


vector

Warbirds Over Wanaka



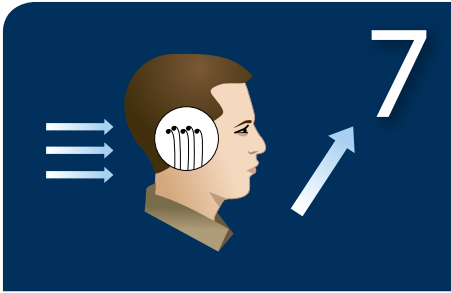
Illusions in Flight
Strip Flying – First, Get
Some Proper Training

The Changing Role
of the Senior Person



4 **Warbirds Over Wanaka**

Flying to Warbirds Over Wanaka this Easter? Here are some hints and tips to get you there and back safely.



7 **Illusions in Flight**

Spatial disorientation and visual illusions can happen to anybody. Learn more about these phenomena, and how to avoid them.



14 **Strip Flying – First, Get Some Proper Training**

Two long-time airstrip pilots say that aviators who teach themselves to fly into and out of rural airstrips are also kidding themselves. Their message is that strip flying is a speciality that must be formally taught, and learned.



18 **The Changing Role of the Senior Person**

In the era of Safety Management Systems, some features of the role of Senior Person have changed forever. We discuss those and the fundamentals that still stand.

A New Era in Aviation Events	3
Warbirds Over Wanaka	4
Avoid a Bad Avoid	6
Illusions In Flight	7
Dipstick Woes	10
SMS... Taking the Plunge!	12
Strip Flying – First, Get Some Proper Training	14
The Right Fuel	17
The Changing Role of the Senior Person	18
Airworthiness and Maintenance Workshop 2018	20
Diverse Opinions at the Big Table	21
Maintenance Records – Part of the Aircraft	24
New Southern Sky	24
New AD Logbook Tabs	24
In, Out and Around Christchurch GAP Booklet	24
Is there an AvKiwi Safety Seminar coming to a town near you?	25
Clarification	25
Aviation Safety Advisers	25
How to Get Aviation Publications	25
Planning an Aviation Event?	25
Accident Briefs	26
GA Defects	26
Aviation Safety Officer Course	28

Cover: Two De Havilland DH-15 Vampires performing at Warbirds Over Wanaka. The Vampire served in 21 countries, including New Zealand. See our Warbirds article on page 4.

Photo courtesy of Warbirds Over Wanaka/Steve Zimmerman.

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A New Era in Aviation Events

The Shoreham tragedy was a global game changer. Each country had to look again at how it regulated aviation events, and the way New Zealand has responded is being lauded by many overseas organisations.

Eleven people were killed and 16 injured, when a warbird crashed at the Shoreham Airshow in England, in August 2015.

After investigating, the Civil Aviation Authority (UK) made 32 recommendations, and globally, regulators scrambled to toughen their rules.

But, as a result, many airshows have permanently wound up, organisers saying the harsher regime is just too difficult to comply with.

“But in New Zealand,” says Jeanette Lusty, CAA’s team leader of sport and recreational aviation, and herself, an aerobatic pilot, “the response has been different.

“We believed there was a better way to ensure safety at airshows than just introducing more rules.”

Jeanette says the New Zealand Airshow Association (NZASA), of which she is a board member on behalf of the CAA, felt that the role of display director was key to safety. It developed a manual defining the responsibilities associated with that role.

“We believe we’ve found the right balance. Certainly that’s what other European Airshow Council members are telling us. Even the Royal Netherlands Air Force wants to buy the manual and adapt it for its own use.”

Starting from the 2018–19 airshow season in New Zealand, any NZASA member wanting to organise an aviation event must use a display director approved by NZASA.

The CAA and NZASA will be hosting a conference on 24 May 2018 to review the organisation and conduct of airshows in New Zealand, post-Shoreham.

“The conference will cover the regulatory regime,” says NZASA board member, John Lanham, “and all aspects of display control and discipline.

“It will also look at the development and mentoring of a new generation of display pilots.

“The conference will be open to all those who are thinking about holding an aviation event.”

To attend, email jeanette.lusty@caa.govt.nz. ■

Warbirds Over Wanaka

Large numbers of aircraft are heading to Wanaka for the biennial airshow this Easter. Make sure you get there safely by planning ahead.

Preflight

The saying goes that good luck is a residue of preparation. This is very true in aviation, and particularly so if you're joining the masses flying to Wanaka this Easter.

If you're taking passengers, consider giving them a briefing on things like baggage weight limits; what to bring to cater for a survival situation; and most importantly, the vagaries of VFR flight in New Zealand weather.

A four-day trip can easily turn into a week, so flexibility with the proposed return date, or alternate travel plans, should be discussed. Remember that Easter is also a busy time for public transport.

Fatigue is also an important consideration, given the planning, travel, and the event itself. Tiredness can easily lead to a reduced concentration span and poor judgement, so ensure you're well rested before flying.

AIP Supplement 38/18 for Warbirds Over Wanaka – available in early March – must be read and understood if you plan to land at Wanaka. It covers temporary airspace changes, arrival and departure procedures and time slots, fuel availability, emergency procedures, and flight planning and briefing services.

On the day, fully brief yourself on weather conditions and check for NOTAMs – any changes to airshow times will be notified by NOTAM.

Which Way?

Coming from the North Island, there's the Cook Strait crossing to think about, with its height and airspace considerations, and the possibility of having to wait due to weather.

Aircraft have become stranded in the North Island, unable to continue in time for the show. The same applies on the way home.

Wanaka can be a challenging destination to reach from any direction. You can't get there without flying over or through the mountains, and changeable alpine weather can throw low cloud, poor visibility, rain, updraughts, downdraughts, and turbulence at you.

CAA Aviation Safety Adviser, Carlton Campbell, knows the importance of situational awareness in the mountains.

"People must maintain a top-class lookout, regardless of their radio contact. It's a fundamental principle of airmanship. While they might hear, they also have to see.

"With the sheer size of terrain in the Southern Alps, lookouts need to be diligent. The clarity of the air and the size of terrain can result in other aircraft looking smaller than you'd expect."

Wanaka aerodrome is protected by a natural basin, meaning the weather en route may differ. The winds in the region can be severe and, because of the mountains, fickle.

Don't get caught out – study the area forecasts carefully.

"Don't be afraid to call a local operator if you're unsure of general weather conditions," says Carlton.



Eastern Routes

The coastal route to Christchurch is straightforward from the north, but south of Christchurch there are several alternates if weather is a factor.

The Mackenzie Basin, Omarama, and the Lindis Pass form what is probably the most-used route, leading conveniently to the Tarras VRP. This is a key point in the Wanaka arrival procedures.

A low cloudbase on the east coast might require using the Waitaki valley to get to the Lindis area, or even diverting to the south of Dunedin to access the Clutha Valley. Any major diversions of this nature will need careful revision of your fuel plan.

Western Routes

From the Blenheim area, the Wairau, Buller, and Inangahua/Grey valleys offer an easy crossing to the west coast, but rework your fuel calculations if you choose this option.

You might prefer the west coast route anyway, from a purely scenic and experience perspective. It has a lot to offer in that regard, but diversion choices, fuel, and radio coverage are very limited south of Hokitika.

The Haast Pass is a convenient entry to the Wanaka area, but before getting too far up the Haast River, you will need to be sure that the cloud base will let you cross the 1845 ft pass and transit the narrow valleys at a safe height.

Just a tip – look carefully for the junction of the Haast and Landsborough Rivers, as here the Haast enters via a sharp turn from the south. It's easy to find yourself a few miles up the Landsborough before realising that you've missed the turn.

Arrival

You cannot fly into the Wanaka aerodrome during official practice times, or when the airshow is in progress. Arrivals and departures are only permitted during the times shown in the AIP Supplement.

The helipad drop-off area is now located in the aircraft/helicopter private park. Helicopter operators should check the AIP Supplement for new arrival and departure procedures.

Take time to consider the alternate options of Queenstown, Cromwell Racecourse, Alexandra, Omarama, Makarora, and Haast. Check the AIP for the types of fuel available at each, and ensure you have the correct fuel card. No fuel is available at Makarora or Cromwell Racecourse.

Frequencies

Note that this year, there is no ATC service. An Aerodrome Flight Information Service will be provided on 120.1 MHz within the temporary restricted area.

Also make sure you listen to the ATIS on 127.6 MHz before entering the restricted area. If you find yourself out of ATIS range, the responses from preceding traffic may be helpful.

"People must also ensure their radio calls are accurate, and that they report relevant reporting points or clearly identified features on the map," says Carlton Campbell.

Remember the four Cs – make your calls Clear, Concise, Consistent, and Correct.

Be aware that all frequencies have coverage limitations due to terrain.

In Short

The key to a safe and fun trip is careful planning. Study all possible routes and read AIP Supplement 38/18 thoroughly. Brush up on your mountain flying skills, and make contingency plans so that you don't succumb to 'get-there-itis' – when getting to Wanaka, or flying home.

Make sure you are fully briefed on weather and NOTAMs, file a flight plan and remember to terminate it. Take decisive action en route, and enjoy flying in this spectacular environment.

More Information

The GAP booklets *Plane Talking* and *Mountain Flying* will give you some good advice. Email info@caa.govt.nz for free copies. Also, check out the e-learning course, www.caa.govt.nz/avkiwi, and the *Mountain Flying* DVD, www.caa.govt.nz/videos/mountain-flying-dvd. ■

Warbirds Checklist

This isn't a comprehensive checklist; just a few basics to get you started.

