Pointing to safer aviation

Winter 2024

vector

ENGINEERS' MENTAL HEALTH

FROM STRESS TO STRENGTH

Mixing it up *at uncontrolled aerodromes*

Be ready for the emergency

The STC approval process

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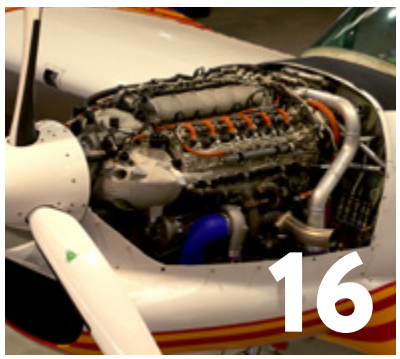
CIVIL AVIATION AUTHORITY OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

// BE READY FOR THE EMERGENCY



// THE STC APPROVAL PROCESS

// MIXING IT UP – VFR AND IFR AT UNCONTROLLED AERODROMES

Cover: LAMEs are in a naturally stressful job. They need to watch for early warning signs that the stress is becoming a problem. See our cover story on page 4.

Photo: CAA

// ENGINEERS' MENTAL HEALTH – FROM STRESS TO STRENGTH

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vector

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Reader comments and contributions on aviation safety are welcome. Let us know your thoughts by emailing education@caa.govt.nz. We'll try to publish a selection in each edition, although they may be edited or shortened.

We'll only publish ideas and observations contributing towards safer aviation.

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Photo courtesy of NZAAL

THE VALUE OF AN ELECTRONIC CO DETECTOR

// By NZAAL CFI, Celroy Mascarenhas

Installing electronic CO detectors across the entire training fleet wasn't cheap – but we believe that almost immediately, one saved two lives.

In February 2020, I received a CAA UK notification of a fatal accident involving a Piper PA-46 Malibu in Britain due to carbon monoxide (CO) poisoning.

Five months later, I received another notification, about a fatal seaplane accident north of Sydney. Blood samples of several of the occupants indicated elevated levels of CO[1].

That a well-respected aviation company and a highly experienced pilot could potentially fall prey to CO poisoning hit home.

We operate the New Zealand Airline Academy in Oamaru, where we train mainly international students who want a commercial pilot licence.

It was evident to me the plastic card CO detector was useful only if you were looking at it. There was no other means of having your attention drawn to it, particularly if you're occupied with flying the plane.

So, within minutes, we were looking at electronic detectors for our entire fleet – both glass cockpit and analogue.

It took some time to receive the CO detectors, due to COVID and subsequent supply chain issues, but we finally installed them in December 2021.

What they do

The electronic CO detectors produce both an audio and visual warning. The audio warning is provided through the headset as a series of beeps.

As the CO level increases, the beeps get louder and more closely spaced. The visual warning is provided on the glass cockpit screen as a number which, as the CO value increases, becomes highlighted in yellow, and then red.

The electronic detector fitted in our analogue cockpits has the same audio warning. It also has a light that stays green during normal operation, turning red when CO is detected.

Immediate benefit

While we were pleased we'd installed the detectors, we also wondered if we'd made the right investment at a time when we needed to be frugal. That changed on 25 February 2022.

A cross-country flight, carrying our senior B-category instructor and a student, returned safely to base after an audio-visual alert from the new CO detector.

The plastic card CO detector, still in the aircraft, had not changed colour, so our initial thoughts were that the electronic CO detector was likely to be faulty.

We couldn't have been more wrong.

The aircraft's exhaust muffler had a cracked weld (due to wear and tear, see photo above), which let fumes into the cabin through the heater duct.

It's hard to say what would've happened had we not installed electronic CO detectors. Worst-case scenario? The same as had happened in Sydney, either on the cross-country, or the following flight.

That realisation sent a shiver down our spines – but it was also evident our investment had paid off – in just weeks.

// FOR MORE INFORMATION

On the CO poisoning accident in Sydney, go to **atsb.gov.au** – and search for "Hawkesbury floatplane accident".

On the CO detector survey in the UK, go to **caa.co.uk** – and search for "CAP2611".

1 The Australian Transport Safety Bureau investigation concluded the CO had leaked into the engine due to cracks in the exhaust system, then into the cabin's instrument panel that was missing some bolts.

The working lives of LAMEs are interwoven with stress. Sometimes, it gets too much. Here's how to spot the early signs and take action.

Maintenance engineers in aviation spend their days keeping aircraft finely tuned, so people can fly safely.

But, like many professionals whose priority is people's safety, sometimes engineers put their own wellbeing last.

And an overload of relentless stress can lead to fatigue, burnout, and mental illnesses such as anxiety and depression.

Engineers aren't alone in this. Nearly half of New Zealanders will experience mental illness or distress during their life.[1]

"Prolonged periods of high stress (chronic stress) is detrimental to both our physical and mental health, particularly when it's unabated," says Alaska White, CAA's Chief Advisor of Human Factors.

ENGINEERS' MENTAL HEALTH

FROM STRESS TO STRENGTH

// It's important to let your employer know if you have workload concerns or you're feeling fatigued and stressed. They can't fix it if they don't know.

Paul's story

When Paul[2] stepped up to be the chief engineer at an aircraft maintenance company, his workload, roles, and responsibilities increased significantly.

