



NZ Helicopter Sector Activity and Safety Update

October 2016

Based on activity data received to date from operators we estimate approximately 145,000 total helicopter flight hours flown from January to September this year (chart below). 50% of reported hours are for air transport - up from 33% in the years 2011-2013. 29% of the remaining 2016 hours have been agricultural, 14% 'other commercial' and 7 % private. There are currently 833 helicopters on the NZ register. 445

are turbines and 367 are pistons. The licencing database indicates that there are currently 1,719 helicopter pilots with an active Class 1 or 2 medical currently, 137 ATPLs, 1,172 CPLs, and 410 PPLs.

Safety Performance

The charts on the following pages show the three-yearly accident rates for the different operation types.

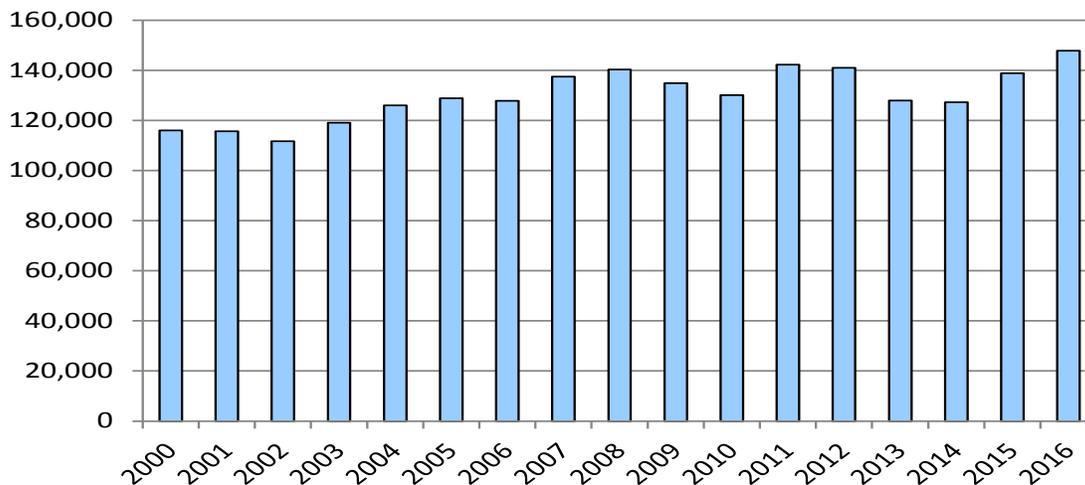


Figure 1: Total helicopter flight hours, January-September annually

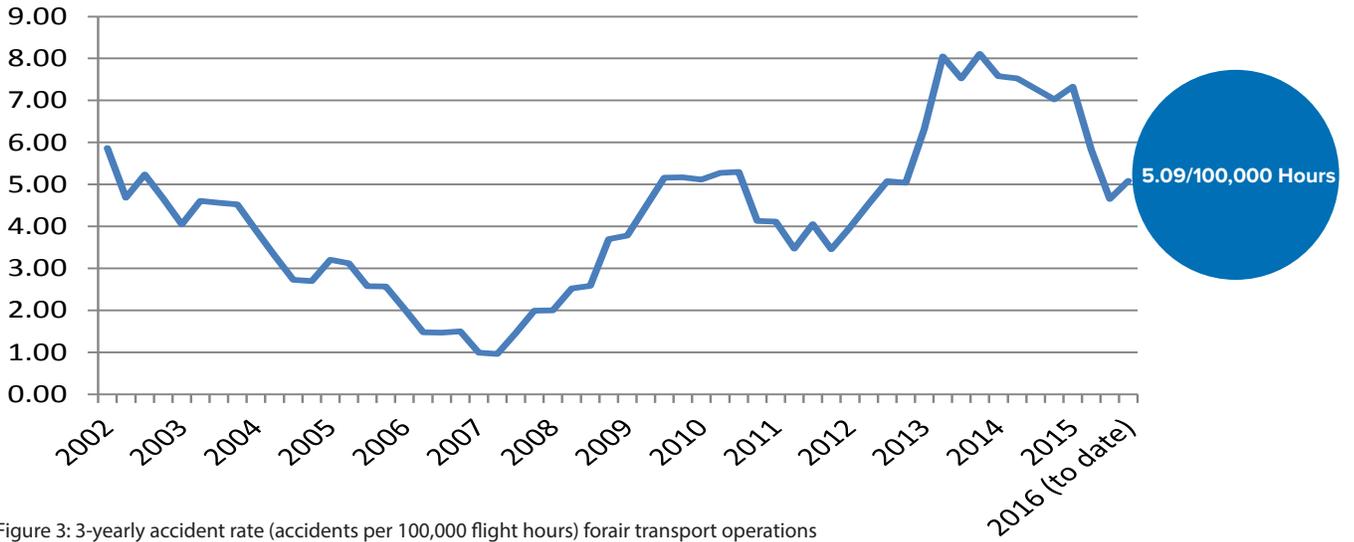


Figure 3: 3-yearly accident rate (accidents per 100,000 flight hours) for fair transport operations

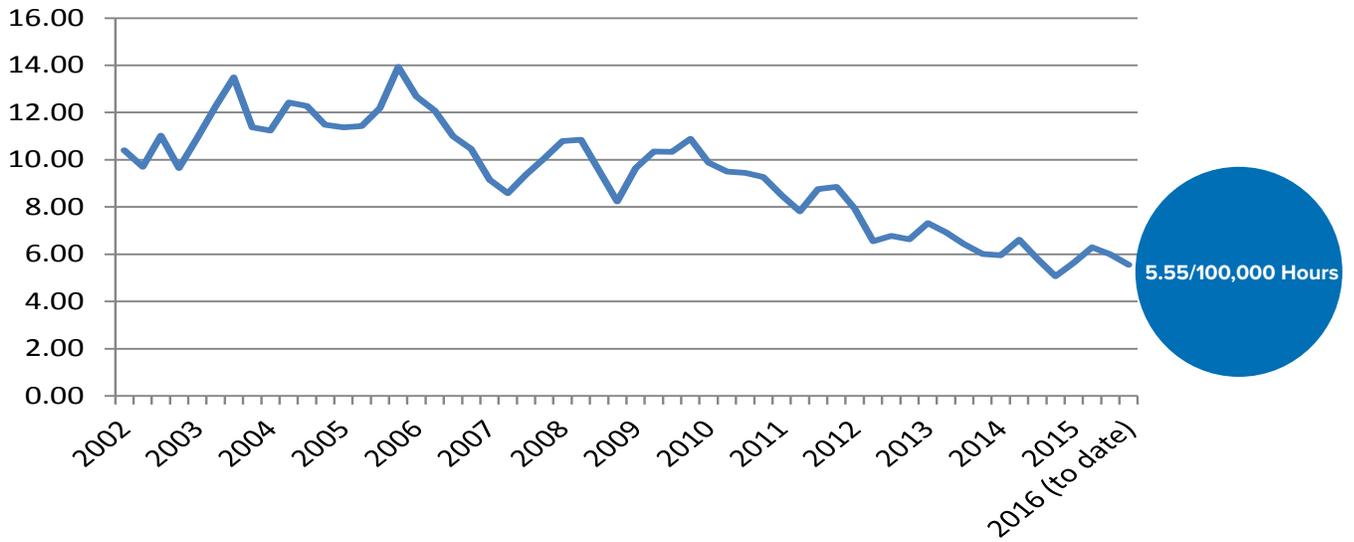


Figure 3: 3-yearly accident rate (accidents per 100,000 flight hours) for other agricultural operations