- » Understand AIP Supplement 38/18 effective 29 March 2018 – which you will find at www.aip.net.nz from early March
- » Alternates planned
- » Arrival procedures handy
- » Aircraft tie-downs and survival gear (check these are in your weight calculations)
- » Weather checked
- » Flight plan filed
(Note that Wanaka Flight Service will not be accepting VFR flight plans or SARTIME terminations. You can terminate either by phone after arrival, or while still airborne and within coverage of Christchurch Information)
- » Mountain flying skills up to scratch
- » 30 minutes extra holding fuel
- » Neck stretches (You want to be ready for all that scanning!)
- » On the day of your flight, obtain weather information and NOTAMs from Airways IFIS, www.ifis.airways.co.nz
- » For information on the airshow, see the Warbirds Over Wanaka web site, www.warbirdsoverwanaka.com

Avoid a **Bad Avoid**

When you're in your aircraft, keeping a 'good lookout' should be just as automatic as 'look both ways before you cross the road'.

CAA Aviation Safety Adviser, Carlton Campbell, says right-of-way rules are well understood, but pilots don't always respond to situations instinctively.

Right-of-way rules are outlined in Part 91, under rule 91.229. At their most basic, the rules state that aircraft approaching head-on both turn right.

But Carlton says you can't apply the right-of-way rules if you don't see someone in the first place.

He says some pilots have become over-reliant on the radio.

"People have got themselves locked into feeling that if they make a radio call, then they've done their bit. But no, they haven't. A good lookout is the fundamental thing.

"I was at a safety meeting recently, and pilots were constantly talking about the importance of radio calls and I had to remind them that the radio call is the secondary thing. The primary tool is the lookout. They've got to see somebody to avoid them, not just hear them to avoid them."

Nathan Clarke, the CFI of the Canterbury Aero Club and Safety Coordinator for the Rangiora airfield, agrees.

"People get reliant on the radio. Lookout is the primary source of traffic separation."

In fact, sometimes a radio call might set you off looking in the wrong place because not all calls are accurate.

Carlton says pilots also have more distractions now.

"In all the flight tests that I observe, the common factor is that people's lookout is not as good as it should be."

He says because joining procedures at aerodromes are now documented in the AIP, pilots tend to look down at it when they get in controlled airspace to reassure themselves that they've got the correct information.

He says more sophisticated technology has also had unintended consequences.

"There's a lot more information to interpret as a result of glass cockpits which can lead to people becoming distracted."

He says it's the responsibility of pilots to exercise self-discipline to minimise the time spent viewing things in the cockpit.

Engraining in Training

Nathan Clarke says if you have an aircraft coming head on, it should be instinctive to turn right rather than having to think about it.

He says a big thing when teaching new pilots, is that they are aware of where the traffic's coming from.

"For instance, when transiting through busy airspace, position the aircraft on the right hand side of where you think the traffic that's coming head on will be."

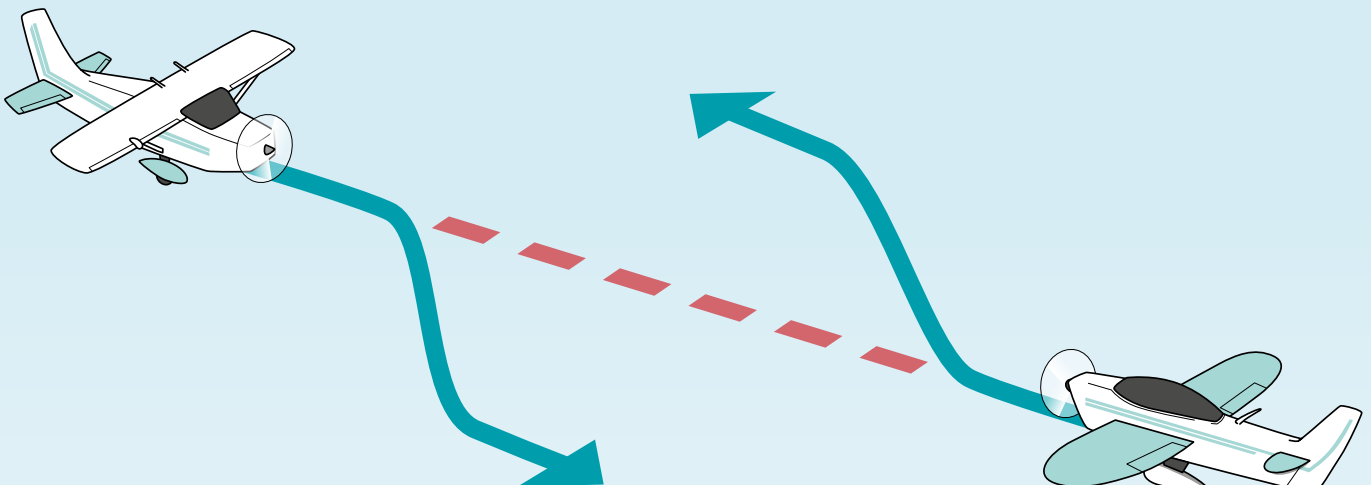
Nathan says cruising levels are also important.

"Many pilots insist on transiting below 3000 feet, especially helicopters, when being above would give them more protection."

He says pilots who don't get to put the rules into practice can be at a disadvantage.

"We're quite busy down here in Canterbury, so pilots have to apply it a lot as they transit around the place. Probably the ones most vulnerable are those who don't have a lot of traffic, as they don't get much exposure to it."

He says scenario-based training is good for teaching right of way and is often used to confirm a pilot would react in the right manner in the case of a head-on. ■



Illusions In Flight

Good flight isn't possible without good information. So what if your own body is feeding you misinformation?

If the sensation of flight is natural to humans only when we fall, the sensation of powered aerial manoeuvres must be completely alien.

So it is, that the human body can become disoriented easily in flight, giving incorrect feedback that can be recognised only with prior knowledge.

"These illusions occur because our balance mechanisms were not designed for flight," says CAA Principal Medical Officer Dougal Watson. "An understanding of these illusions and how to stop them causing problems is important for all pilots."

Spatial disorientation is a major cause of human-related aircraft accidents, and can lead to loss of control or controlled flight into terrain.

Let's look at some of the illusions a pilot may experience.

Somatogyral Illusions

Sensory cells inside your ear, within the *crista ampullaris*, detect angular movement such as banking, spinning, or spiralling.

One of the most common in-flight illusions is known as **The Leans**.

Around 30 seconds into a steady bank, the vestibular system within the ear 'catches up', leading to a sensation of level flight.

A bank can even be gentle enough to not be detected by the inner ear at all, for example when an aircraft is not trimmed correctly. An abrupt correction to level can then trick the mind into thinking the aircraft is now banking in the opposite direction.

"I well remember my first 'leans'," says Dougal. "Despite a thorough understanding of the physiology, I was totally unprepared for that powerful false feeling of roll, when I knew that my wings were level."

Such spatial disorientation was implicated in the 1978 crash of Air India Flight 855, a Boeing 747 that came down in the Arabian Sea just 101 seconds after leaving the runway.

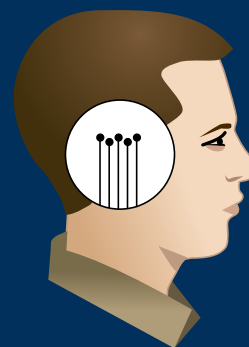
Following an apparent miscommunication about instrument readings, and without visual reference, the pilot erroneously rolled the aircraft to the left and never regained level flight. There were no survivors.

To reduce the likelihood of such illusions, if you can't avoid IMC, always maintain an instrument scan and try to avoid very slow turns, particularly when you have no visual references.

Similar to The Leans, the **Graveyard Spiral** occurs when a pilot in IMC wrongly perceives the state of a banking aircraft. Believing it is level, the pilot tries to correct the accompanying descent by pulling back on the stick. This only tightens the spiral, and increases the descent rate.

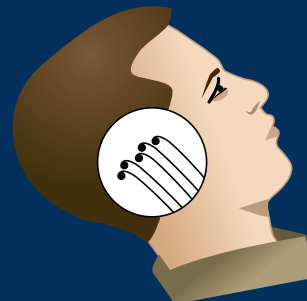
Somatogravic Illusion

Head stationary and upright



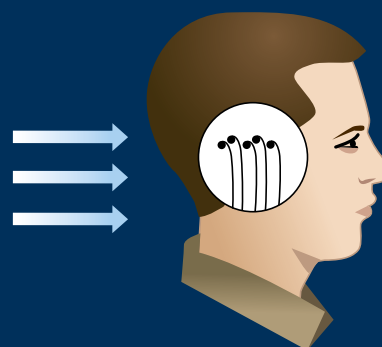
The impression is "I'm stationary and upright"

Head tilted up



The impression is "I'm pitching up"

Forward acceleration



The false impression is "I'm pitching up"

Continued over >>

The **Graveyard Spin** occurs when coming out of a spin. The sensation can trick a pilot into thinking they're now spinning the opposite way, causing them to correct and re-enter the original spin.

The **Coriolis Illusion** occurs when a pilot moves their head too quickly during a constant turn that is no longer stimulating their inner ear. The sudden head movement can lead a pilot to believe the aircraft is yawing, pitching, or rolling.

Somatogravic Illusions

Linear accelerations stimulate the otolith organs in your ear.

When accelerating quickly, these organs can give the impression that the plane is pitching up, causing a pilot to instinctively lower the nose. The opposite can occur under rapid deceleration.

Five lives were lost in Queensland in 1990, after the pilot of Beech King Air VH-LFH is believed to have pitched his aircraft into a shallow descent after takeoff.

Without an instrument scan, and with no visual reference through the dark night, the pilot had no way of knowing the aircraft was on a collision course with the ground just 600 metres past the end of the Wondai runway.

This sensation is most commonly known as a **False Climb** or **Head-up Illusion**. The opposite of this, occurring under sudden linear *deceleration* is known as **Head-down Illusion**, which can end in a pilot pitching up to the point of stalling.

Inversion Illusion occurs when pitching down too quickly from climb to level, causing a sensation of tumbling backwards.

The natural response to this sensation is to push the nose further down, which can start the cycle over again.

Steady control inputs are the key, and if you don't have visual reference, an instrument scan can quickly tell you what the aircraft is doing.

During a takeoff at night, switch to instruments as you rotate and stay on the dials, maintaining V_x until you've reached a safe altitude. No attempt should be made to look back at the runway lights or any other ground lighting.

