



NEW ZEALAND HELICOPTER

SAFETY UPDATE

SEPTEMBER 2019

INTRODUCTION

This is a further update on activity and safety performance in the helicopter sector, with activity and accident rate information current to July 2019. The report includes details of accidents and incidents for the purpose of raising awareness about risks and sharing lessons amongst the sector. If you have questions or comments about the information then please contact me at Joe.Dewar@caa.govt.nz.

SECTOR ACTIVITY

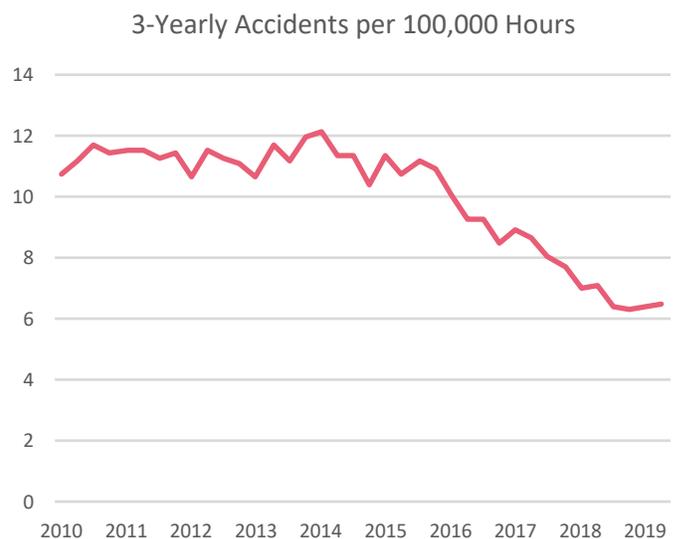
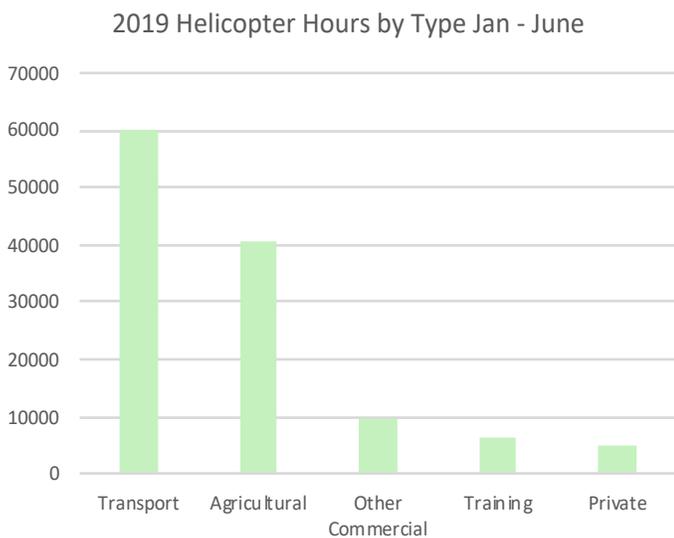
In most operation types activity increased for the first half of 2019 compared to the same period in 2018. There have been a total estimated 121,000 helicopter hours in the year to July, compared to 113,000 for the same period on 2018.

There are currently a total of 896 helicopters on the New Zealand register the table below has the numbers and average airframe ages (in years) of the ten most common types.

