

6. *During Spray Ag operation the helicopter struck overhead power wires in a gully. The pilot performed a precautionary landing. No injuries. Have you notified any other agencies? Other- Provide details: Power Co.*

7. *On the last load of the day ground crew failed to disconnect spray tank filling hose. Pilot failed to confirm spray tank filling hose had been disconnected as per standard procedure. During the take off sequence pilot felt unusual movements threw the airframe. A right turn was made to land at a suitable location about 40 to 50 m from take off loading site. Helicopter dragged pumping equipment with pump ending up next to fence. Pump was damaged. No damage to aircraft.*

8. *On the 6th load of the day, the pilot felt a jolt while in straight and level flight. This occurred shortly after take off over the application area, during fertiliser spreading operations. Aircraft returned to load site for pilot to investigate. It was found that the front left top quick release pin, holding the Swing Frame to the aircraft, had come out of the top fork. This allowed the forward attach cable to drop off the hard point on the aircraft. This caused the Cargo Hook Swing Frame to shift back and up to the right, punching a hole into the aft belly pan. Operations ceased, and an engineer was contacted immediately. Engineer came down to inspect the damage. Hook and belly pan was taken away to engineering for inspection and repair. Human factors: Pin was potentially not fully locked in - 'looking, not seeing'.*

9. *Incident Report - Fert bucket dropped during flight. Pilot inadvertently activated the cargo release button during flight which caused the fertiliser bucket he was carrying to be dropped from the helicopter. The pilot reported that a bee had flown into the cockpit down his shirt and while he was trying to remove the bee from his collar he bumped the release button with his elbow.*

<u>*Aeroplane/fixed-wing*</u>

10. *Pilot was conducting ag runs on a dairy farm. He was on his third or fourth run and it had been running smoothly. He'd smelled Avgas on the last couple of runs, but aircraft was running well. He finished a run, then suddenly it started running rough. He flicked the fuel pump on but it kept running rough so he found a place to land ahead. It was all downhill options and was a rough landing. Damage to prop, undercarriage, wings and tailwheel. He was fine except for a sore back. He advised he had 153l of fuel on board so not fuel exhaustion. Pilot suffered minor injury only. Pilot report: During a fertiliser application the engine reduced power to a rough idle, forced landing into a paddock.*

11. *Sowing last load of the day nearing end of run when ADSB gave traffic alert "aircraft 1 o'clock same altitude". Pilot couldn't see aircraft so shut off and pulled up, making a hard turn to right assuming the other plane was below the ridge at the end of the run. As he turned, pilot saw the plane at his 11 o'clock and tightened turn to get clear. Other aircraft was a Cresco ferrying home. Radio contact was made with the other aircraft. The event gave me a very big fright.*

12. *Whilst conducting Agricultural operations, due to weather conditions the pilot elected to cease operations and return to base. Prior to taking off from the airstrip to return to base, the Pilot stopped the aircraft in the loading area of the farm airstrip and remained in the aircraft for approximately 2-3mins to complete paperwork, the pilot then exited aircraft to help a loader driver close the fertiliser bin (standard practice). Some 3 minutes after the pilot exited the aircraft, the aircraft has rolled away downhill from the loading area. The aircraft has tracked off the side of the farm airstrip and come to rest at the bottom of a shallow gully approximately 300m from the loading area, sustaining significant damage to the aircraft. Full internal investigation is underway and a full report will be sent to CAA within 90 days.*

13. *Take-off accident Report. While being loaded with fertiliser I thought I saw the loader move away from the aircraft and started the takeoff roll, alas the loader had not moved and the horizontal stabilizer and elevator struck the loader truck. Damage to aircraft, no injuries.*

14. *Top dressing run end path directly above house and stock, causing stock to flee into fences (Alpaca with cria). We tried to wave them off several times today and on previous date, to no avail. They continued to fly low over our property. The aircraft is white with a blue stripe and has … on the side of it.*