Optical Illusions

What a pilot sees outside the cockpit informs a lot of what they do inside the cockpit. Unfortunately, that view can also be deceptive.

Linear Perspective Illusions can occur over sloping terrain, or where a runway is wider or narrower than a pilot is used to.

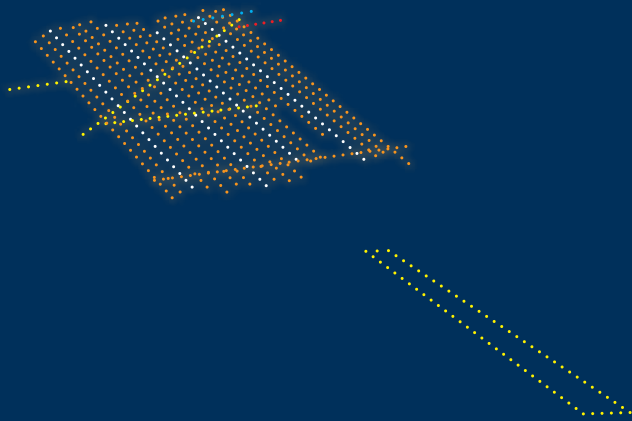
From a greater height, a wide runway may appear to be the same width as a narrow runway. For that reason, a pilot used to narrower runways could believe that their height on approach is lower than it really is.

A final approach over down-sloping terrain can give the same illusion. This could result in a pilot pitching the nose up and bringing the aircraft towards a stall condition.

Up-sloping terrain on approach, or a particularly long or narrow runway, can elicit the opposite effect, with a pilot inclined to believe they are too high on approach. This can quickly translate into an aircraft flying too low on its approach path.

Dougal recounts his experience of this.

"I remember flying into Melbourne's Tullamarine Airport for the first time, and flaring at about 100 feet. All of my previous flying had been on thin grass strips and I was unprepared for this illusion caused by the runway width."



This illustrates a classic black hole, where there are no visual references before the aerodrome, but town lights beyond it.



A pilot may read a **False Horizon** when in mountainous or unfamiliar territory. What appears to be the horizon may simply be an unrelated geographic feature.

This can be an even greater issue at night, when a row of lights may give the false impression of having a relationship to the real horizon. Ground lights can even be confused for stars.

Autokinetic Illusion occurs when a pilot fixates on a single point of light against a dark background. This could be a star, a planet, or a light on the ground.

“Almost every pilot will have experienced some of these illusions during their flying career. Those that make the effort to learn about them will be better prepared for their next flight.”

Without other visual references, subtle movements of the eye can give the illusion that the point of light itself is moving.

To prevent this happening, avoid focusing on a single light, and look to one side and use your peripheral vision.

The **Black Hole Approach** happens when a pilot approaches a lighted runway over unlit terrain – a ‘black hole’. This can cause disorientation and in the worst case could see a pilot land short of the runway.

Even in daylight, featureless terrain can give a pilot the illusion of a lack of movement, or a false sense of their height above ground.

In May 2012, a Hughes 500 with no apparent mechanical defects crashed into Lake Sumner on a calm and clear day. The sole occupant didn’t survive the impact.

The probable cause of the accident was spatial disorientation resulting in controlled flight into terrain.

Repeating Pattern Illusion is particularly troublesome for helicopter pilots operating at low level over calm water. Any repeating pattern, such as the ripples on a lake, can be visually misaligned by the left and right eyes, resulting in incorrect altitude perception.

Similarly, glassy water landings are notoriously difficult in

floatplanes, a procedure often likened to landing on a mirror.

Other Illusions

While less common than vestibular and optical illusions, a pilot may also experience ‘dissociative’ illusions.

These illusions are generally associated with high altitude flight, where the pilot has a relatively low level workload, ie, during an autopilot-controlled transit.

The **Break-off Phenomenon** can result in a pilot feeling that they are sitting on the wing of the aircraft, watching themselves flying.

When experiencing the **Knife Edge Illusion**, a pilot can feel their aircraft is extremely sensitive to control inputs. The opposite of this is the **Giant Hand Illusion**, in which a pilot can feel as though the aircraft is unresponsive to inputs, as if held aloft by a giant hand.

Avoidance and Recovery

Spatial disorientation and visual illusions are most commonly experienced when flying with reduced visibility.

Whether this is at night, with the added distraction of bright ground lights and the stars above, or during the day in fog, it is crucial to maintain a regular instrument scan.

Doing so is important during any flight, but even more so when visual references are lacking. Instrument readings may be the only way to get an accurate and immediate picture of the location and attitude of the aeroplane.

Where night flight is necessary, cockpit lights and torches should be kept dim, and a scanning motion should be used when looking outside the aircraft to avoid fixating on lights.

Instrument approaches under such conditions are preferable to visual approaches, and the use of visual approach slope indicators and approach lights can help.

Dougal Watson repeats the importance of knowledge and preparedness.

“Almost every pilot will have experienced some of these illusions during their flying career. Those that make the effort to learn about them will be better prepared for their next flight.”

Further Reading

Email info@caa.govt.nz to get a free copy of the GAP booklet *Night VFR*. ■

Dipstick Woes

How an interrupted and rushed preflight had this pilot virtually flying blind, and returning to the runway, just minutes into the flight.

It was a great day for a jaunt to New Plymouth in the Cessna.

I had lunch in the town and was a little late getting back to the airfield for a scheduled 3 pm departure.

But after a quick preflight check and topping up the oil, I was in the cockpit in good time.

The Tower gave me a more complex clearance than I'd expected, with extra waypoints added in. That took a few minutes to enter in the GPS, but still I looked good for the 3 pm departure as long as I didn't mess around.

Looking up from the dash, I noticed the oil hatch on the cowling was open. "Bugger! How did I forget that?"

I hopped out and closed it quickly, then got back in and started up. The engine run-up and cockpit checks were all good, and by 3:01 pm, I was lined up and rolling down the runway. Great.

The instruments were looking good and the plane was accelerating nicely. I patted myself on the back for a well-compensated crosswind takeoff.

At 300 ft, I eased back on the power and set pitch and trim for the climb... and noticed an oily haze on the lower part of the windshield.

By 500 ft there was quite an oil slick, with a definite decrease in forward visibility.

This was a decision point. The engine instruments and performance remained good, but I didn't know why oil was spraying out of the engine, nor how long that could go on before the engine would stop.

I turned crosswind and called the Tower, requesting a circuit to land. I then turned downwind early and low (I didn't want to get any further away from that runway than I had to) and continued my climb on the downwind.

On most small aircraft engines, the oil dipstick and filler cap are a combined unit. It was about this time that it dawned on me that when I closed the hatch I hadn't checked that the dipstick/filler cap was firmly in place.

In fact, I hadn't checked it at all.

I had left it resting on the fueling step on the side of the cowling while I refilled the oil and hadn't put it back.

Stupid! But right now I had a plane to fly. There would be plenty of time to dwell on mistakes later...

Engine checks remained fine, downwind checks done. Now I had to think about landing. I kept the plane high until sure of



landing without power if necessary, then set full flap producing a slower steeper descent.

Even with this approach, my forward visibility wasn't great. The runway was a grey blur between green blurs, but I had some forward view, at least of the edge of the runway through the side of my now well-oiled windshield.

As I pulled into the final flare stage of the landing, I reflected that this was a bit like a night landing. I knew the runway was ahead, but I was judging height and round out by the relative aspect of the runway edge markers. My compensation for the crosswind was automatic.

The landing was probably best described as abrupt. I taxied back to the fuel stands wondering what my chances were of finding a replacement dipstick.

According to my GPS watch, the whole flight took 4 min 12 sec.

Amazingly, when I got out of the plane the dipstick/filler cap was still sitting on the fueling step where I had left it!

I replaced the dipstick carefully and cleaned the plane up. Very little oil had been lost according to the dipstick, but it had still made a decent mess of the cowling and windshield.

About 20 minutes later I was back in the air on a flight home which was boringly pleasant and uneventful.

So what did I learn?

Decisions: In this case the decision to turn back rather than push on into uncertainty was a fairly easy one to make.

Checklists: We have them and we use them with the specific objective that we don't forget stuff. But you can't regulate for

every possibility. I don't think that my preflight checklist includes "check that you've put the oil cap back on", and if it did, it would probably mean that the list was such an unwieldy volume that I would skip steps, or spend more time working through the checklist than on conducting the actual flight.

Probably more important is adhering to your routine check without interruption. For me, taking off at a controlled airport and having to get clearance prior to engine start put my routine out of whack.

On this occasion, the change in the flight plan route, and my desire to get away on time, were no doubt factors as well. I'm not making excuses – my point is that these are the times when it is particularly important to go back to the routine of the checklist and make sure that nothing has been missed.

Training: This whole flight was conducted in clear daylight, but I have no doubt that having been trained in both night and instrument flying made it easier. I didn't think about positioning the plane high and close to the runway, it was just a natural reflex after multiple engine failure practices, and while I was busy thinking about landing with decreased visibility, I compensated for the crosswind automatically.

Communication: I must thank ATC at New Plymouth. The controller was immediately on to it and was proactive in offering help. During the flight, there was nothing he could do other than clear me to get back on the ground as soon as possible, but it was immensely reassuring to have a friendly and helpful voice on the other end of the radio. ■

Initially, the pilot thought he hadn't pushed the dipstick in far enough after his preflight inspection. But he realised later, he'd not replaced it at all.



SMS... Taking the Plunge!

While the aviation sector is relatively new to Safety Management Systems, a range of industries have been using them for some time now. What can we learn from those industries, and just how important has leadership been?

If the aviation business is all about keeping people comfortable and secure at height, the opposite could be said of bungee jumping.

Despite the inherent risks of throwing people off high things, AJ Hackett Bungee is renowned for the safety record they've built over 30 years.

So good is their record, the Code of Practice they created has become an industry standard in New Zealand and Australia, and is used as a guideline throughout the world.

AJ Hackett Bungee Health and Safety Officer, Malika Rose, knows the value of embedding a safety culture throughout an organisation. So much so, her email signature reads 'Safety... Did it, done it, doing it tomorrow!'