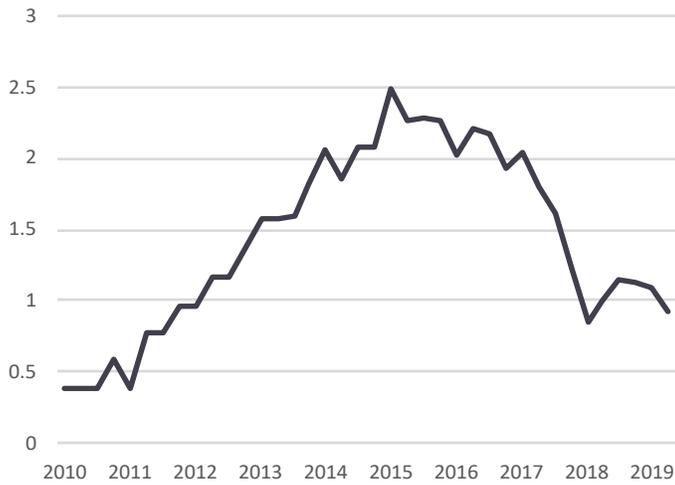
Helicopter Type	Total	Avg Airframe Age
AS 350	202	21
R44	154	15
Bell 206	94	36
R22	92	23
Hughes 500	81	37
Hughes 300	59	36
BK 117	42	26
Cabri G2	26	5
MD 500/600N	25	23
AS 355	21	34

HELICOPTER ACCIDENT RATES

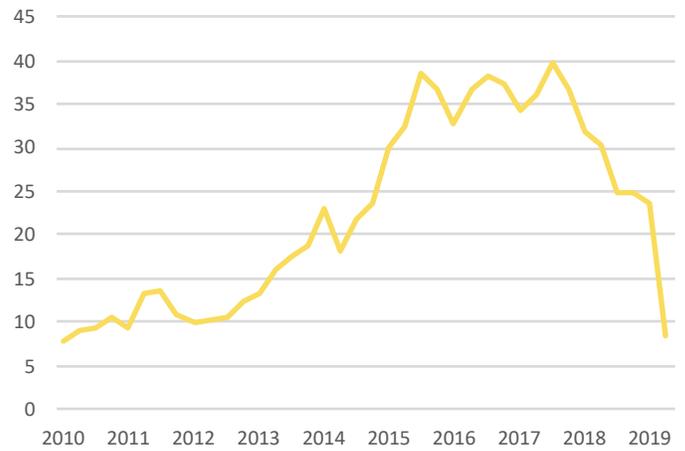
The overall 3-yearly rate of helicopter accidents per 100,000 hours, which includes all operation types, is 6.5 while the fatal rate is 0.92.



3-Yearly Fatal Accidents per 100,000 Hours



Training Accidents 3-Yearly Accidents per 100,000 Hours



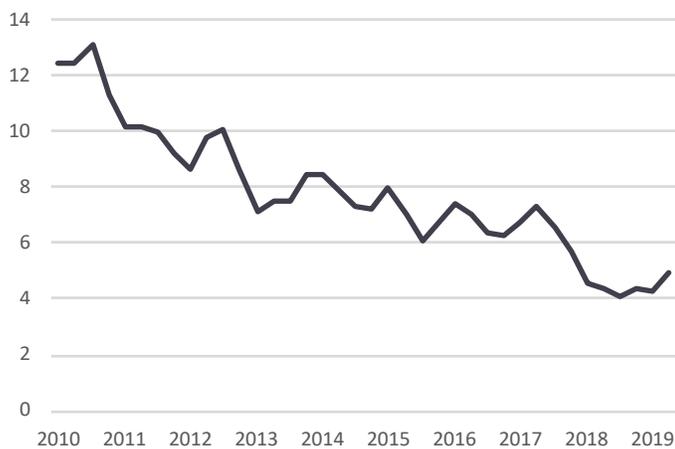
Air Transport 3-Yearly Accidents per 100,000 Hours



Other Commercial Accidents 3-Yearly Accidents per 100,000 Hours



Agricultural Accidents 3-Yearly Accidents per 100,000 Hours



ACCIDENT DETAILS

There have been 12 accidents for the year to date - 4 more since the previous safety update in July. 5 occurred on other commercial operations, 3 on private, 2 on agricultural, and 2 on air transport operations.



January



North of Taupo



Bell 206



Collision/strike - wire

The helicopter hit power lines and crashed while spraying. During the last load of the job and while searching for broom to spray, the aircraft contacted high voltage power lines. The aircraft rotors cut through the power lines, rendering the helicopter uncontrollable, and it subsequently impacted the ground. The pilot indicated that although he was aware of the power lines, he lost situational awareness while focused on the search for pockets of broom.