And in the interests of supporting his team, especially those who were newer to the company, he took on some of their tasks that he could do more quickly.

Instead of the tasks transferring to them over time, it became the norm that Paul did them.

While he acknowledges now that he may have made a rod for his own back, he says it all felt manageable at first, and the effects of the ongoing stress were gradual.

"It sneaks up on you."

Paul became heavily involved in managing customers, supporting staff, organising rosters to keep everyone working, running logistics, solving supply chain issues, and signing off engineering jobs.

He was sleeping just a few hours a night, with his days often starting around 3am when he woke and his "mind started ticking". He was working up to 12-hour days, sometimes six days a week.

"I brushed it off"

Paul's family and friends noticed his deteriorating mental state before he did. "My partner said, 'We need to look at this seriously'. I brushed it off as 'just how it is'.

"But I started to notice I was getting short with people and being more grumpy – including with customers and staff."

Listen to the people who know you

Paul wishes he had listened. It would have helped him recognise some of his unhealthy behaviour patterns sooner, and he may have been quicker to put steps in place to better manage what was happening to him.

"Take note when people close to you are telling you things aren't good. My partner was very good to me through this. Quite often, I would snap at her. I didn't realise to what extent that was happening." »

1 *Mental distress prejudice and discrimination in Aotearoa* | Key statistics 2022, Mental Health Foundation of New Zealand.

2 Not his real name.

Photo: CAA

The final straw

Some mornings, Paul didn't want to get out of bed, and he began to have anxiety attacks.

"You have an overwhelming fear of what you need to achieve and you know you can't do it."

The final straw came when, after many months of relentless pressure, he was driving to work on his first day back after New Year.

"I had to stop and throw up on the side of the road. My stress levels were through the roof."

Paul resigned a few weeks later.

A fresh start

Looking back, Paul says he didn't think enough about the personal consequences of the strain he was under.

"Afterwards, I thought I was a dumbarse. I put the job ahead of my family. I really regret how that damaged my relationship with my kids.

"After I resigned, my kids commented that I was smiling again. They said they hadn't seen me smile for years."

He wishes he had been more communicative with his staff when he was under pressure. He said sorry to some afterwards, and he apologised to customers who had got the sharp side of his tongue when he was under stress.

In his new job, Paul's working hard to learn the ropes and enjoying his spare time.

"I'm enjoying spending time with my kids, and going out on a Saturday afternoon with my partner for lunch. Before, I was on call 24-7."

He says that, while some engineers may say the industry is not how he has described it, that's how it was for him, and he believes others face similar pressures.

> "You have an overwhelming fear of what you need to achieve and you know you can't do it."

There's no silver bullet to fix it all, he adds. "It's a job where there is stress, and you'll never get rid of that, but it's important to learn to manage it."

Don's story

Don McCracken has worked in aviation businesses for 35 years – in engineering, management, and leadership roles.

He still bears the emotional "scar tissue" from an incident when, as a young engineer, he released an aircraft back to a customer against his better judgement, without having been able to replicate the electrical fault the customer had complained of.

The fault recurred as the owner flew back to home base that night and, while the aircraft landed safely, Don says it took a long time for him to recover mentally and emotionally from what ensued.

Don says his decision to release the aircraft that day was part of a longer-term pattern of not wanting to let customers down.

In this case, he says the customer was a very successful person not used to being told 'no', and Don respected him a lot.

He says if he had the time again, he would have resisted the pressure he felt to release the aircraft back to the owner without having discovered the source of the fault.

And after the event, the company put clearer rules in place to support engineers' decision-making – especially around resisting pressure from customers.

Traumatic investigation

The ensuing post-incident internal investigation was traumatic for Don. Such was the impact, that he considered leaving the industry.

He got through it with a combination of counselling and talking to others.

"It took a massive recovery for me to sign anything off again."

"To try to get my confidence back, I talked to peers – licensed engineers who had been around longer. They were good listeners."

He said the fact they worked in the same field, and had experienced similar problems, meant they understood and often had helpful advice.

Photo: CAA

// Find a mentor or someone who will listen, not criticise or judge your actions.

To this day, Don says he finds the way to manage anxiety around decision-making in any aspect of a job is to talk it over with the team. Then everybody knows what the objective is, and there are no shortcuts.

Locking hurtful feelings away

He says during his recovery he put some of his more overwhelming feelings away in his "hurt locker".

Even today, though, the feelings resurface when he faces similar decisions and situations. This can be helpful, he says, because it's an opportunity to work through decisions from the perspective of what he does differently now. "You have feelings that help you not to go there again."

What does the law say?

The law is clear about an employer's responsibility to provide a safe physical and psychological workplace.

The Health and Safety at Work Act 2015 (HSWA) "...requires Persons Conducting a Business or Undertaking (PCBUs) to provide and maintain a work environment that is without risks to safety and health, including mental health, so far as is reasonably practicable", WorkSafe's website says.

"As with other risks, we [WorkSafe] expect PCBUs to identify mental health risks and eliminate them from work so far as reasonably practicable. If the risks can't be eliminated they should be minimised."

Find out more about this in the "information and support" section at the end of this article.