"Safety does have to come from the top down, but it also comes from every angle," says Malika.

"Our Board embraces it and wants everybody to be proactive. We've also got a strong health and safety committee, which is empowered to do good things."

Not only is the health and safety committee empowered, but it is also given the resources and funds to make good ideas happen.

"A couple of our supervisors went out and researched mental health, and ended up running a presentation through the whole business. Their training was adopted across the company, and everybody was able to see the positive results," says Malika.

New staff inductions include a strong health and safety component from day one, which is then repeated 30 days into the role. After 60 days new staff have to give the induction back to the person who inducted them.

AJ Hackett also encourages a strong reporting culture, making it easy for crew to report occurrences through an online interface.

"We talk to the crew and reinforce that reporting is key, rewarding good culture."

"We really push the reporting of near misses, and we investigate them and smaller occurrences. We look for patterns, and regularly give feedback to the crew."

Just Culture is a key tenet of any good Safety Management System, and AJ Hackett are believers. While swift and decisive action is important, so too is fair and just treatment.

"Somebody having a near miss will be drug and alcohol tested, stood down, and retrained if necessary. There's no stigma around that, as long as people have followed process," says Malika.

"If people aren't sticking to procedure, we also question whether the procedure is still correct."

And that's another key to implementing a good SMS. Constantly seeking to improve, and measure success. It's hard to measure accidents that aren't happening, but there are other things you can look at.

"We try and measure our adherence to procedures, and audit how our people are working. We observe them doing their job, and talk to them."

"Last year we went through a gap analysis, from the café to bungee making. We asked, 'what do we do that could hurt people?'"

Watching Generational Change

The local maritime industry, too, has been using Safety Management Systems for more than two decades. Maritime New Zealand's National Compliance Manager, Bruce McLaren, says he's seen real generational change.

"It's really interesting to see a second and third generation in the fishing sector taking SMS on board, without question, while their fathers may have resisted it. There is far less tolerance for risk today, and they're far more open to doing something about it."

"Rather than say, with arms crossed, 'I'm safe all the time', which is what their fathers may have said, the new generation is saying 'I'm as safe as I can be in this high-risk environment, here is the evidence to prove it, and we're constantly looking at ways to improve on this.'"

In 2014, Safe Ship Management (SSM) was replaced by the Maritime Operator Safety Systems (MOSS) – each a mandatory form of Safety Management System. More than 1500 commercial operators are currently in MOSS, and must satisfy Maritime New Zealand that they're meeting its requirements.

"People are often enthusiastic to begin with, and things are put in place, including policies, procedures, training, and supervision. But, a lot of systems fall over at that point. That's as far as they go," says Bruce.

"To close that loop, you must have monitoring, implement an audit process, or ensure there are checks to make sure the people who are meant to be doing things are actually doing them. The lessons learned from those internal checks must be assessed and applied within the SMS."

Bruce stresses the need for strong leadership.

"Chief executives and boards not only have to buy into the SMS, they have to lead it, communicating to the rest of the organisation, 'Hey, we are serious about our Safety Management System and we expect you to be too.'

"The introduction of 'Officer' duties in the new Health and Safety at Work Act 2015 has really helped reinforce this key principle."

The Importance of Leadership

Francois Barton, executive director of the Business Leaders' Health and Safety Forum, says the advantages of embracing SMS are far-reaching.

"Many CEOs take safety walks around their company to signal to their people that safety is a priority – which is great. But increasingly, many business leaders are doing it to actually

learn, not just as a signalling exercise – doing it as a genuine commitment to learn something.

"Take a deep breath and listen to your people. You will learn a lot about your business – what's helping and what's hindering performance... not *just* health and safety."

Compliance is only one reason why health and safety is important.

"Compliance is a reality, but if it's your only goal, you could easily waste time and money – chasing compliance by looking at compliance *only* can be a mirage," he says.

"The legislation is quite deliberately not prescriptive. People think there are a bunch of boxes to check and a bunch of accreditation labels to possess, and therefore that equals safety. A phone book of paper is not going to keep people safe," says Francois.

"It's critical there's buy-in from the top. Leadership drives culture and culture drives performance. What interests the boss fascinates the team.

"But make sure leadership focus is on people and managing the risks to keep them safe - don't just tick a box." ■



Photo courtesy of AJ Hackert Bungy.

Strip Flying – First, Get Some Proper Training

Following our 2017 article on strip flying, the message from two long-time airstrip pilots is “get some quality training”.

“I can’t emphasise enough the importance of getting training before flying into airstrips”.

That was Carlton Campbell, CAA Aviation Safety Adviser, in the article “Strip Flying”, published in the March/April 2017 issue of *Vector*.

Here, Ross Crawford – with both agricultural experience and 50 years instructing under his belt – and Andrew Hogarth – E-cat instructor, agricultural Flight Examiner, and 150,000 takeoffs and landings at airstrips – urge pilots to follow that

advice and get some *specialist* training before embarking on their first flight to an airstrip.

“Some pilots,” says Ross, “think that the flying they’ve done around forgiving airfield runways qualifies them to also fly in and out of small, rural airstrips.

“Some pilots think they can teach themselves airstrip skills. You sometimes see them dragging in low and slow to an airstrip and high on power. It’s not a technique I’d recommend – there are no margins for safety. Consequently, many self-taught pilots feature in occurrence statistics.”

Ross says most such pilots are poor judges of their own ability to negotiate all the possible complications of airstrip flying.

“They don’t know what they don’t know. They need to train with someone with good strip experience, or an E-cat because of their considerable training background in this environment.”



Andrew Hogarth agrees, saying Raglan airstrip is a classic example of a seemingly straightforward destination that catches out unwitting pilots.¹

“The pilot has a plane at home, and only heads out in the summer. They haven’t got upskilled and they’re not current. But it’s a lovely day and the family wants to fly to Raglan.

“Today, they’re in luck and land okay, it’s all calm, and everyone heads into town for a coffee. But by the time they want to go home, the day has warmed up, and the sea breeze is starting to push in. Before they open the throttle to take off, their threat and error management is non-existent. They take off in warmer conditions and possibly with a tailwind – both of which could mean poor climb performance and fewer safe options in an emergency. All this with a planeload of passengers.”

Andrew says even before airstrip training begins, a pilot must show themselves capable of accuracy and precision.

“A pilot must be able to repeatedly and successfully fly a stable approach – stable speed and profile, and aircraft configured to land – and a three degree approach angle to a nominated touchdown point on the runway at their home aerodrome.

“They need to have selected a decision point on the approach, be able to identify a non-stable approach, and carry out a go-around before that decision point, if needed.”

Ross Crawford agrees, saying that a pilot needs to start on a runway that gives some latitude.

“Working up to the more demanding airstrips, with variations in slope, and limited go-around is the way to develop accuracy and skill.”

Learning to Know

So what would a pilot learn from proper airstrip training that they don’t know that they don’t know about?

¹ Approximately one reported occurrence every six weeks at Raglan since 1 January 2015.

Here are a few things.

Approach

Andrew says that not all strips require a steep approach.

“Steep approaches just above the stall may win you bush flying competitions, and do have their place in certain airstrip operations, but executing a stable three degree approach to a nominated touch point is sufficient.

“An agricultural pilot – who can do up to 100 landings in a day – is always flying a stable three degree approach. The only thing that is different is they intercept the glideslope closer to the touchdown point. If you’re having to get ‘creative’ with your approach, consider not landing at all.”

Ross agrees, saying that if extreme measures are needed to get into a strip – such as an ultra slow approach speed aiming to touch down at the very threshold – the pilot should not even be flirting with the idea of landing.

Landing Decision Point (DP)

Ross says that at DP, you must be on profile, on speed, and confident of touchdown at your aiming point.

“The simplest way to establish a DP is the point at which the aircraft descends below the highest obstacle in the missed approach.

“With many country airstrips, there’s higher terrain beyond the strip, and on a missed approach, the climb path is taking the aircraft towards that. So there are places that people talk about as ‘no go-around’ strips – what they’re saying is that when the pilot descends below that terrain they’re committed.

“If the aircraft has passed the nominated decision point,” says Andrew, “but isn’t configured correctly, the pilot must remain committed to the landing.

Continued over >>

A grass runway can be deceptive. If the grass is wet, a pilot can lose control of the landing on the slick surface.

If the grass is long, the takeoff roll is longer because of drag on the wheels. In addition, long grass can hide rabbit holes and ruts. Always fly over first to assess the condition of the runway surface.

"They must make the best of a bad situation. At that stage the aircraft becomes a tool that should be used to kill inertia to ensure the pilot and passengers survive and, if possible, are unharmed."

Aiming Point

Ross says this is a critical part of strip training.

"On some strips the aiming point may not be at, or close to the threshold. It's dependent on strip length, wind conditions, slope and variations in slope. The surface conditions may be factors as well – dew, frost, grass length, for instance. Where there's a relatively steep slope, flare technique and eye-focus also need consideration."

Go-around

Andrew says the correct technique is not power up, pitch up.

"It's power up, use all available room to gather airspeed to best AOC (angle of climb) speed, reduce drag in conjunction with the first two, then climb or turn away.

Ross: "History does not record the names of pilots who go around."

Landing

"The fact is," says Ross, "that if the aircraft is suitable, and the strip is adequate, the landing should be a normal one – as long as you apply precision and accuracy, and that includes landing on and maintaining the centre of the strip.

"A well-planned and executed strip landing means braking isn't needed on the landing roll, until parking at the top of the strip.

Wind

Ross says a pilot must always know where the wind is, and learn to anticipate its effects. "Appropriate training will mean a pilot can make correct speed adjustments for different conditions."

Takeoff Decision Point

Andrew says the takeoff DP depends on the performance of the aircraft (weight and balance, P-chart), the airstrip conditions (size, slope, surface), the given conditions on the day (wind, temp, pressure alt), and pilot experience and currency.