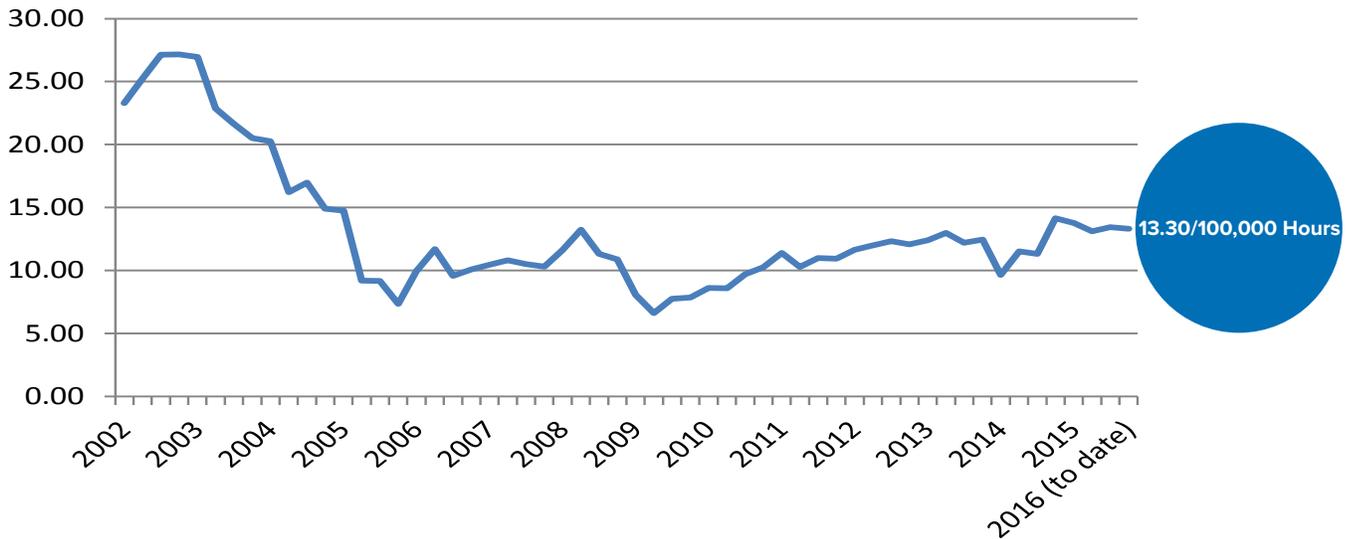


Figure 4: 3-yearly accident rate (accidents per 100,000 flight hours) for other commercial operations

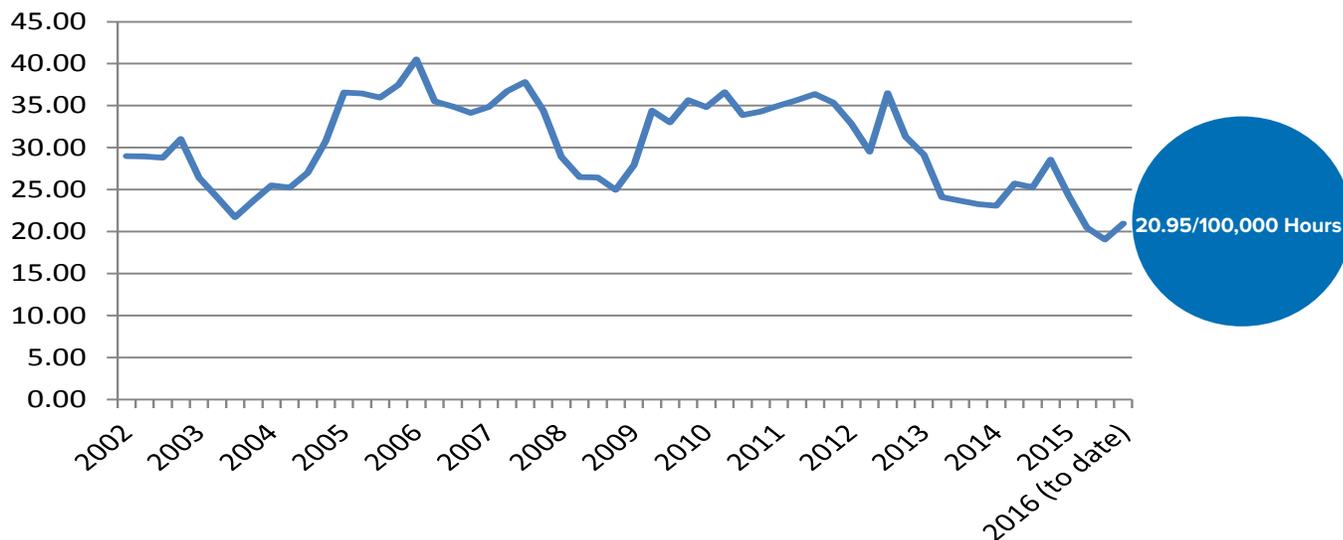


Figure 4: 3-yearly accident rate (accidents per 100,000 flight hours) for private operations

Accidents

In 2016 to date there have been nine accidents on helicopter operations. The details of these are provided below:

-  25 January 2016
-  Hawkes bay
-  Robinson R44
-  2,122 total hours, 237 on type
-  Collision/strike: tree

Details

Helicopter sustained a main rotor blade strike on a tree while spraying gorse below it. No vibration felt, landed the helicopter immediately, noted blade damage. The operator's investigation identified that as a new employee to the company the pilot may have been attempting to spray every weed/gorse bush to complete the task as well as possible. They also noted that agricultural training may not have covered the importance of keeping a good distance from hazards. The operator undertook to reemphasize situational awareness training with all pilots.