February



Nelson



AS 350



External load

The helicopter was engaged in fire-fighting duties when the pilot noticed a sudden yaw to the left followed by another to the right. This was followed by a sudden pitch up. The pilot immediately jettisoned the monsoon bucket. The pilot found he had little directional control but was able to control the rate of descent down to the ground. The cause of the loss of control was the monsoon bucket making contact with the tail rotor. The operator's investigation identified that the most probable cause was that the top ring in the bucket partially collapsed. An extract from the findings section of the report states: ***It is probable that the top ring in the bucket partially collapsed when the PIC was on his last dip fill essentially turning the bucket into a sack without the rigid top ring in place. Once the pilot released the water from the bucket and gained forward speed while travelling back down the valley the bucket would have experienced significant aerodynamic drag which moved it upward into the tail boom and tail rotor.***

The bucket was a Cloudburst CB1000MF. From the report: ***This investigation has highlighted a possible risk factor when operating the older style Cloudburst CB1000MF bucket with a collapsible top ring that is secured by Velcro. Partial collapse of the ring or if the ring comes away from the Velcro could cause an empty bucket to 'fly' erratically in flight and move dangerously close to the tail.*** The operator has contacted the manufacturer.



January



Pacific Ocean



Hughes 500



Loss of control - strops/tie downs

It was reported that the New Zealand - registered helicopter attempted to take off while still strapped to the deck of a boat by one line. The aircraft was unable to climb and rolled back onto the deck.



March



Northland



AS 350



Ground handling/External load

At the end of a day undertaking DoC Track work, a ground crew member sustained fracture injuries during the loading of a bucket of gravel onto the back of a truck. The crew member was attempting to guide the bucket onto the truck. When the pilot lifted the load slightly to better position it, the crew member held on to the bucket and was lifted approx 3 metres into the air before releasing their grip and falling on to the roof of the truck, where they lost their balance and fell to the ground.



March



Wairarapa



MD 600



Landing accident

While conducting a ridge top landing the pilot noticed a momentary shake in the cyclic. Subsequent inspection identified that the main rotor had contacted the tail boom and sustained some puncture and delamination damage. The operator identified that using increased aft cyclic on the sloping ground at the site may have contributed.



April



Manawatu



Robinson R44



Collision/strike - wire

The pilot was conducting aerial spraying work when the helicopter struck an electric fence wire while completing the third load of the job. The pilot was aware of the location of the wire and had avoided it during the other spray runs and on previous work on the block. He managed to execute an emergency landing, however the helicopter suffered extensive damage to the front canopy, a rotor blade and during the ensuing heavy landing.



April



Auckland Island



BK117

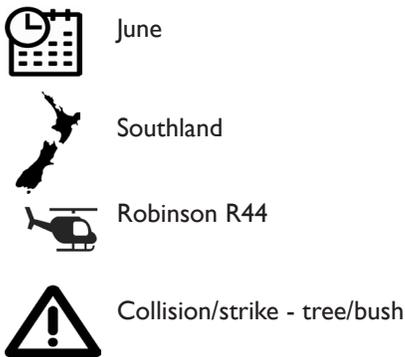


Under investigation

The helicopter was on an air ambulance flight to the Auckland Islands with 3 crew on board when it was reported missing. The 3 crew were subsequently rescued with some minor injuries. The TAIC are investigating the accident.



The pilot forgot to uncouple the foot pedals before the take off. Once the helicopter became airborne it immediately began to spin. The pilot dropped the collective and a skid partially collapsed on contact with the ground.



During a mustering operation the helicopters main rotor blades contacted foliage. This was not noticed until the post flight inspection. The investigation determined that the pilot may have been task fixated on the cattle and as such lost situational awareness while operating at foliage height.