"But one rule of thumb is 50 per cent of the airstrip at 50 kts, and a conscious decision to abort the takeoff if not at 50/50.

"Persisting with the takeoff roll past this point will be detrimental to all on board."

Short Takeoff Technique

Ross says PPL and CPL holders are taught that for a short takeoff they should apply full power with the brakes on, check RPM, oil pressure and temperature, and fuel pressure or flow, then release the brakes.

"But on an airstrip, particularly in a tricycle undercarriage aircraft, that creates an eddy under the propeller, sucking up small stones and other debris with the risk of prop damage.

"So a rolling takeoff is preferable and I always say, 'if that adds two or three metres to your takeoff roll and that's critical, you shouldn't have been there in the first place'."

So Now You're Convinced...

Ask around locally for someone who has cred in strip training.

"Generally the seasoned instructors at flight training organisations are a good start point," says Carlton Campbell.

"Getting referred by someone is generally the best indicator, because not all instructors have appropriate experience.

"Asking around really is the best advice."

Email info@caa.govt.nz for a free copy of the GAP booklets, *Takeoff and Landing Performance* and *Weight and Balance*. ■



The Right Fuel

You missed breakfast to catch the best of the weather and you've been flying all day. You are hungry, tired and – fortunately – you've just caught yourself about to make a very silly mistake.

Pilot error is regularly put down to fatigue. It's often assumed that fatigue is caused by a lack of sleep.

The tiredness, however, may not be the result of a late night, but from what you've eaten, or not eaten, before flying.

The breakfast that was missed, the fluids not consumed, and the lunch you are now late for, may have more to do with that potential silly mistake than you realise.

Pilots know their aircraft needs fuel and the right sort, but often act as if the same doesn't apply to them.

Eating healthy food lifts energy and reduces the risk of fatigue. According to the Ministry of Health, that includes vegetables, fruit, whole grain foods, low fat milk products, nuts, seeds, and protein sources such as fish, chicken and eggs.

The right foods, in the right quantities at the right times, allow pilots to remain active and alert.

"Flying schools regularly see young pilots preparing for a two to three hour afternoon flight," says CAA's Principal Aviation Examiner, David Harrison, "with a lunch that consists only of the latest caffeine drink to keep them going."

In the last two or three years, three student pilots have passed out at the controls. The students were stood down from training for several months, while their incidents were fully examined. In each case, it was found that their lapses of consciousness were due to lack of food and or water.

Those highly caffeinated and sugary drinks undoubtedly make the individual alert and active.

For a while.

When individuals consume high quantities of sugar, the pancreas releases insulin to lower blood sugar levels.

But the pancreas releases too much insulin for the relatively easy task of breaking down the simple sugars contained in modern drinks.

The body cannot distinguish between them, and complex carbohydrates that require large amounts of insulin to break them down.

It's that excess of insulin that causes the energy deficit, about 30 minutes after drinking an ironically-named 'energy' drink.

Those insulin-activated crashes cause tiredness, and tiredness can make an individual clumsy, easily confused, and more prone to making mistakes.

It's not just young and inexperienced pilots who use inappropriate fuel to keep them going. In today's time-poor world, even some commercial pilots will grab a quick coffee instead of eating a sandwich, before returning to the flight deck.

But a meal rich in complex carbohydrates – potatoes, brown rice, whole wheat bread, kumara, oatmeal-type cereals – will sustain a pilot a lot longer than a chocolate bar or a can of their favourite fizz.

And keep that pilot genuinely alert, and safe. ■



The Changing Role of the Senior Person

Some characteristics sought by the CAA in a Senior Person remain constant – experience, knowledge, and integrity among them. SMS means a Senior Person will also need to demonstrate a proactive and energetic approach to safety.

There's a new Senior Person role – that with special responsibility for Safety Management Systems.

The role will incorporate some of those associated with the era of internal quality assurance, such as overseeing an audit programme and management reviews. But the focus of the position will be overseeing the organisation's Safety Management System, including proactively identifying hazards and ensuring their associated risks are controlled.

"The sort of person we're looking for," says Mark Hughes, CAA's Deputy Director Air Transport and Airworthiness, "will have a sound understanding of safety management, including finding aviation safety hazards, mitigating risks, safety performance, and monitoring and measurement.

"It differs from quality assurance in that with QA, one person was the go-to for safety, and the various line managers would say, 'You assess my part of the organisation, you tell me what's wrong and how to fix it'."

But, Mark says, a fundamental of SMS is that everyone is responsible for applying it in their particular area.

"In a Part 119 air operation, for instance, you have a chief executive, then a Senior Person for flight and ground operations, a Senior Person for training and competency assessment, one for security, and one for investigating occurrences.

"All those Senior Persons have to have knowledge of SMS, and promote associated safety behaviours within their area. The Senior Person responsible for Safety Management Systems then makes sure the overall SMS 'machinery' is working."

Resourcing

In assessing the suitability of a candidate to be a Senior Person, of any hue, the CAA examines the time the individual will have available for the role.

"People often hold multiple roles within an organisation, or multiple roles within industry," says Mark. "With SMS now an integral part of the Senior Person role, the CAA needs to be convinced they will have enough time to be effective in all those roles.

"For instance, will they spend enough time on site? Will they dedicate enough time to the job? We need confidence that not only is the candidate capable, but they're actually going to be dedicating sufficient time to their responsibilities.

"The chief executive, of course, is responsible for providing sufficient people, resources and facilities so their employees can carry out their work effectively.

"But a candidate for Senior Person should also be assessing whether they have the time to do the job they've been employed or contracted to do.

"If the answer is 'no', they should be having a talk with their chief executive before their application gets to the CAA."

Mark says in a smaller organisation, a part time role may be appropriate, but in a larger one the Senior Person may need to be full time.

"Senior Persons don't have to be on site all the time. In the Skype and mobile phone era, a certain amount of time can be spent away from the base of operations. But if they're in a supervisory role, it's very hard to promote change, and to monitor the organisation completely, from afar.

"Vague commitments of, 'Oh well, I'll be monitoring my phone' do not demonstrate the hands-on supervision needed, nor give the CAA confidence that the Senior Person applicant can be effective in their important safety role."

Use or Lose It

Mark says the CAA is always interested in the ongoing ability of the Senior Person to do their job.

"For instance, what they are doing in terms of professional development. Are they keeping themselves updated? Are they attending user group meetings, are they up to play with rule changes, are they totally across exposition changes in their company? So all those things they need to do to keep themselves ahead of the game, that's part of the role too.

"They should never think, 'Hey, I've got through the gate, now my job is done'. Continuing to meet the fit and proper person requirements is an ongoing obligation. It's definitely not just 'once every five years, I tick a box'."

"Genuine Commitment"

The CAA also assesses the approach to safety of a candidate for Senior Person. This is especially important to achieve the benefits of SMS. Is there a genuine commitment to safety for its own sake, or is the bar they're shooting for, minimum compliance?

Mark Hughes says that's critical for him.

"An attitude is demonstrated in behaviour, so we're looking for behaviours that would illustrate they've got a positive, proactive and constructive approach to safety.

"We're also keen to assess their level of communication, with us, the regulator, and with their own people.

"Is it open and two-way? What is their attitude to employees reporting errors? To their employees offering quality improvement suggestions? To reporting occurrences to the CAA?"

"In an interview, I might ask something like, 'If you had a serious occurrence or deficiency at your organisation, who would you talk to about that?'"

"Given the critical nature of these supervisory roles in fostering a safety culture, it's important the candidate is prepared to go beyond simple compliance with the rules, and describe how they intend to raise the bar at their organisation."

The Basics

While knowledge of SMS, and a willingness to work with it, is new to the Senior Person interview, the longstanding fundamentals of a successful application remain the same.

"They have to do their research before applying," says Mark.

"They're accountable to the Director, so they need to know their way around the Act and the rules. They need to know their organisation well, its exposition, and its particular hazards and risks, and how they are to be managed.


"And of course the foundation of expertise, knowledge, experience and character remain the same if someone wants to be a Senior Person."

Read More

See the various sections on personnel requirements in Part 119 *Air Operator – Certification*. For further guidance, read AC 119-1 *Air Operator Certification*.

Go to www.caa.govt.nz, "Quick Links > Forms > Fit and Proper Person Process" for guidance on the role.

To read other Senior Persons articles published by *Vector* in Nov/Dec 2006; Jan/Feb 2012, and Mar/Apr 2012, go to www.caa.govt.nz, "Quick Links > Publications > Vector". ■



Andrew Crawford, Senior Person, Sounds Air

"Once I changed my mindset from a QA-based approach to one based on the principles of Safety Management Systems, it was relatively straightforward to pass on to staff.

"They learn more willingly and effectively from the people they know and trust. Yes, it takes time and perseverance, but it was crucial that adoption of SMS was done from the inside of our organisation.

"We are already seeing a quantum shift in thinking, and people taking genuine responsibility for SMS."

Image courtesy of Sounds Air.

Airworthiness and Maintenance Workshop 2018

Here's a new and improved course with benefits for anybody interested in aircraft maintenance, from aircraft owners to maintenance controllers.

Every year, the CAA runs a number of courses for people looking to learn more about maintenance control. These aren't just valuable for people wanting to become a maintenance controller though – and the new name reflects this.

"Attendees have included private owners, persons working in maintenance organisations, student pilots, engineers about to do their law exams, airline and defence personnel, and attendees from across the Pacific," says CAA Aviation Safety Adviser, John Keyzer.

Certificated air operators are required to designate a Senior Person to be responsible for the control and direction of their maintenance – a maintenance controller.

Their role ensures that both scheduled and unscheduled maintenance is carried out as necessary, and that the operator's aircraft are maintained to an airworthy condition.

Licensed Aircraft Maintenance Engineer, Sean Coleman, has been running his own business, Heli Assist, which focuses on aviation management, for over seven years now. Among the services he offers are maintenance control and Review of Airworthiness inspections.

"There is a definite benefit from attending the course for those who aren't maintenance controllers. Owners in general will buy a helicopter or aeroplane with little, if any, knowledge of the maintenance or inspection requirements, however the rule says they're responsible," says Sean.