-  19 February 2016
-  Southland
-  Robinson R22
-  7,950 total hours, 5,000+ on type
-  Dynamic rollover

Details

The helicopter was engaged on a private hunting operation. While hovering above a steep slope to pick up a crewman the machine was put out of balance and a forward dynamic rollover occurred. The pilot cited complacency as the principle cause of the accident.

There have been a number of similar accidents on hunting operations. In July 2014 a Hughes 300 crashed in Marlborough in similar circumstances. There, the shooter took hold of the starboard skid, in front of the forward 'hockey stick' while the helicopter was in the hover. The pilot was surprised by this and the excessive forward weight was such that he could not correct with control inputs. As the shooter did not release themselves from the skid, and due to the helicopter being manoeuvred close to the ground, the rapid loss of control and collision with the ground. Both the pilot

and the shooter were severely injured in the accident. The pilot had given the passenger a briefing prior to the flight around how to enter and exit the helicopter in the hover and to wait until getting the 'okay' from the pilot before doing so.



2 April 2016



Taranaki



Bell 206



20,000+ total hours, 12,000+ on type



Hard landing

Details

While demonstrating a “jammed pedal” procedure to a new employee, the instructor took over after the student landed near to wires. He then pulled up and proceeded downwind over wires to get clear while still in “jammed pedal” mode, causing the helicopter to spin to the right. He let it spin into wind thinking that rapid lowering of the collective would alleviate it, but was still too close to the wires, and had to pull up again to clear. By this time complete loss of tail rotor effect, coupled with the downwind rotor wash effect meant that the only action left was to close the throttle and lower the collective, which stopped the spin, but left little height for a power on recovery. The helicopter landed heavily on the front of the skids with the cross tube taking the brunt of the downward force, with the resulting spring-back causing the tail boom to suffer a compression bend about 400mm behind the attachment point. The helicopter was shut down and both pilots exited with no injuries.

To learn from the incident and to prevent re-occurrence, the company reviewed its training procedure, and decided any of these types of procedures, including Governor and hydraulic failure, will in future be conducted over a wide open space, preferably at an airfield.



7 April 2016



Whakatane



Guimbal Cabri



1,524 total hours, 74 on type



Autorotation accident

Details

The helicopter was engaged on a dual training flight with a CPL holder undertaking a night rating. During the autorotation power recovery phase of a practice autorotation, initial twisting of the throttle from idle to flight RPM had zero response. Realisation of this by the instructor prompted them to immediately take control from the student and another fistful of throttle rotation was applied to increase the idle RPM to flight RPM. By this time, the aircraft was suffering from low rotor RPM and the aircraft was at an altitude where powered recovery was not sufficient to arrest the decent rate and low rotor RPM.

In reviewing the circumstances of the accident the investigation determined that the instructor did not notice the onset of the rotor RPM decay whilst he was visually assessing the correct height to initiate recovery, while simultaneously the application of throttle failed to produce the expected result of increasing the engine RPM, the subsequent delay in taking a second grip of the throttle proved too late as the pilot was already instinctively raising collective and levelling the skids. Therefore the aircraft was unable to complete a normal autorotation practice recovery and it impacted the ground.

The investigation cited three main causal factors:

- No response from the throttle when twisted from idle to flight RPM;
- The instructor was relatively new to instructing on night constant attitude autorotation; and
- The instructor and the student had not flown before and verbal signals and responses between them were slower than usual.



15 April 2016



Rotorua



Guimbal Cabri



Not reported/released yet



In-flight fire

Details

The pilot and sole occupant of helicopter heard some noise and smelt smoke after departing from Rotorua Aerodrome. He made a precautionary powered landing on a farm paddock nearby. When he saw flames coming from the engine area, he shut down the helicopter and moved away. The helicopter was destroyed by fire before the fire service could respond. An investigation into the accident is underway.