The pilot has been counselled on his actions, has undergone low level operational training and conducted a FCCC 137 check.

The operator is also implementing SOPs for mustering.



While carrying out a WARO operation, the pilot landed on a ridge top, reduced power to ground idle and secured the friction. On exiting the helicopter the pilot checked the skids which appeared flat and solid against the surface and the helicopter appeared level. As the pilot walked away he saw the helicopter fall backwards. The tail rotor contacted the ground and was damaged. The report determined the the vibration of the helicopter allowed the hard-frozen surface to give way to a soft area under the LH rearer heel of the helicopter.



Upon landing the helicopter drifted right and the main rotor came into contact with the hangar door.

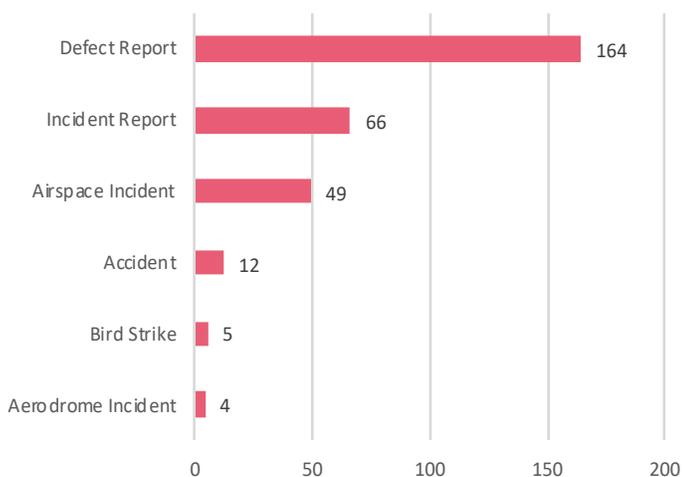
-  September
-  Otago
-  AS 350
-  Other

The helicopter was landed with the nose into the hill for a ‘power off’ pick of passengers with collective down, flight idle maintained. As clients were getting into the machine the tracking finger on two blades contacted the snow in the 12 o’clock position. Noise was heard first to raise attention and the pilot then noticed the mark in snow. The passengers were removed from the helicopter and it was shut down for inspection. It was then relocated to a close safer area (the lodge) for the engineer to fit replacement cap.

OTHER OCCURRENCES

The chart below shows the total occurrence reports for NZ helicopter operations for the year to date. As the following examples of recent incidents and defects illustrate, a couple of safety issues are currently trending.

Total Helicopter Occurrences 2019 to Date



The chart below shows the total occurrence reports for NZ helicopter operations for the year to date. As the following examples of recent incidents and defects illustrate, a couple of safety issues are currently trending. One of these issues concerns external load operations: a number of equipment defects and operational incidents have been reported this year concerning these. ***This safety notice will conclude with some external load safety data and information about 4 upcoming regional external load workshops.*** Other trending issues include ground handling, doors opening in flight, and maintenance.

-  May
-  Tasman
-  AS 350
-  Door opening

On take-off the bottom of the pilots door came open. The take-off was aborted and the door was shut correctly.

-  May
-  Southland
-  Hughes 500
-  Near collision/strike - wire

As the pilot turned onto finals to set up the spray run they noticed a very high wire strung across the gully. This wire was strung right on their eye line and also had a wire joining the fence at the bottom of the gully. When the pilot noticed it they pulled up over the wire

and finished the half tank load on a different part of the paddock away from the wire and flew back to the load sight.



June



Auckland



AS 355



Fuel union

Pilot and crew noticed a strong fuel smell in flight when the aircraft was in different attitudes, a precautionary landing was made and the aircraft shut down. Fuel was observed draining overboard from the right hand engine deck drain pipes. Pilot opened the right hand engine cowl and with boost pump selected on fuel was leaking at a very high flow rate from the cracked union. Union from engine driven fuel pump to differential fuel pressure switch found cracked. Union replaced and functional check carried out of fuel system with boost pump operating and engine operating. No further leaks observed.