"The course is open to a broad range of people. There is so much to know, from rules to ADs, service bulletins, inspections, coordinating with an engineer, and coordinating with flight operations. This will give them more insight and knowledge about what the role is."

The two-day workshop is designed to be both hands-on, and practical. The parts complement each other and will enable you to get the most out of the Airworthiness and Maintenance Workshop.

"It is very interactive, and participation is key to the success of the course," says John.

Aside from the subject matter, the chance to network with others in your industry is invaluable.

"I enjoy CAA courses, as they're a chance to meet a range of different people and take in different opinions. I find it really beneficial to see how different people do things," says Sean.

What's New for 2018?

In conjunction with Skills New Zealand, the course has been redesigned to be even more effective and dynamic.

It's now tailored to better cater to the different participant groups, rather than Part 135 operators alone. The exam portion has also been dropped, allowing for more time to focus on a variety of topics.

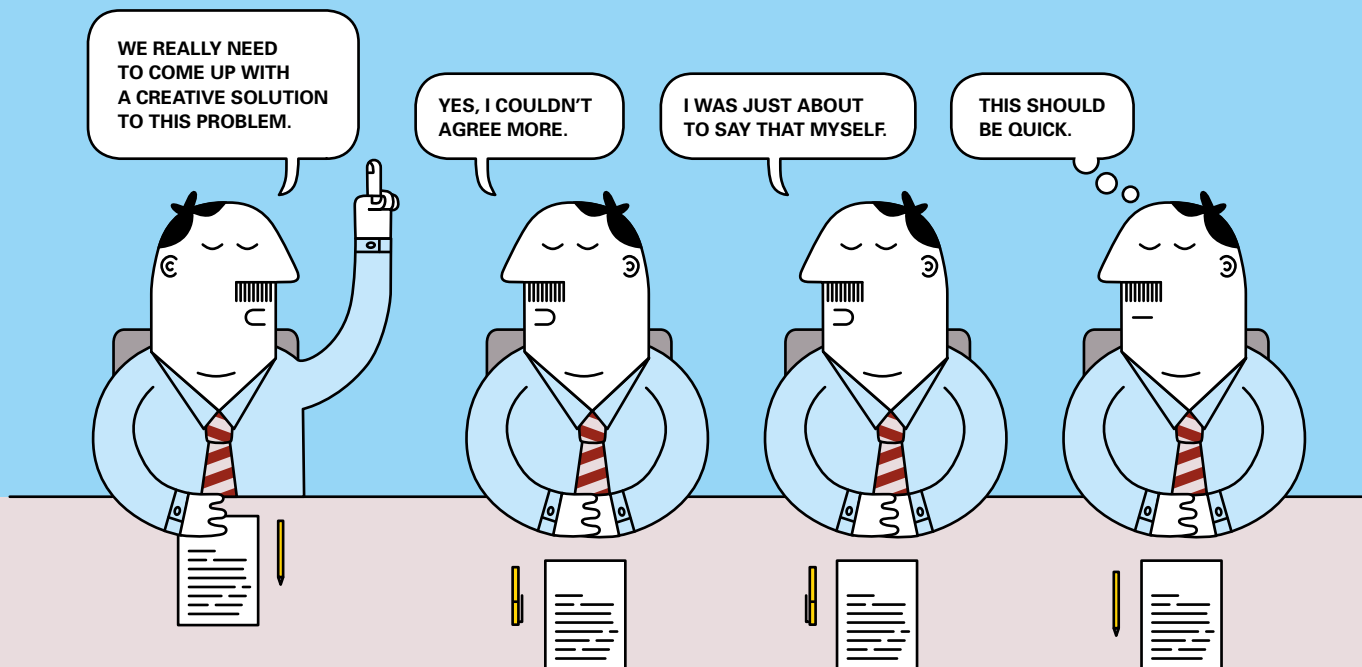
"We have now put all the content into a workbook for students, tidying up the resources and handouts used in the past," says John.

More Information

To register for an upcoming course, or find out more about them, see www.caa.govt.nz, "Quick Links > Seminars and Courses > Airworthiness and Maintenance Workshop." ■

Photo: iStock.com/ozefculak





Diverse Opinions at the Big Table

Can a group of people from different backgrounds come up with a better solution to a problem than the sole expert? Research indicates they can. That may have implications for decisions about aviation safety.

It would seem logical that an aviation operator needing a solution to a problem would gather together the chief executive officer, the chief pilot, and the chief engineer to thrash out an answer.

After all, they would have years of experience between them, have attained seniority based on merit, would possess advanced skills, intimate knowledge of the operation, and be cohesive in their attitudes.

But 'diversity' research is indicating that the answer that impressive trio comes up with may not be as effective as the one found by a group of outsiders, who are not cohesive at all in their attitudes to the problem.

There are some practical reasons why that might be the case.

An outsider will see the problem as a stranger, and that will sharpen their observations. Likewise, they'll avoid the confirmation bias¹ that may get in the way of the decision made by the insider group.

Secondly, their different backgrounds will provide novel perspectives on the issue.

And thirdly, an organisation insider who is nevertheless a decision-making outsider, may 'know stuff' the executives are strangers to.

In *Pushing Your Aviation Risk Management Comfort Zone* (2007) from the Dallas-based International Risk Management Institute, aviation commentator Adam Webster says:

"Solicit ideas from the janitor to the CEO, giving them equal weight.

"While this may sound preposterous to the CEO who rides comfortably in the corporate jet as (s)he reads the contents of the suggestion box, one carefully constructed argument by diversity author James Surowiecki, is that the pool of idea generators should *not* focus on recruiting the smartest and most experienced exclusively.

"Unabashed and maximum diversity of opinion is more valuable than the typical circles we've been acclimated to seek out first."

Further, diversity research is finding that groups made up of individuals with differing perspectives are almost eerily accurate in their estimation of a probability, or prediction, of something happening.

¹ The tendency to interpret new evidence as confirmation of one's existing beliefs or theories.

Continued over >>

This is thought to be the result of each member of the group having at least some information *of their own* to contribute; that they're not influenced by the opinions of the others in the group; and that they're able to specialise, and draw on local knowledge.

When those individual opinions are turned into a collective decision, their answer is likely to be accurate.

But why?

Put simply, if you ask a large enough group of diverse, independent people to make a prediction or estimate a probability, then average those estimates, the errors each of them makes (sometimes called 'idiosyncratic noise') in coming up with an answer will cancel each other out (or, eliminate the 'noise').

American social scientist, Scott E Page, has arrived at a mathematical theorem that translates in plain language, to 'when the diversity of the group is large, the error of the crowd is small'.

But it's not just about finding specific answers to mathematical questions. In formal studies, 'collective insight' seems to result in better decisions than the sole expert, or a small group of experts, produce.

In October 2014, the magazine *Scientific American* wrote in "How Diversity Makes Us Smarter":

"It (diversity) encourages the search for novel information and perspectives, leading to better decision making and problem solving. Diversity can improve the bottom line of companies and lead to unfettered discoveries and breakthrough innovations. Even simply being exposed to diversity can change the way you think.

"Interacting with individuals who are different forces group members to prepare better, to anticipate alternative viewpoints, and to expect that reaching consensus will take effort."

Former CAA Regulatory Intelligence Analyst, Tania Chinnaiyah, looked for patterns and trends in occurrences reported to the CAA. She says an operator trying to find a solution to a problem might do well to bring in an outsider.

"A solution to a significant problem, arrived at by a sole operator based only on their own perspective could be quite ineffective, even dangerous.

"Sometimes an operator will need someone to challenge the status quo. So they could consider bringing in people from the wider system. For example, the local aerodrome operator, or someone from the CAA. All three together might pick apart the problem, leading to a better understanding of the issue, and find a customised solution that originates from their different perspectives."

Organisational psychologist and ex-RNZAF squadron leader, Keith McGregor, says that despite the obvious benefits of obtaining diverse opinions to avoid the risks of 'groupthink' (see caption next page) there are subtle, hidden barriers to doing so.

"One example is the phenomenon known as 'positional chauvinism'. For instance, a former air force officer recalls an incident when a wing commander who had transferred from another base enquired about joining a local service organisation.

"On being advised to talk to a particular corporal, everyone in the room noted the look of confusion on the wing commander's

face, and knew exactly what he was thinking, 'But how could that be? He's just a corporal.'

"That unconscious belief that people of lower 'status' are somehow less intelligent or have less to contribute is evident from its origin in family life and on through to virtually all private and public sector organisations.

"It's been a factor in countless aviation tragedies, it throttles organisational creativity, and it demotivates those with much to offer."

But Think About What You Want

CAA Principal Policy Adviser, Brigid Borlase, says while a fresh pair of eyes is always useful, it's important to first decide what sort of eyes are needed.

"Sometimes, that might be someone with technical expertise that's maybe comparable to the group, but from a different sector.

"There are some conversations where you would not want a total outsider brought in because it would be just too disruptive.

"Although sometimes," she adds, "disruption can be a good thing."

Brigid also says it's critical to understand why you want different perspectives.

"You need to tease out why diverse minds would be better than that of the like-minded group. Ask 'What is the benefit of bringing in someone from outside the group?'

"And ask 'What are the risks of bringing in just the CEO and chief pilot?'. It may be that they will see only what they expect and want to find there."

Brigid says for a 'diverse minds' approach to be effective, it must be respected by the wider organisation.

"There's no point ticking the 'diverse thinking' box and ignoring the result. It has to be wanted, respected, and valued."

Keith McGregor agrees, saying for a manager, overcoming something like positional chauvinism can be a challenge.

"It can take a great deal of courage, as Captain David Marquet discovered when, as the captain of a United States nuclear fast attack submarine, he one day gave what turned out to be an impossible order, which his crew tried to carry out anyway.

"When he questioned why no-one had challenged that order, he was told 'because you gave an order'.

"He made a decision to encourage leadership at every level, and never give another order himself.