Image 1: The helicopter on fire after landing.



29 April 2016



Lindis Pass



Robinson R22



Not reported/released yet



Collision: terrain

Details

The helicopter was on a private flight with the pilot and a passenger on board. It impacted terrain in the Lindis Pass area. The passenger was killed and the pilot sustained serious injuries. The investigation into the accident is ongoing.



Image 2: The R22 wreckage and accident site.



22 July 2016



Te Awamutu



Hughes 300



Not reported/released yet



Loss of tail rotor authority

Details

The helicopter suffered a suspected tail rotor failure on approach to land during which tail rotor authority was lost. After initial touchdown the helicopter bounced and spun 720 degrees before impacting the ground and collapsing the right skid. The main rotor also contacted the ground in the accident. An investigation into the accident is ongoing.

Flight Training & Supervision Analysis

The helicopter flight training workshop at the recent New Zealand aviation conference discussed training, supervision,

and monitoring as areas of focus for improving safety performance. This was also raised by a number of responses in the recently released Helicopter Safety Survey (which you can access [here](#)).

Analysis of helicopter accident data found that:

- For accidents involving Part 135 certificate holders 35% involved pilots with fewer than 1500 hours total; 53% of accidents involved pilots with fewer than 500 hours on type;
- For accidents involving non-135 certificate holders 57% involved pilots with fewer than 1500 hours total; 55% involved pilots with fewer than 500 hours on type.

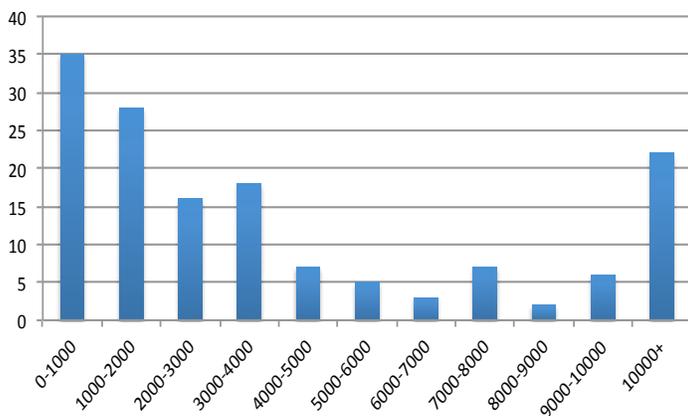


Figure 5: Number of helicopter accidents and total flight experience of pilots involved (Part 135 Certificate Holders only).

Using the accident dataset with the causal factors assigned by the NZHA, we took a closer look at the accidents involving pilots with fewer than 1500 hours total to investigate the kinds of accidents that had occurred:

- 28 were 'unrealistic expectation of power available' accidents - 65% of all accidents in this category;
- 13 were 'mishandling' accidents - 52% of this category;
- 9 were CFIT accidents - 43% of this category;
- 6 were 'inappropriate conditions' - 60% of this category;
- 6 were 'loss of control' accidents, 67% of this category.

Here are some examples of these accidents.



23 November 2000



Arthur's pass National Park



Hughes 300



527 hours total, 393 on type



Loss of control - performance management

Details

The pilot had picked up two fishermen with light packs from the Crow Hut helipad (at the junction of the Karamea and Crow Rivers). The wind was a light southerly, although the direction was locally variable at the pad. The pilot lifted to a hover twice to assess the power available, but landed again because of the wind. On the third attempt he achieved a vertical climb to treetop height before transitioning forward. The helicopter began to lose height without loss of rotor rpm, but the pilot was already committed to the takeoff path and could not turn back to the helipad. The machine touched down in the rocky riverbed at low forward speed and rolled on to one side. All three occupants vacated without injury. One of the passengers had a mountain radio, with which he was able to contact a base station and report the accident.