Early warning signs

Alaska White says that disturbed sleep, poor concentration and moodiness are some of the classic early warning signs that your mental health needs some extra support.

"Left unchecked, these interconnected symptoms can lead to fatigue – an overwhelming feeling of mental and physical exhaustion that doesn't improve much with sleep or rest. It can take months or years to recover from.

"The effects of fatigue can include degraded situational awareness and judgement, poorer accuracy and precision, delayed reaction time, and a struggle to prioritise tasks."

Cycle of worry

For engineers, Alaska adds, these effects can be alarming in themselves because of the possible negative impacts on your performance and the safety of aircraft. This cycle of worry can keep the symptoms going.

Alaska says it's important to let your employer know if you have workload concerns or you're feeling fatigued and stressed. They can't fix it if they don't know.

And while some people will seek medical assistance and counselling to help get them back on track, Alaska says there are also practical habits that help us maintain good mental health.

Stay active and sociable

"Regular exercise, eating well, and drinking plenty of water helps promote the good sleep that's so essential to our wellbeing," Alaska says.

"Keep your social plans, even when you don't feel like it. Lots of research shows that staying connected with supportive loved ones, friends, and peers is essential for our longevity, and physical and mental health. »

> **The way to manage anxiety around decision-making in any aspect of a job is to talk it over with the team.**

"This can be especially important for engineers who work by themselves a lot, or have little separation between work and their personal lives.

"Do stuff you enjoy and learn new things. It helps with mindfulness (being 'in the moment', rather than thinking about the past or future), and it's proven to increase your confidence and sense of achievement.

"Limit your alcohol consumption. After its short-term, feel-good boost, the effects of alcohol on your brain can make anxiety and depression worse. Other substance misuse, including prescribed medication, can have a similar effect.

"Contact your workplace Employee Assistance Programme (EAP), if that's something your employer provides.

"Finally, it's important to listen to your body. We're all human, we're all fallible, and we all feel stressed and low from time to time. But if you're feeling low for a prolonged period (two weeks or more), talk to your doctor as the first point of contact to see what options are available to you for your situation."

Shifting gear into leadership

Don knows a thing or two about making the shift from being a hands-on engineer to leading people and companies. And he's got some advice that has stood the test of time – for him, and others he knows in the industry.

"A big part of day-to-day business requires solving non-engineering problems. Often significant stress is caused by not having the knowledge, skill, and experience to manage these types of problems.

"These can tax the brain with things like finances – such as 'can we pay the wages?', or 'will that customer pay us on time?'

"Things like arguments over job costs, delays, and quality issues, or delays over invoice payments, invade every spare bit of thinking space – going around and around until they've created a permanent repetitive circuit in your brain.

"Other factors such as relationships, family, health, and emotional influences can also cause chaos within your regular thought processes."

Build a support network

Don says connections are everything.

"Find a mentor or someone who will listen, not criticise or judge your actions. Ensure you have friends around you.

"Get advice and support from peer groups. As I said earlier, spend time with those who have worked in the same field before, as they'll have experienced similar problems and may have helpful advice. Accept help when it's offered.

"Include those who work for you in discussions around the work that the company is doing," Don says, "because they're an integral part of your success."

Stay in the moment

"Try to solve only the problems of the day. Don't search your mind to remedy the problems of the next day, week, or month. That's best done at a planned strategy session with help from others.

"Finally, we all make mistakes, seldom are they catastrophic. The opportunity is to learn from them."

Communication is crucial

John Keyzer, a CAA Aviation Safety Advisor with more than 24 years' industry experience as a rotary-wing engineer, says the first COVID-19 lockdown taught him heaps about the importance of keeping communication lines open to manage stress.

"Ordinarily, my job takes me all over the North Island visiting maintenance providers as well as running workshops and courses across the country."

When the first lockdown happened, John quickly developed a way to keep in touch with his industry contacts so he could keep fulfilling his role.

"I developed a series of questions to trigger discussion points, and I called all the senior engineers I knew.

"I would ask them, 'How is this situation affecting you and your family? How is it affecting your business and your staff? What measures have you put in place to support them?'

"Then I'd tell them what the CAA was doing to keep people informed on developments and changes, and where to find information.

"Then, without directly mentioning mental health and wellbeing, I'd suggest if they needed any help or support or a listening ear, give me a call. I had the time.

"I was making at least six to eight calls a day, often for up to an hour, listening to people's problems, offering advice and support.

"By the end of every day I was shattered, and that was from just being on the end of the phone.

"The upside was, within a week I was getting calls from senior engineers thanking me for my call, and saying it inspired them to do the same for their staff.

"This was soon followed by people calling me, checking in to see how I was doing.

"Being a listening ear can mean so much to an engineer who may be struggling."

John managed his stress during that time by putting his effort into home DIY after work.

"I stripped wallpaper, I plastered walls, and I painted the whole inside of the house, one room at a time, over about eighteen months."

He has one more tip for any engineer who's feeling overwhelmed for any reason.

"Sit down with a sheet of paper. Write down anything that's worrying or bothering you. Then separate them into things you can change, things you can't change, and the things that are important to you. This may help you to look at things more objectively.

"Then sit down with a trusted person – your business partner, your life partner, a mentor – and decide your next steps. It may be easier when you're thinking rationally."