"Within two years, Captain Marquet's submarine went from having the worst morale and retention in the US Navy to achieving the highest possible grading."

Try It Out

Tania Chinnaiyah says aviation operators don't always need to worry about exactly what group would be 'diverse enough', or how different from the norm their perspectives would have to be, to come up with a good decision.

"It's just a matter of embracing the idea that including people who're not normally at the big table, in an otherwise homogenous group, might lead to a more effective decision, than that arrived at by just two or three like-minded 'experts'." ■



28 January 1986. The Space Shuttle Challenger STS 51-L with seven crew, exploded 73 seconds after launch.

Social psychologist Irving Janis believed the tragedy was at least partially due to what he called “groupthink” – it becomes more important to people in a like-minded group to agree, than to look at alternative ways of doing things.

The official Challenger investigation found the program engineers were anxious about the robustness of protective O-ring seals in the freezing temperatures predicted for the launch. Unable to prove the seals would fail, they were persuaded to support the launch. The NASA managers to whom the engineers reported, were desperate for the launch to go ahead. It was therefore more important to have unanimous agreement to the launch, than to deal with dissenting opinions.

Maintenance Records – Part of the Aircraft

Want to spend more money than necessary for a maintenance programme? Then make sure you accept your new aircraft with few, or no, maintenance records.

Engineers are frustrated that some newly purchased aircraft arrive in their workshop for induction, with little, or no, documented history.

"It really holds things up," says Timaru-based engineer, Dave Crosbie. "Certified log entries are not enough these days, especially when presenting the machine for a Certificate of Airworthiness, be it import or export.

"The same applies, transferring from one maintenance provider to another. It's the owner's responsibility to make sure all the maintenance records follow the machine – not just the log books.

"Otherwise, you've got to take the time to substantiate components, confirm that what is in the log books is correct, and chase up historical information for the new Review of Airworthiness."

Steve Backhurst, CAA Aviation Safety Adviser, says that obviously means it's going to cost the new owner more to get a maintenance programme set up.

"What some of the vendors – and purchasers – may not realise is that the maintenance records are part of the value of the aircraft and cannot be withheld."

Dave Crosbie says some of the problem may stem from owners' and some maintenance providers' confusion about what a maintenance record actually is.

The following documents, at the very least, should be transferred:

- » All aircraft log books
- » Component history cards
- » Worksheets
- » Release documentation
- » Tech logs – in accordance with rule 91.623.

"My advice," says Steve, "is to not accept the aircraft without the records. To be absolutely sure, make it part of the purchase contract that you receive the records before payment is made." ■

New Southern Sky

Get out your diaries because two key NSS events should be on your radar in 2018.

Approach 18

20 to 21 March 2018, Wellington

The NSS team, including Airways and Aeropath, will come together again to present Approach 18, following on from the success of Approach 16. It's a two-day seminar at the CAA in Wellington where you'll be brought up to date with all things in the Performance Based Navigation (PBN) world.

This is not just for pilots. We encourage the staff of avionics shops, LAMEs, airport operations staff, air traffic controllers, and procedure designers to participate. There will be something for everyone.

NSS Conference 2018

15 to 16 May 2018, Auckland

A range of delegates and presenters from both local and international aviation fields are being lined up for the second NSS conference. It will be held at the Beca Conference Centre, Pitt Street. Places are limited. This conference will examine all aspects of the NSS programme as Stage 2 continues to be rolled out across New Zealand.

For information and to register for both events visit www.nss.govt.nz/events. ■

New AD Logbook Tabs

The CAA has added two more tabs to the AD logbook for operators and maintainers to be able to contain information on Electrical Load Analysis and Aircraft Software Configuration Management in a common place.

These new tabs will be supplied in initial packs from now on. If you wish to add them to your existing AD logbook, you can order them separately for \$5.75 incl GST.

See www.caa.govt.nz/forms. ■

In, Out and Around Christchurch GAP Booklet

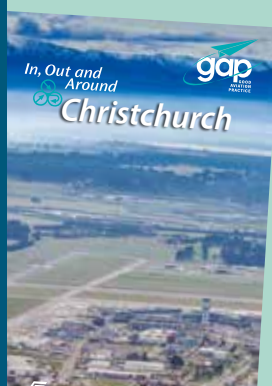
This new Good Aviation Practice booklet aims to improve pilots' awareness of what is involved in flying through and around the Christchurch district.

It is busy, and in some places, complex airspace. There's an international airport, a multitude of CFZs and MBZs, a plethora of private airstrips, charted and uncharted, areas of adventure aviation, and Antarctic operations. It's also been called "a giant training zone".

In addition, many of the visual reporting points in the area can be difficult to identify because of the transformation of natural features into dairy farmland.

This booklet introduces itinerant pilots to some of those VRPs, and to many of the characteristics peculiar to flying in this area.

For a free copy, email info@caa.govt.nz. ■



Is there an **AvKiwi Safety Seminar** coming to a town near you?

Well, not in 2018 – we are taking a year off to support the SMS team.

Implementation of SMS in 2018 needs support from all teams across the CAA, but in particular from Communications and Safety Promotion. We are pleased to be able to help them, and are putting our AvKiwi resources and expertise into the SMS workshops to assist the Group 2 organisations achieve SMS implementation by 30 July 2018.

But watch this space. In 2019 we'll be back, and I know you will be keen to know what the topic is, and when we will be coming to a town near you. Keep an eye on *Vector* about this time next year, and the CAA web site www.caa.govt.nz/avkiwi.

Remember that link will also take you to the e-learning from previous AvKiwi Safety Seminars – they're great for revision.

Rose Wood
Team Leader Safety Promotion



Clarification

In the November 2017 issue of *Vector*, we featured helicopter safety in an article, "Helicopter Over Water". The article recommended the use of floats as a safety measure. For that article and the cover, we used photos that featured a helicopter that was not equipped with floats at that time. Sorry if this has caused any confusion, but the safety advice in the article remains relevant.

Aviation Safety Advisers

Contact our Aviation Safety Advisers for information and advice. They regularly travel the country to keep in touch with the aviation community.

Don Waters (North Island)

Mobile: +64 27 485 2096
Email: Don.Waters@caa.govt.nz

Carlton Campbell (South Island)

Mobile: +64 27 242 9673
Email: Carlton.Campbell@caa.govt.nz

John Keyzer (Maintenance, North Island)

Mobile: +64 27 213 0507
Email: John.Keyzer@caa.govt.nz

How to Get **Aviation Publications**

AIP New Zealand

AIP New Zealand is available free on the Internet, www.aip.net.nz. Printed copies of Vols 1 to 4 and all aeronautical charts can be purchased from Aeronautical Information Management (a division of Airways New Zealand) on 0800 500 045, or their web site, www.aipshop.co.nz.

Pilot and Aircraft Logbooks

These can be purchased from your training organisation, or 0800 GET RULES (0800 438 785).

Rules, Advisory Circulars, Airworthiness Directives

These are available free from the CAA web site. Printed copies can be purchased from 0800 GET RULES (0800 438 785).

Planning an **Aviation Event?**

If you are planning any aviation event, the details should be published in an AIP Supplement to warn pilots of the activity. For Supplement requests, email the CAA: aero@caa.govt.nz.

To allow for processing, the CAA needs to be notified **at least one week** before the Aeropath (Airways) published cut-off date, 2017/18.

Applying to the CAA for an aviation event under Part 91 does not include applying for an AIP Supplement – the two applications must be made separately. For further information on aviation events, see AC91-1.

CAA Cut-off Date	Aeropath (Airways) Cut-off Date	Effective Date
14 Feb 2018	21 Feb 2018	26 Apr 2018
14 Mar 2018	21 Mar 2018	24 May 2018
11 Apr 2018	18 Apr 2018	21 Jun 2018
Visual Navigation Charts 2017 (scheduled dates for change requests)		
15 Mar 2018	19 Apr 2018	08 Nov 2018

See www.caa.govt.nz/aip to view the AIP cut-off dates for 2018.

Report Safety and Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY

(0508 472 338)

isi@caa.govt.nz

For all aviation-related safety and security concerns.

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT

(0508 222 433)

www.caa.govt.nz/report

The Civil Aviation Act 1990 requires notification "as soon as practicable".

Accident Briefs

More Accident Briefs can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".
Some accidents are investigated by the Transport Accident Investigation Commission, www.taic.org.nz.

Air Tractor AT-402B

Date and Time:	15-Feb-2017 at 17:20
Location:	Kumeroa
POB:	2
Damage:	Substantial
Nature of Flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	48 yrs

On recommencing an agricultural operation, the pilot circled the remote airstrip to assess the wind and ensure the strip was still clear. The wind sock indicated nil wind.

The pilot commenced the approach, but on short final a significant sink was encountered. The pilot was unable to arrest the rate of sink by applying power and increasing the nose attitude.

The aircraft contacted a bank, collapsing the undercarriage and damaging the wings, and coming to rest on the airstrip.

CAA Occurrence Ref 17/595

Guimbal Cabri G2

Date and Time:	15-Apr-2016 at 15:45
Location:	Tikitere
POB:	1
Damage:	Destroyed
Nature of Flight:	Training Solo

The pilot of the helicopter heard a loud noise on departure, followed by the smell of smoke. They then saw smoke in the cabin and made a precautionary powered landing on a farm paddock.

Before exiting the aircraft, the pilot pulled the mixture, turned off the mags, fuel pump and master. Once a safe distance away, they looked back and saw flames already at the masthead. The helicopter was destroyed by fire.

The Transport Accident Investigation Commission report 16-004 is available on its web site, www.taic.org.nz.

CAA Occurrence Ref 17/1755

GA Defects

GA Defect Reports relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less.
More GA Defect Reports can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".

Key to abbreviations:

AD = Airworthiness Directive	TIS = time in service
NDT = non-destructive testing	TSI = time since installation
P/N = part number	TSO = time since overhaul
SB = Service Bulletin	TTIS = total time in service

Robinson R22 Beta

Lower Drive Sheave

Part Manufacturer:	Robinson Helicopters
Part Number:	A493-1

During unscheduled maintenance, it was found that the metalised coating on the lower sheave was absent on approximately one-third of the circumference of the aft face. The last scheduled inspection during which the sheave was examined was the 100-hour inspection, completed approximately 45 hours prior to the defect being identified. The sheave had been in use for approximately 3350 aircraft hours.