June



Hastings



BK 117



Collision/strike - terrain

The pilot and crew were conducting an ab-initio crewman training sortie in the approved low flying area. Part of the sortie, IAW the syllabus, was dedicated to consolidating hover entry and exit procedures, in the same area as previously trained.

The pilot was positioning the aircraft nose first into the slope of the hill, with the 'toe' of the left skid in contact with the hill, when the wire cutter contacted the ground and sheared off at the shear point. Neither the trainee nor the crewmen instructor could see the contact being made between the wire cutter and the hill.

The pilot's previous experience of hover entry and exit procedures in BK-117 aircraft had all been in aircraft without a wire strike kit. By his own admission the pilot forgot how far the nose 'cutter' protrudes.

The pilot landed and in consultation with the crew assessed the damage to the wire cutter. It was deemed the aircraft was safe to fly back to base where maintenance were notified of the incident.

The operator has since revised the BK 'differences' SOP/Aircraft Induction Document, to include a caution regarding the wire strike protection system (WSPS). Particularly as aircraft with and without wire kits are being swapped around the different bases.



January 2019



Nelson



Bell 206



Door opening

The front left hand door top latch broke and dislodged the top roller on the sliding door. The helicopter was then flown a short distance to pick up another guide, who pointed out the damage. The pilot reattached the roller, checked over the door and was satisfied it was serviceable. On return to base the door was removed for repair. Corrective action – guide completed recurrent groundcrew training.



Main rotor pitch housing retaining bolts found to be working and loose on scheduled 100hr inspection on one of the five main rotor grips resulting in the replacement of the pitch bearing housing spacer due to excessive fretting. Main rotor spacer replaced. Droop angle checked. Remaining four main rotor pitch bearing housings check torqued and relocked. Rotational movement was noted on all four other housings.



On landing, while positioning the helicopter to find level ground, the main rotor blade made contact with the roof iron on the edge of a hut in the landing area. The aircraft was shutdown and an engineering inspection found that the blades were not damaged.



After engine repair and ground test a bolt was found on the engine deck and another on the grass. On further investigation it was noted that all Inlet Housing bolts were loose and the 2 bolts found had come out altogether. Corrective Action Taken - New Lock Washers PN MS35333-74 and tooling was sent to the operator to re-torque the bolts, and suggested a vibe run be carried out prior release to service. This has now been carried out successfully and the aircraft is released to service.



Just after taking off at the Thames Airfield, the windows began to fog up and limited the pilot's view. As he could still see the ground through the door, he landed back on the ground to turn on the demister to full and allow the fog to disappear. The pilot had previously performed winter operations with the door removed so fogged windows had never been an issue.



June



Otago



AS 350



Near collision/strike

On takeoff the helicopter's tail rotor came into proximity with a nearby parked helicopter. The investigation report determined that the principle causes were loss of situational awareness due in part to distraction from the passengers, who included a crying 10-month old baby.



July



Central North Island



AS 350



External load

During an external load operation, a strop failed causing load to fall. The operation consisted of the slinging of a steel door weighing approximately 600kg using an 80ft longline. The door was rigged to fly flat as this was deemed to be the best way to avoid spinning or oscillations. During climb out a sharp edge of the door cut through one strop causing it to fail, the load then slipped out of the remaining strop. The failure occurred approximately 30m from the lift off point. The load fell approximately 10 feet. On investigation, it was found that a sharp edge on the steel door panel had cut through the lifting strop causing it to fail.



July



Whangarei



S-76



Other

On departure an audible thump was heard. A PAN call was declared and a precautionary landing carried out. Upon inspection of the starboard engine intake compartment two small pieces of a plastic label/placard were located in/around the intake mesh. The Rolls Royce Tech Rep was contacted. An external condition check carried out on engine looking for cracks or areas for air loss which could lead to a compressor stall/ surge - nil defects. Compressor impeller inspected for FOD damage - nil defects. Fuel nozzle removed for precautionary clean, inspection and flow check. Outer shroud wear found unrelated to sticker ingestion. The fuel nozzle was replaced.