15. *The aircraft was leaving Maintenance before returning to service. The pilot had raised and lowered flaps during his post maintenance acceptance with no issues, had uplifted fuel and had cycled flaps again before departure. This time the flap went to full down but did not return when selected. Investigation found the actuator had separated between the black bearing block and the cad-plated tee which attaches to the torque tube. The bearing block was jammed on the Motor/ gearbox end of the actuator, and running the flaps down overpowered the grub screws and unscrewed the bearing block from tee of the flap torque tube separating the actuator. Physical inspection of the actuator revealed no marks on the threads of the bearing block and slight marks on the tails of the grub screws and both parts could be screwed together by hand even though the grub screws are still fully installed as they would normally be, a good amount of vertical play in the bearing/ screw jack was measuring at 0.068" and associated lateral play which was a lot for an actuator of 120.4 hrs TSN and significantly more than the replacement which had done more hours, no deformation in the rubber drive was noted. A replacement actuator was fitted and Up/ down stop clearances and rigging checked out fine, all functions of the microswitches tested fine. It could not be definitively determined why the bearing block had jammed up against the gearbox housing. Cause: Discussion with engineers and … Chief Engineer. Cause is likely to be either the up micro switch was rigged wrong or had failed. There was no defamation to the rubber coupling though, so the motor must have stopped. The thought was that the ball-nut normally bottomed out on the actuator casing, which they used to and which the Owners Manual suggests, but a few of these actuators checked the ball nut bottoms on the end of the thread before contacting the casing. … CE has advised the factory that their advice of having a buffer between the ball-nut and case of 1/16"-1/8" needs amending, as there can be close to 1/16" gap when the ball-nut has bottomed on the thread. Secondly the grub screws should have not been overpowered to separate the actuator. They should engage on a flat surface and having them engage onto the thread is not adequate. I've passed this information onto the factory and they will get onto their engineers about it. Action taken: Advised the Air Tractor South Pacific Agent, to be discussed at the next dealer meeting. Submission to Air Tractor to modify the position the grub screws contact on. Modify the data in the owners manual to have the clearance mandated from the base of the screw jack not the housing. Discussed the flap rigging and stop clearance on the AT flap actuator with maintenance provider.*

16. *I am writing to you desperately with concerns of a private plane spraying my water supply. On (date) Flight ZK-… flew over the river that runs along the back of my farm and was spraying some sort of substance. The plane operated from 2pm-6pm (roughly) I can see on the flight map/path that the plane was landing nearby (I presume there is a runway strip on a nearby farm) and refilling with whatever substance was being sprayed. My concerns are with what was being sprayed? It was clear that the plane was targeting the river which is also of people and also livestocks drinking water. Could someone please direct me to find out what is being sprayed in my drinking water. Attached are photos for your convenience.*

17. *Nosewheel shimmy noticed on takeoff. Was worse when landed on return - no nosewheel steering available. Kept straight using differential braking. Found clevis bolt missing. ATA code: 32 Engineering description: Travelled to aircraft and found the centre nose scissor bolt missing. The bolt is an AN6-34. It is very unusual for these to shear even when the aircraft is experiencing heavy shimmy. We were unable to locate any part of the bolt so cannot really determine the events. But the bolt must have failed. The arms of the nose scissor were not damaged therefore we suspect the bolt did not shear. These bolts are not changed at a set interval but are replaced as condition determines. In light of this event we will take a more critical approach when inspecting these bolts.*

What's next

Thank you for continuing to report occurrences to the CAA. The information you provide is incredibly valuable for identifying key risk areas and generating insights that help others learn and operate more safely.

To further strengthen the usefulness of these reports, we encourage you to include complete and accurate details – such as aircraft type, model, operator information, pilot details and any analysis you've done to understand why the event occurred. Thoughtful, well-described reporting enables us to build a clearer picture of emerging risks and share more meaningful guidance back to industry.

If you have any further questions, or ideas for additional insights, please reach out to the Safety and Security Education team at education@caa.govt.nz.