The defect was reported to Robinson Helicopter Company, and the lower sheave was replaced with a serviceable part.

CAA Occurrence Ref 17/3904

Hughes 369E

During cruise flight, the pilot smelled oil and observed fumes in the cabin. This was accompanied by a low oil pressure warning and the pilot executed a precautionary landing. After landing, the pilot noted that there was oil on the fuselage and shut down the engine.

The engineering investigation found that the leak was the result of a split metallic O-ring seal on the external sump. During ground runs following an engine teardown, the engineers had identified a leak and re-torqued the retaining bolts to the manufacturer's specifications. If a leak is found, the sump should be removed, new sealant applied, and a new metallic O-ring seal installed in accordance with the Rolls-Royce M250-C20 Series Operation and Maintenance Manual, Paragraph 72-50-00.

When installing the sump, care must be taken to ensure that all surfaces are clean and flat and that the sealant is applied evenly and sparingly, where required. Applying additional torque to a seal that has already been installed in accordance with the manufacturer's specifications may result in splitting the metallic O-ring seal.

Following the incident, the engine was inspected and the external sump metallic O-ring was replaced.

CAA Occurrence Ref 17/1672

NZ Aerospace FU24-954

Compressor impeller

Part Model:	M601d-11nz
Part Manufacturer:	Walter
ATA Chapter:	7230
TSI Cycles:	227
TSI Hours:	79.38
TSO Cycles:	394
TSO Hours:	159.48
TTIS Cycles:	9168
TTIS Hours:	5134.4

During the take-off roll, the pilot noticed puffs of white smoke and sparks from the exhaust. The takeoff was aborted and engineering assistance sought. The initial maintenance inspection found that damage had occurred to the power turbine blades.

The engine was removed from the aircraft and sent to GE Aviation in Prague, who found that a section of a compressor wheel short vane had broken away and caused further damage downstream in the engine.

GE Aviation determined that the failure of the impeller short vane was related to fatigue. A crack started at the trailing edge on the transition between root fillet and airfoil and later it propagated along the root fillet up to the end of overlapping machining. Such a fracture would not propagate to the impeller disk and would not result in disk burst, based on the historical event observation.

This type of fatigue fracture would occur early in the engine usage as an infant mortality event. The fleet is mature enough for a similar event to be unlikely.

CAA Occurrence Ref 17/1280

Britten-Norman BN2A-26

Vent Fan Motor

ATA Chapter:	2100
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The pilot contacted the Tower advising of smoke in the cockpit while on the downwind leg and requested an immediate landing. RFS responded and was stood down following a safe landing, once it was ascertained that there was no danger.

Maintenance investigation determined that the source of the smoke was the air vent electric motor which had overheated.

CAA Occurrence Ref 17/1640

Eurocopter EC 130 T2

Seat Belt Buckle

ATA Chapter:	2520
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Following a flight, a passenger attempted to undo their seat belt by rotating the release mechanism of the 4-point harness. Upon rotating, the entire front section of the buckle separated from the buckle housing. To release the passenger from the harness, the pilot used pliers to rotate the nut on the mechanism.

The remaining seat belts were checked, with another buckle found to be cracked in the same position as the first.

There are two EASA ADs addressing rotary buckle issues that relate to EC 130 aircraft, 2007-0256 and 2014-0279. It was found that the buckles on this aircraft fell within the parameters of the ADs. The defective buckles have now been replaced.

CAA Occurrence Ref 17/257

Hughes 369D

Blades

ATA Chapter:	6210
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While undergoing a Review of Airworthiness (RA) it was discovered that the serial numbers on the main rotor blades on the aircraft did not match the serial numbers recorded in the aircraft logbooks. It was found that the incorrect blades were fitted while undergoing scheduled maintenance at another maintenance provider. The blades fitted were of the appropriate part number but belonged to another customer.

The installed blades were removed from service and the correct blades were located and installed accordingly. The incorrect blades were returned to the appropriate maintenance provider.

As a result of this incident, a review of the maintenance provider's labelling and storage of removed parts process has been carried out.

CAA Occurrence Ref 17/5302

Hughes 369D

PC Air Line

Part Number:	23054628
ATA Chapter:	7320

During flight, the engine power reduced to ground idle and the pilot undertook an autorotation. A successful landing was made with nil injuries to POB. The helicopter was shut down and secured, and both ELT and Spidertracks were activated.

The engine power reduction was determined to be caused by a cracked Pc air line. Fretting and corrosion marks were observed under the end of the nut ferrule. A new Pc air line was installed.

CAA Occurrence Ref 17/1185

Gippsland GA8

Overhead switch panel

Part Model:	GA8
Part Manufacturer:	GA8 Airvan Pty Ltd
ATA Chapter:	2460
TSI Hours:	98.9
TTIS Hours:	1989.4

During maintenance, a burning smell was traced to the overhead switching panel wiring.

Wiring, including the main battery cable to the overhead electrical bus, had chafed as it passed from the overhead switching panel through and over the carbon fibre cabin roof panelling and structure.

Two wires, the Comm 1 and the optional air conditioner wire, shorted to ground through the panelling. This resulted in arcing at three other locations through the cabin roof structure and roof panels due to their conductivity.

The main cause was the lack of protection between the wiring loom, the structure, and the carbon roof panelling.

The wires were replaced as required. The main cable to the overhead bus was sleeved, and the structure was insulated to prevent recurrence. All GA8 aircraft maintained by the maintenance provider will be checked at the next maintenance visit, and the aircraft manufacturer has been advised.

CAA Occurrence Ref 17/1113

Aviation Safety Officer Course

Auckland

1 – 2 March 2018

Sudima Auckland Airport
18 Airpark Drive
Airport Oaks, Mangere
Auckland

The number one function of any company is business success – safety is critical to business success.

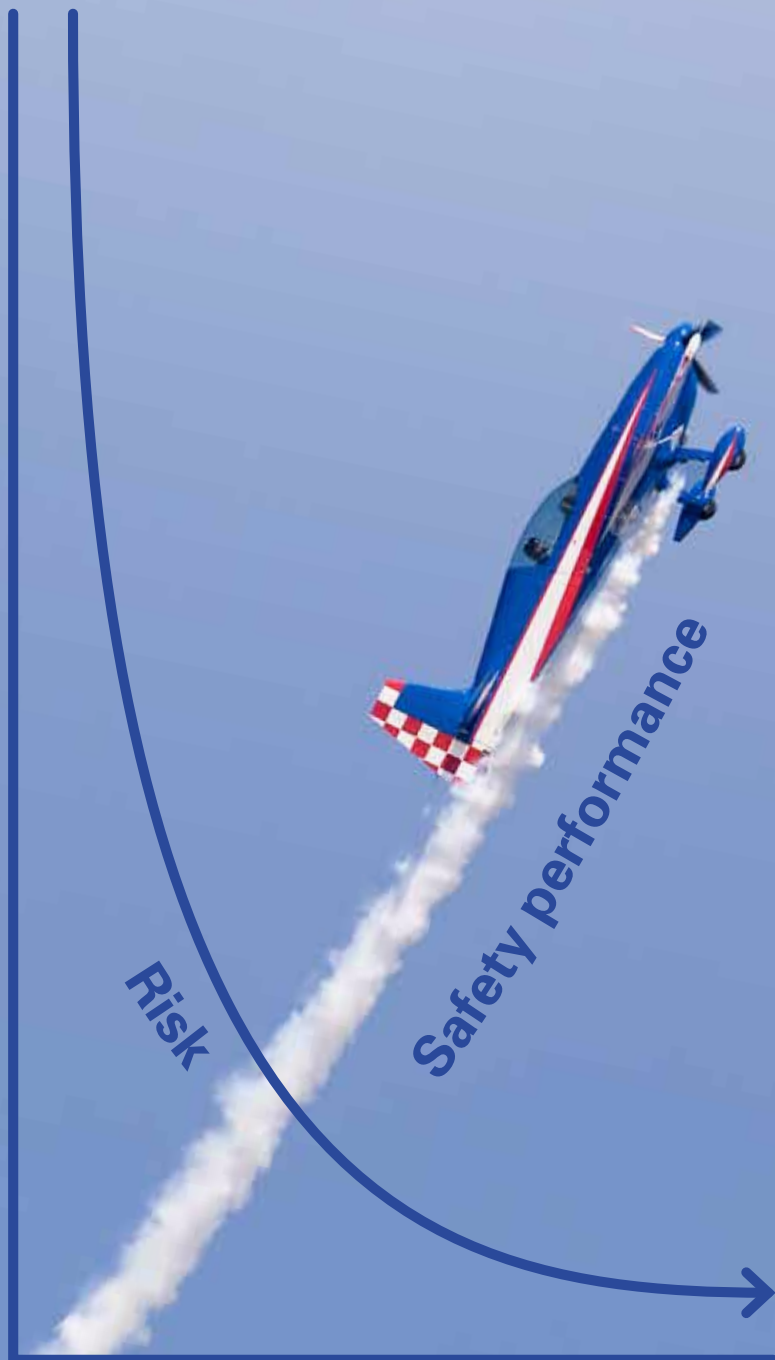
If your organisation operates commuter services, general aviation scenic operations, flight training, sport aviation, or engineering, you need an Aviation Safety Officer.

Attend this free two-day course to understand the role of a safety officer, or for those who are already in a safety role, to refresh your skills.

You will get comprehensive guidance material and access to all the latest CAA safety resources and support.

Lunches are provided (but you will have to arrange and pay for your own accommodation, transport, and other meals).

Check the CAA web site, www.caa.govt.nz, "Quick Links > Seminars and Courses" for more information and to enrol online. Places are limited and they fill up quickly, so enrol early.



Take a step on the ladder to SMS