July



Marlborough



Hughes 500



Other

During climbout, the pilot's sleeve got caught in the door handle and opened the door. The instructor took over while the student closed the door.



July



Tasman



Hughes 300



Maintenance

All main rotor blades were removed from helicopter for maintenance access. On reinstallation, it was found one rotor blade had two identifying colours, and one was unmarked. All three were re-installed, but during ground runs an excessive lateral vibration was noted. Two rotor blades were swapped around rotor hub, a ground run carried out, and lateral vibration returned back to normal level. Cause: The main Rotor Blades were unmarked at their locations prior to removal, therefore not returned to their original blade grip.



July



Whanganui



Hughes 500



TR pitch control assembly

During a scheduled 100hr airframe inspection excessive play was found in the Tail Rotor Pitch Control assembly. The control assembly was removed and upon further inspection 20 of the 25 splines in the Swashplate Tee were found to be severely worn and or missing. The defective part was returned to the manufacturer for further inspection. The inspection found no anomalies in the material specifications, design or the manufacture of the affected part. It was therefore concluded that excessive vibration and/or an out of balance condition

of the tail rotor components may have accelerated the premature wear of the splines. This was possibly exacerbated by particles from the worn parts contaminating the grease, further abrading the spline teeth.



July



Ardmore



Hughes 300



Cargo swing gimbal

During scheduled maintenance, while complying with Airworthiness Directive DCA/AS350/129A on the cargo swing gimbal/universal joint assembly, P/N OAL 114-10504, a crack indication was identified. The part was removed and the 146 Design Organisation was notified of the defect.

Gimbal to be scrapped. Link to the AD is here, page 54:

https://www.caa.govt.nz/assets/legacy/Airworthiness_Directives/AS350.pdf



August



West Coast



Bell 206



External load

The helicopter was conducting a long-line operation transporting gravel to a Department of Conservation (DOC) track near Punakaiki. While conducting this operation, an unexpected load (machinery) turned up and was required to be lifted into a site near where the gravel was being delivered. The pilot had a long-line

extension available, but assessed that the length in use would be sufficient for delivering the machinery to the site. While lowering the load into the site, a main rotor blade contacted a treetop. A precautionary landing was conducted into the nearest available clearing.

The Occurrence Investigator advised that as a result of the occurrence the operator had made changes to the procedures for these types of operations. The Safe Operating Procedures for Rigging and Lifting of External Loads (SOP) in place at the time was client/ground crew oriented. It had been developed for personnel involved with helicopter operations to increase safety in and around helicopters. The Occurrence Investigator advised that a section will be added to the SOP on Pilot Protocol that will include the following pilot requirements:

1. A formal discussion with management of any variation to original plans;
2. An aerial reconnaissance to aid pilot situation awareness and identify hazards; and
3. Any other precautions to be taken to ensure the safe conduct of the operation.



August



West Coast



Hughes 500



Oil cooler belt

The engine oil cooler belt broke on ferry flight between Fox and Franz. The pilot heard a bang accompanied by vibration and slight drop of altitude and then a burning rubber smell, carried out a precautionary landing.

Blower assembly replaced (including bearings and belt), rubber removed from firewall.