The role of industry groups

Don, who's chair of the Aircraft Engineers' Association of New Zealand (AEANZ), says groups like these can be great for building networks and getting access to training and development opportunities. AEANZ is part of the Aviation Industry Association, an umbrella body for the industry in New Zealand.

Engineering New Zealand, a professional body for engineers since 1914 and with branches all over the country, also offers a community of learning, collaboration, and support for engineers from all disciplines.

While Engineering New Zealand has no specific special interest group for aviation engineers, it says the Mechanical Engineering Group and the New Zealand Society for Safety Engineering have aviation engineers as members.

Organisational culture

The culture of a workplace – the 'way we do things around here' – plays a massive part in contributing to wellbeing at work. Take a deep dive into this topic, and learn more about the human factors that contribute to people's performance, in a *Vector Online* article written by CAA Chief Advisor of Human Factors, Alaska White.

Go to **aviation.govt.nz/vector-online** or use this QR code to view Alaska's article.

// INFORMATION AND SUPPORT

Industry organisations

- **Aircraft Engineers' Association of New Zealand (AEANZ)**
  aianz.org.nz > divisions
- **Engineering NZ**
  engineeringnz.org > join us > groups
- **Aviation and Marine Engineers Association**
  amea.co.nz > divisions > aviation
- **Mechanical Engineering Group**
  mechanical-engineering-group.org.nz
- **New Zealand Society for Safety Engineering**
  nzsse.org.nz

WorkSafe information

worksafe.govt.nz and search for "Supporting mentally healthy work".

Online mental health support

- **mentalhealth.org.nz**
- **depression.org.nz**
- **yellowbrickroad.org.nz**

Talk to someone

- Need to Talk? **Text 1737** or visit **1737.org.nz**
- Samaritans: **0800 726 666**
- Rural Support Trust: **0800 787 254**
- Healthline: **0800 611 116**

BE READY FOR THE EMERGENCY

After a forced landing in the bush, this pilot did three things that made the difference between survival and possible death.

It was the end of a successful winter hunting weekend in the Kaimanawa Forest Park. The pilot – who we're calling John – his dog, his sister, and their hunting buddy, boarded John's Cessna 172, bound for home.

John (PPL, with around 600 hours at the time) had already flown some of their gear out. As they prepared for their final departure mid-afternoon, he noticed the weather conditions deteriorating more quickly than expected. He decided they would head for Tūrangi rather than Taupō or Taihape.

"It was a routine flight, operating in an area I know well," John says.

"Coming out with the second load and my passengers, visibility seemed not too bad. I came through the trickiest part to navigate, but then there are two valleys with similar headings – and I flew into the wrong one."

Split-second decision

An engineer by trade, John is used to critical thinking. "The 172 is a low horsepower model so even though only moderately loaded in this case, once at altitude it leaves

// A forest valley typical of what we see in New Zealand. Inset: John's plane stranded on top of the canopy.

> // I remember vividly flying up the hill, approaching the bank, seeing the trees coming up, and the sound of the crunching aluminium. //

little performance to spare. I went to configure it the right way for a turn, but when I went to turn out, I could see the performance was not there for turning across the valley. I didn't want to go into a stall spin – that usually doesn't end well at low altitude – so I decided I needed to find a place to turn around or land. It became apparent, with no space to turn, we would have to land in the valley.

"Naturally, the stress levels went up. I didn't say much – there was no time – but I warned the others to tighten their seat belts for a forced landing, and headed up the valley.

"The time between realising it was the wrong valley, to landing at the end of it, was about 30 seconds, a minute at the most. There was no panic. I flew the aircraft up into the hill, flaring up the bank. The 172 is light, so that helped with landing at low air speed. There was a noise of crunching aluminium, and we ended up perched on the trees, the nose touching the bank and the tail out over a 40ft drop. My first thought was the risk of a fire, so I immediately turned the power off."

Personal locator beacon

"The aircraft ELT had not activated so I initially turned it on, but this interfered with the VHF comms I needed with aircraft overhead, so I turned it off. I considered activating the PLB that I carry in my pocket as it has GPS functionality but, already knowing our exact location, there was no need."

Although none of the group was physically injured, John's friend became distressed, and calming him down was the first step.

Stay with the aircraft

Then John made some key decisions that proved fundamental to their survival. Their wet weather clothing was among the gear he'd flown out earlier in the day. With rain setting in, and just a few hours until darkness, he decided the group would stay put.

"I knew there was no way we could walk out at night by ourselves." »

Photo: iStock.com/raclro

Flight following

John contacted aircraft overhead to let LandSAR know the crashed Cessna's GPS coordinates, and asked them to relay the message that the group were not injured and would be able to walk out – but only with assistance.

He asked an overhead pilot to text his dad (who was flight following) to let him know they were okay, and to contact their friends waiting at Tūrangi aerodrome to say they would not be arriving.

John's anxiety levels rose when there was muddled communication between Christchurch Air Traffic Control and LandSAR, with his messages not being conveyed correctly. But with a bit of clarification, the rescue team was dispatched and headed into the forest.

Stay warm and dry

"We put on all the warm gear we had, including emergency blankets. We stayed in the plane, and waited. It wasn't that we couldn't get out, but we just didn't want to leave the aircraft because of the conditions. It felt like a very long time.