20 November 2015



Mount Tarawera



R44



251 total hours, 98 on type



Loss of control - performance management

Details

The helicopter was on a standard scenic flight package/route which includes a planned landing on top of Mt Tarawera. The PNC approached the normal landing location from the north and in line with the western crater rim as he had done

earlier that day. During the final stages of the approach he experienced turbulence and increased rate of sink. He allowed his airspeed to decrease with the view of turning into wind for the final stage of the approach and landing. However, the sink rate increased and PNC collective input was insufficient to arrest the rate of sink, resulting in the helicopter contacting the ground heavily and short of the landing area. Electing to complete the landing at that point, the tail rotor contacted a rock located unseen by the PNC and directly behind the helicopter as it settled in the soft ground. Two causal factors were identified in the operator's investigation:

1. The PNC carried out the approach and landing based on information obtained during an earlier flight to the same location and a forecast 2000ft wind of 040 at 15 knots which was similar to that experienced during the earlier flight. He failed to notice that the wind direction had changed to the north west. Having approached the landing area downwind. He encountered turbulence and increase rate of sink due to the wind rolling over the crater rim.

Toitoti bushes near the landing area provided useful indicators of wind direction. The PNC did not observe these indicators on approach. The Chief Pilot estimated the wind as being 330 at 15 knots when he arrived shortly after the incident.

2. Having failed to correctly assess the changes in wind direction, the PNC chose and executed an approach and landing from a downwind position. As a result, he was not expecting the turbulence and sink rate encountered. Having not detected the change in wind direction early enough, his reaction by way of control inputs were insufficient to compensate and arrest the rate of sink encountered.

 10 August 2008

 West Coast

 Hughes 500

 1466 total hours, 260 on type

 Loss of control - loss of tail rotor effectiveness

Details

The helicopter was about to land at a hut to drop the passengers when it encountered a slight tail wind that resulted in the helicopter spinning around and settling into some trees before dropping to the ground. The TAIC investigation found the pilot had been complacent in regard to the following aspects of flight preparation:

- not being fully involved with the loading of the helicopter, which meant he did not assess the accuracy of the cargo weight
- not ensuring that the shoulder harnesses were accessible and worn by the occupants
- not determining that the passengers were familiar with the safety briefing.

The investigation determined that the helicopter's engine and flight controls were operating normally, and found no evidence that a technical malfunction contributed to the accident. The helicopter was heavily loaded, but not overweight, and the flight manual charts showed that it had the performance capability to hover out of ground effect at that altitude. The investigation determined that the un-commanded yaw and loss of control resulted from the approach being attempted under conditions that were noted in the flight manual to be conducive to a loss of tail rotor effectiveness. The precipitating factors for a loss of tail rotor effectiveness can occur singly or in combination, and several were present. The most significant were the weathercock stability and the loss of translational lift during a downwind approach, and the high power demand as the helicopter came to a hover. The full accident report is available [here](#).



image 3: The 500 wreckage



Passenger Transport Risks

New Zealand is currently in the midst of a major increase in tourist numbers. This is clear from a number of different information sources, including data on the number of international passenger arrivals annually (chart below). International visitor data for the year to July shows that already in 2016 there has been an 11% increase in numbers from 2015. Aviation data from operators in tourism-heavy

Here, we explore some of these risks with reference to some incidents that have occurred in recent years on passenger transport operations. The purpose is to highlight some of the risks involved and to get you thinking about how to manage these in the upcoming months.

Passengers can put themselves and the aircraft at risk

This can occur in several ways. The main three are:

- Getting in close proximity to the tail rotor or main rotor blades;
- Having loose cargo, clothing, or other equipment that comes in close proximity with the main or tail rotor blades;
- Inadvertent interference with the flight controls.

Common causal factors link each of these, including pre-flight briefings and passenger safety information. The details of the following incidents highlight these.