August



Otago



AS 350

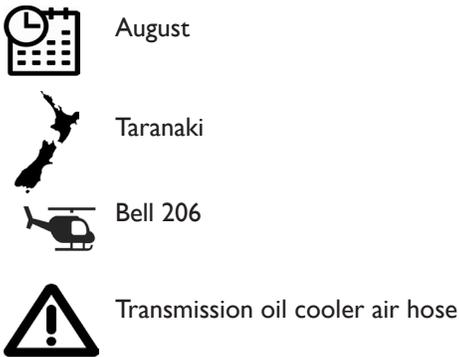


MR pitch link rod

Pilot reported a sudden onset of heavy vertical vibration developed instantaneously. The vibration was severe and the pilot elected to land immediately. On approach the pilot tried slower airspeeds but the vibration sustained itself throughout multiple airspeed ranges. 40kt, 60kt, 80kt. The pilot elected not to dump the hydraulics as he was close enough to the ground and felt that the aircraft was still controllable. The helicopter had a 600Hr / 2 Yr inspection carried out on the 15th June 2019 at 13,598.25 Airframe Hours. The incident occurred at 13,621.15 Airframe Hours, 22.9 hours after the 600Hr / 2 Yr inspection was performed. The Yellow lower Main Rotor pitch link rod end was found to have separated. The Retaining bolt, usually surrounded by the ball and socket type pitch link connection was all that was remaining. Two previous service letters had been issued by Airbus regarding these particular rod end fittings. The new type of rod end fittings have been fitted to all Main Rotor Pitch Change Links IAW AMM.



While carrying out a bucket operation, the pilot failed to maintain a positive rate of climb once he had picked up the bucket. The bucket clipped the top of a previously unseen post resulting in damage to the spinner. The operator's investigation determined that *"The pilot had been operating from the same loadsite for several hours on the day and the preceding day of the mishap. He got complacent as he had plenty of power and room to carry out the operation safely but a lapse in concentration resulting in him not clearing the obstacle."*



During pre-flight, pilot found air hose to transmission oil cooler had detached from flange of radiator thus allowing the hose to get caught by the rotating swashplate. No damage. New hose fitted, safety tie wrap attached to clamp.



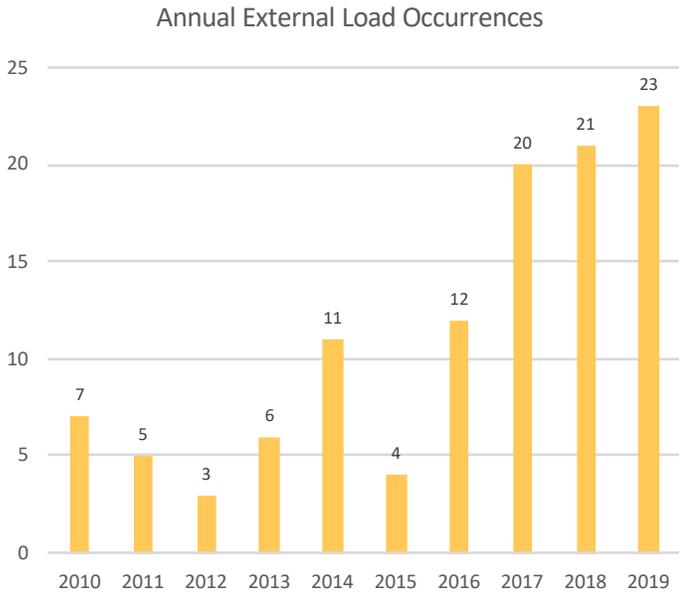
On descent after dropping a guide and skiers, the rear sliding door became unlocked and partially slid open. It appears the door not latched correctly by the guide.