"Then around 2am – about nine hours after we landed on those trees – I heard the search and rescue guys yelling. I climbed out via the landing gear leg and wing strut to the ground next to the nose.

"I'm a hunter and I spend a lot of time on wild terrain, so I was able to get across to them, and I brought them back to the aircraft. We were keen to get out of there. We were pretty cold, and we got colder still when we were walking out."

Within an hour of leaving the stricken aircraft, the group and their LandSAR rescuers were out of the bush.

"I certainly appreciated them getting out of bed for the night," John says.

The after-effects

Four years have passed since the crash, and John says he's spent a lot of time re-thinking it.

"I remember vividly flying up the hill, approaching the bank, seeing the trees coming up, and the sound of the crunching aluminium. It's not something I have nightmares about, but I remember that quite vividly.

"It definitely gave me a bit of a shake-up, for sure. I felt a bit... I'm not sure what the word is... you get a bit flustered for a while.

"It was a bugger-up – my fault and no-one else's. I was angry and upset with myself that I went up the wrong valley."

He says a mix of complacency because of the familiar surroundings, combined with flying in marginal weather conditions, contributed to the event.

"It's that complacency thing. I was right in that risk profile. I was definitely in that classic buildup for an incident – too familiar with the surroundings, and complacent with all those different little things.

"But what I did was the right thing to do. I wanted to avoid stall spin. And the main thing is that, while I bent a plane, everyone was safe."

Although shaken up by the event, John got back to flying quite quickly after the crash.

Life-saving decisions

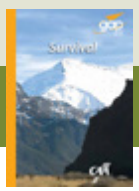
He says three factors were most important in ensuring the survival of his hunting group.

"We were flying in winter, so we planned to be at home base well before dark. We had plenty of fuel, and daylight, and we had lots of Plan Bs. If you're feeling stressed, it probably means you haven't given yourself enough options before you started the flight.

"Communication is everything. I'm a big fan of PLBs, because they have GPS. Some aircraft ELTs don't have GPS so they are only accurate to within a few kilometres.

"Having flight following was crucial. It would have been even more important in raising the alarm if we hadn't been able to make contact with aircraft overhead.

"When we got into trouble, my ability to make good decisions was helped by the fact I'd done a lot of field strip flying, and I had good instructors and good training for emergencies. Reading accident reports is also a great learning tool. Be ready for the emergency, so if it does happen, it's just a procedure."



// MORE ADVICE

For more advice on how to survive after a precautionary landing, download our Good Aviation Practice booklet, *Survival*, at: **aviation.govt.nz/education** > Good Aviation Practice booklets > In an emergency.

DANGEROUS GOODS TIME TO BE ON THE RIGHT SIDE OF SAFETY

// Image: Australian War Memorial. Peter Hanley, *Shark Zero Two coming home*, (2005, synthetic polymer paint on canvas, 61.5cm x 61.5cm) AWM ART92744. Hanley painted this honouring the nine Australians killed in the Nias Island crash.

After two years of CAA guidance, help, and training, we want to be sure that operators' DG procedures are being actively updated.

In 2005, nine Australian defence force personnel died when their Sea King helicopter (call sign Shark Zero Two) crashed on the island of Nias, in Indonesia.

While the cause was found to be mechanical failure due to poor maintenance, the subsequent board of inquiry found that at least four of the seven who survived the initial impact, died of asphyxiation due to smoke inhalation, or burns, from a post-accident fire.

The fire was reportedly due, at least partially, to exploding butane gas cylinders loaded on to the helicopter, allegedly by an aid worker.

While a tragedy the scale of the Sea King helicopter crash is fortunately rare, the CAA continues to receive reports of poor handling or transport of dangerous goods.

"What happened on Nias Island shows how critical to safety the correct shipping, acceptance, and carriage of DG is," says CAA Chief Advisor of Dangerous Goods and A-cat (H) Jim Finlayson.

"We want the whole community that carries dangerous goods to ensure we never have such a catastrophic accident."

The CAA can help you do that

Jim says a small team of dangerous goods specialists is able to help with drafting a DG manual, at no cost, to kick off an operator's exposition amendment. Email **dg@caa.govt.nz**.

"And we're continuing to run training courses for operators, particularly Parts 135 and 137 participants who carry DG as part of their normal business."
(See next page)

At the start of 2023, new requirements from ICAO regarding dangerous goods training came into effect, which is why Jim's team is so motivated to help operators understand and meet DG safety standards.

"We signalled these changes back in 2021, so we really need to see operators taking up this training, and becoming proactive about amending their expositions regarding carrying dangerous goods. But some of them are waiting until their five-year renewal to do that."

Jim believes that compromises safety, and his team expects expositions to be updated as soon as possible.

He says meeting new Part 92 requirements is so important that CAA inspectors will be asking to look at dangerous goods procedures contained in expositions, when they're conducting other certification tasks.

"They will expect operators to have up-to-date, compliant dangerous goods manuals, relevant to their organisation, and to have all employees who have DG responsibilities trained and current, according to the standards in Part 92.