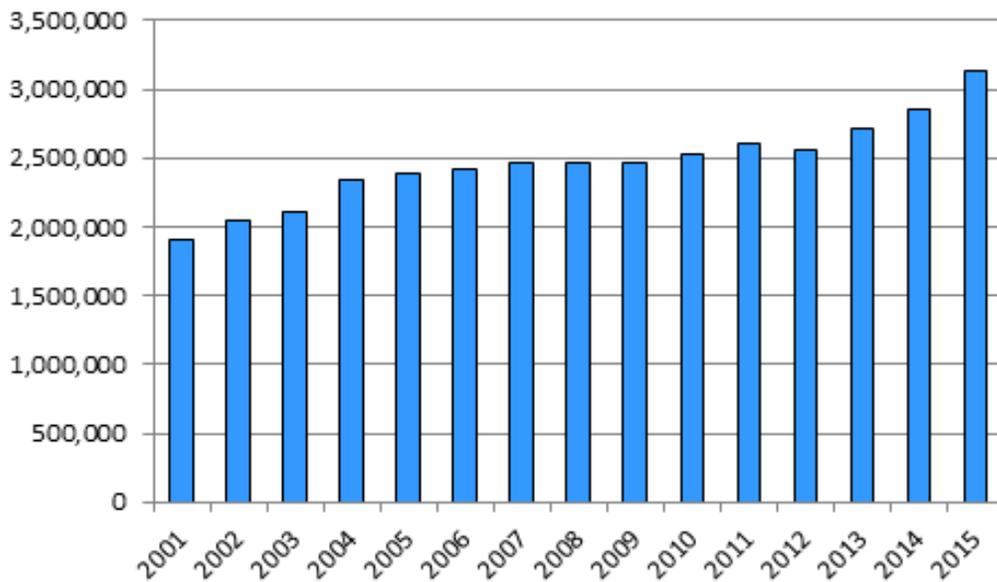


Figure 6: Annual interantional visitor arrivals to New Zealand 2001-2015 (Statistics New Zealand)

regions illustrates clearly that this is leading to big increases in transport, scenic, and adventure aviation flying. The November - February period is traditionally the busiest for tourism activity. While the boom in numbers is undoubtedly good for business, it also has important ramifications for managing safety risks. More people means more flights, more hours worked by staff, busier airspace and landing sites, and more pressure to make the most of the busy season.



October 2015



Mount Pisa



MD 600N



6078 total hours, 490 on type



Passenger proximity with blades

In this incident, the helicopter’s passengers failed to comply with their pre-flight briefing. 3 of the 6 passengers moved and stood behind the helicopter to pose for photographs. Passengers had been briefed prior to flight and again prior to landing. The operator’s report stated *“Fortunately the MD600N is a NOTAR helicopter otherwise this could have had very serious consequences”*. The operator undertook to translate their passenger safety cards into Mandarin.



February 2006



Auckland



EC 120



13000 total hours, 3000 on type



Passenger control interference

The operator reported that dual controls had been fitted on to the helicopter and all passengers had been appropriately briefed prior to the flight and specifically cautioned about the flight controls.. A passenger reached for a bag during transition which resulted in a rapid lift of the collective. An over torque inspection was subsequently carried out.



October 2015



Milford Sound



Hughes 500



1200 total hours, 915 on type



Passenger proximity with blades

After being seated in the helicopter the passenger put her head out the door, raised herself up, and extended her right arm to wave. Her hand came into contact with the rotating main rotor disc, receiving a minor injury. It seemed that her actions were initiated after she spotted a camera pointing at her embarking. The passengers wound was treated. The flights were cancelled and the tour guide returned the party to Milford Sound on the tour bus. The operator undertook to conduct an internal audit to reaffirm passenger safety briefing procedures. The operator has a specialized safety briefing for clients travelling from Asian countries.

Summary

These incidents (and there are many similar ones) show how passengers can themselves present risks to the safety of the flight and to the helicopter itself.

Mitigating the risks

NZHA acknowledges that passengers certainly can provide their own risks. The reality is that many tourists are having their first experience of helicopter travel and are therefore exposed if they have not been properly briefed. This means that all operators have to provide briefing material in a language that all of its customers can clearly understand.

Then they must be given adequate time to read and understand the written briefing. Trying to brief passengers when they are standing beside a machine that is running is pretty much pointless.

But in spite of the best briefing available, passengers can be impulsive and operators have to try and manage this risk with manpower alone. In many circumstances the pilot may be the unlucky one trying to do this. Vigilance is everything but there are some steps that even a simple risk assessment would

identify:

- Never operate the helicopter with dual controls fitted
- Consider covers for controls that cannot be removed
- Operate types that do not permit passengers to reach

up to the rotor from the cabin doors

- Consider the value (not the cost) of having a crew member on the site to help manage passenger risks.

NZHA is of the opinion that if we are not more careful with passengers who are moving around outside the helicopter, the privilege of leaving the rotors running will be lost and that would likely make most businesses unsustainable.