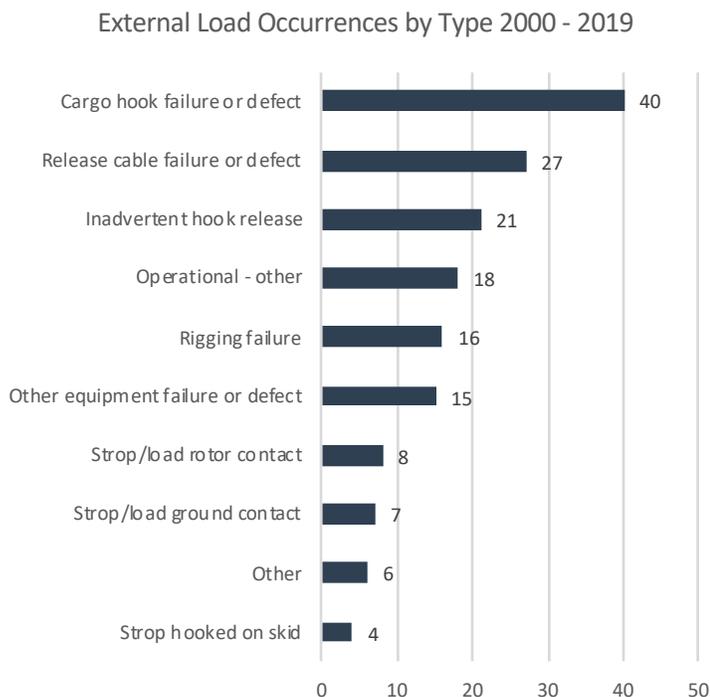
Pilot stopped operation to allow engineer to carry out a nut re-torque as part of maintenance following Starflex installation. Previously detachment of 3x retaining nuts allowing yoke assembly and ring to become displaced. Previous experience with an identical situation indicates the cause may be attributed to heavy contact of the droop stop due to excessive blade flapping at ground RPM. Inspection IAW MM 62-21-00, 62-31-00 and previous correspondence with manufacturer following an Identical incident. No damage detected, components reassembled, and A/C released to service.

EXTERNAL LOAD NOTICE

Accidents, incidents, and defect reports relating to external load operations and equipment are increasing (see the chart below).



The nature of the occurrences vary. Equipment failure is common, as are operational incidents relating to rigging, maintaining appropriate terrain clearance, and ‘flying the load’ correctly.



In response the CAA has organised a series of regional workshops in partnership with Cookes (a Bridon Bekaert Ropes Group Brand). These workshops will deliver both a theoretical and practical understanding of lifting equipment usage, including pre-use inspection criteria. The course fee is \$100.00 incl GST, lunch will be provided.

A link to the course information and registration page is below:

<https://www.caa.govt.nz/safety-info/seminar-info/inspection-and-safe-use-of-lifting-equipment/>

You will also find a summary of the course attached to the end of this safety notice. If you cannot attend, then please consider reviewing some other available safety resources to ensure that your knowledge and procedures are fully up to date. The UK CAA has a great guidance document covering external load operations:

<https://publicapps.caa.co.uk/docs/33/CAP426.PDF>

While the flight safety foundation has also published useful material in the Basic Aviation Risk Standard Volume Two:

https://flightsafety.org/files/bars/bars_implementation_guidelines_vol2_aug13.pdf

Inspection and safe use of lifting equipment

The Civil Aviation Authority is partnering with Cookes – a Bridon Bekaert Ropes Group brand – to deliver a workshop for helicopter operators on how to inspect and safely use lifting equipment.

The workshop delivers both a theoretical and practical understanding of lifting equipment usage. This includes pre-use inspection criteria at a user level and how to assess the safety condition of equipment. The course covers the following:

- Introduction from the CAA
- The Health and Safety at Work Act
- ACoP Load-Lifting Rigging & LEENZ CoP New Zealand
- Pre-Use Inspections of Lifting Equipment (under aircraft)
- Safe use of lifting equipment – specific to Aviation Industry
- Understanding Lifting Equipment Load Limit Charts (LEENZ)
- CAA Rule 133 - Helicopter External Load Operations
- Understanding asset registers

At the end of the course, the attendees are taken through a recap / group discussion to cover any underlying queries and for general information sharing.

Workshops

The workshops will cost \$100 per person. Each session runs from 10am to 3pm and will include a lunch break with meal provided.

Auckland

Tuesday, 5 November

Sudima Auckland Hotel

Queenstown

Tuesday, 12 November

Rydges Queenstown

Christchurch

Tuesday, 19 November

Sudima Christchurch Airport

Wellington

Wednesday, 27 November

Asteron Centre