// It's not enough for an operator to have 'DG procedures' in their manual and believe that's all that's needed. Their procedures must be sufficient and correct so that rule 92.13 is properly understood and applied by their pilots and loaders. //

> **...operating according to Part 92 gives you 'bang for buck' in meeting what other safety legislation requires you to do.**

"It's not enough for an operator to have 'DG procedures' in their manual and believe that's all that's needed. Their procedures must be sufficient and correct so that rule 92.13 is properly understood and applied by their pilots and loaders," says Jim.

"There are significant requirements for the carriage of dangerous goods cargo that must be explained in the exposition.

"Part 135 operators also need to be sure their DG manual meets the requirements of rule 92.11(c), but at present we're seeing a number of expositions not doing that."

It's not just the civil aviation rules

Meeting the requirements of Part 92 is also a significant step toward your responsibilities under the Health and Safety at Work Act 2015, and the Hazardous Substances and New Organisms Act 1996.

It also means you're on the right side of the ICAO Technical Instructions.

"So operating according to Part 92 gives you 'bang for buck' in meeting what other safety legislation requires you to do," says Jim.

Book your place now

The CAA training courses, while popular, sometimes have space for more participants.

You can find upcoming dates by using this QR code or look at the back cover of this issue.

You can also visit **aviation.govt.nz/education** and go to our courses and workshops page.

WHAT SOME DG RULES SAY

92.13 ***Carriage by passenger or crew member***

A person shall not carry dangerous goods or cause dangerous goods to be carried aboard an aircraft in checked or carry-on baggage or on their person unless permitted by the (ICAO) Technical Instructions.

92.177 ***Information in cargo acceptance areas***

Each operator shall display notices to the public at cargo acceptance areas providing information about the carriage of dangerous goods.

92.179 ***Information to passenger***

An operator of an aircraft must inform a passenger of the type of goods that he or she is prohibited from carrying aboard an aircraft.

92.11 (c) ***Exceptions***

A person may offer or accept dangerous goods for carriage by air that are for the recreational use of a passenger without complying with this Part if —

(1) the dangerous goods are carried in an unpressurised aircraft that —
  (i) has a MCTOW of 5700 kg or less; and
  (ii) is on a domestic VFR flight; and

(2) the dangerous goods are not listed in the Dangerous Goods List in the Technical Instructions as being forbidden for carriage by air in an aircraft that carries passengers; and

(3) safety and emergency procedures for the carriage of the dangerous goods are established; and

(4) each item of dangerous goods is identified; and

(5) the pilot-in-command is informed of the hazardous nature of the goods; and

(6) the dangerous goods are —
  (i) in a proper condition for carriage by air; and
  (ii) segregated if they are likely to react dangerously together; and
  (iii) stowed, secured, and, if necessary, packed, to prevent leakage or damage in flight; and

(7) the only passengers carried aboard the aircraft are passengers who are associated with the dangerous goods.

There are more rules to become familiar with, particularly if you're carrying DG *cargo* – you must be fully aware of the safety requirements, trained, and have appropriate procedures in place.

// Jon Kerr and Clyde James of Part 146 design organisation, Flight Structures, doing a test article inspection prior to pressure testing a new carbon fibre hopper. This was done as part of an STC application for its installation on a P750.

THE STC APPROVAL PROCESS

Photo courtesy of Farmers Air

It can be a long and complex job to get a New Zealand supplemental type certificate (STC) for your new bit of kit. Here's how it goes.

An STC is issued by the CAA to approve a design change to an aircraft, engine, or propeller. The STC approval process is overseen by the CAA to make sure all the latest safety requirements that may be affected by the design change continue to be met, and that there are no apparent unsafe conditions introduced.

Advisory Circular AC21–8 *Design Changes – Supplemental Type Certificate* notes that the change you want to make might have an "appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product".

If you're wanting to install new equipment into or onto your aircraft, you want to know that you and your passengers continue to be safe flying in it.

So before approving an STC, the Director (or one of his delegates) needs to be satisfied that installing this new equipment won't negatively affect the airworthiness and the safety of your aircraft.

So you have a great idea...

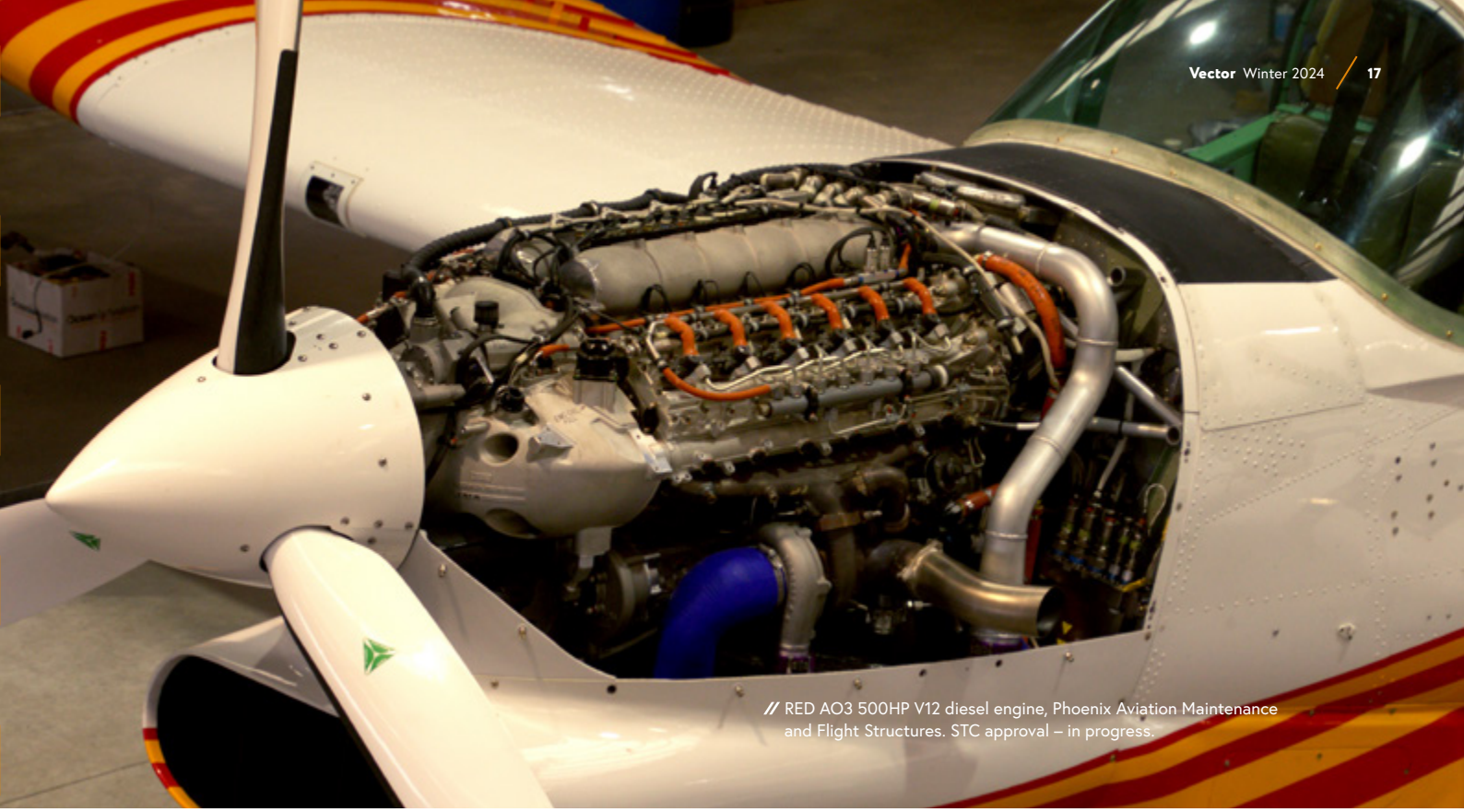
You, as an individual or organisation *could*, legally, come up with a good idea and have the kit designed, manufactured, approved and 'embodied' into your aircraft.

And you *could* develop and complete the necessary compliance documentation and apply to the CAA for an STC yourself.

Bad idea.

The advice from *every* participant *Vector* spoke to, is to go through a Part 146 design organisation because they're the experts. They're dealing with STCs on a daily basis, so provide valuable guidance on the appropriate approach to the CAA for the specific design change you want to make.

Contact the design organisation early in the process and keep the communication lines open between you. Be clear about your requirements and intentions, and together with the design organisation, set goals, targets, and timelines.



// RED AO3 500HP V12 diesel engine, Phoenix Aviation Maintenance and Flight Structures. STC approval – in progress.

Photo courtesy of Bill Sutherland

Then, stay involved in the process. Know what's happening, and what will happen next, and why. Even if the proceedings are slower than you would like, or more expensive than you anticipated, knowing why is better than not knowing what's going on at all.

The '146'

The first major step in the journey to an STC is the creation of the 'project specific certification plan', or a PSCP. This is a core planning document that outlines what technical requirements will need to be addressed, how they will be addressed, when, and by who. The PSCP is reviewed and accepted by the CAA before the project starts, is used to plan what the CAA involvement is in the project, and what is delegated to a Part 146 organisation.

Inside the 146, there'll be various people who have specialist knowledge to design particular changes.

Their areas of expertise might be, for example, the structure of the aircraft, its avionics systems, or its interior layout.

The design organisation makes sure the design change complies with a huge number of rules and standards (several hundred compliance requirements are common for complex projects), so the aircraft remains safe to fly, after the design change.

For instance, how does the change affect the weight and balance and the flight characteristics of the machine? What about the aircraft's structure and airframe, the avionics, and other systems related to the changes being made?

Flight tests may be needed, as well as engineering inspections. New flight manual supplements may have to be created if there are changes to operating procedures, performance, or limitations to the aircraft. If new airworthiness limitations are needed, the instructions for continuing airworthiness may have to be changed.

The STC project may have many tasks that depend on other tasks, and depend on the availability of experts, so any delays could have knock-on effects to the entire project.

Building in some 'fat' and allowing for small delays in the schedule is good practice. It's quite common to discover that changes need to be made to the design, for example after flight testing, which may create delays if not planned for. Discovering these issues and resolving them before approval is one of the main reasons why the STC process exists.

In some cases, hundreds and hundreds of documents are compiled ("...the weight of the paperwork must equal the weight of the aircraft" is a 'joke-not joke' in a 146) and become part of demonstrating compliance for the issue of an STC. »

Finally, a Senior Person at the 146 – a Design Delegation Holder (DDH) – signs a 'finding of compliance', basically saying that the documented evidence demonstrates the airworthiness design standards are complied with, and, 'acting on behalf of the Director, I can approve this aspect of the STC'.

That person is exercising a privilege delegated by the Director which takes many years of experience and training to obtain – so they're *very* careful about what they're saying.

The CAA

The CAA's product certification team are the 'fresh eyes' on the work of the 146 organisation, identifying any inconsistencies in its paperwork or methods, and querying when it's not clear if safety requirements will be met by the design change.

Within its ranks, the team has a variety of skills gained 'out in the field' so it can also guide a 146 organisation, which may lack a particular area of expertise. Where the CAA team itself lacks specific experience, it reaches out to other areas of the CAA, or other regulators for guidance, such as the FAA or EASA.

Individual members of the CAA product certification team, acting on delegation from the Director, need to be satisfied of the continued safety of the aircraft, before signing off on a 'finding of compliance' that current airworthiness design standards are being met.

The team also needs to be confident the proposed design change meets international standards, including making sure the STC application, and the way it's treated, is acceptable in other jurisdictions.

This standardisation is important because STCs may subsequently be validated by other aviation safety regulators for use on aircraft within their area – either directly or via the export of the aircraft.

This means the STC-holder – the operator who had the original 'great idea' – can sell the design change overseas.

New Zealand is a 'State of Design' – which means we have an engineering capability and responsibility for the airworthiness of the design changes approved in New Zealand. It means ICAO recognises that New Zealand's manufacturing and design expertise, safety standards, and levels of compliance are such that other ICAO member states can trust what is developed here.

There are much larger ICAO member countries which do not approve designs of an aircraft from the ground up, as New Zealand does. There are much larger countries which don't have the ability to approve originally designed and manufactured products (called OEMs – original equipment manufacturer) as this country does.

This means that aircraft designs, parts designed, and STCs from New Zealand, hold weight overseas.

The CAA sends approved design changes to overseas aviation safety authorities for validation. If those authorities find risks in the design, or gaps in the airworthiness documentation, New Zealand's reputation is put at risk. It can also damage the commercial benefits associated with designing something that aircraft overseas can use.

The time it takes

The design change process has been described as 'a marathon, not a sprint'. While some simple changes can be approved within months, complex innovations can take years.

Sometimes, a seemingly complex change may, in fact, be quite straight-forward to approve, and others seemingly very simple, are anything but.

The CAA product certification team and the design community say that it does take time to complete a robust design assurance process, so that you can be assured of continuing flying safety.

There's also been a shift over the years, from aviation safety measures largely responding to an accident, to assessing the risk of an accident happening *before* it happens.

As a result, safety standards have become more exacting, and more emphasis is placed on understanding failure mechanisms and designing measures to prevent them from ever happening.

This is possibly reflected in the detailed information that makes up the work of a 146 organisation and the CAA. Those increasingly exacting standards over the years have also corresponded to improved global aviation safety.

If rushing an approval ends catastrophically, so too does everything else – potentially lives are lost and the assurance of safety that came with the STC is devastated. Gone, too, is all the commercial potential of the operator's great idea.

There's a lot riding on a properly processed supplemental type certificate.

// Sometimes, a seemingly complex change may, in fact, be quite straight-forward to approve, and others, seemingly very simple, are anything but. //

// An example of a NZ CAA-approved STC – an upgrade to the cockpit of an 0800 series Cresco.

Photo courtesy of Bruce Peterson

It may be cold comfort to STC applicants who are dismayed by the length of time it takes to get an approval, but the CAA team has in fact – on numerous occasions – received praise from operators and design organisations who've dealt with regulatory authorities overseas, for the team's flexibility, pragmatism, and responsiveness.

And lastly...

The STC process is detailed in Advisory Circular AC21-8 *Design Changes – Supplemental Type Certificate.*

Be careful about the name on the STC application. If the maintainer's name is put down, it's the maintainer who 'owns' the design change that the operator has paid for.

// ADVICE FROM A WELL-ORGANISED MAINTAINER

Before setting out on the path to a major modification or design change, carry out an SMS (Element 8, *Management of Change*) review.

Understand the change, who it will affect, identify related hazards and potential hold-ups, and plan accordingly.

If your change is new or novel, contact the CAA early. The team may not have the capability to consider the STC application, and may need to find that capability externally, or develop it internally before being able to consider the application.

Understand export control rules if you're developing novel technology or military, dual-use technology. Passing technical information across borders can violate those controls.

With novel technology, a major modification and design change can become extremely complex. The design change activities associated with a complex STC can start to get close to the effort and cost of a type certificate.

In planning for these complex projects, use:

- Advisory Circular AC21-8 *Design Changes – Supplemental Type Certificate,* and
- Advisory Circular AC21-7 *Product Certification – Type Certificates, specifically Figure 1: TC Process Diagram.*

Not doing the design, prototype manufacture, and installation within certificated organisations can increase the conformity and compliance issues for the maintainer and operator.

New Zealand has limited access to Category 1 test pilots. This needs to be anticipated at the early stages of the project to make sure a suitably qualified pilot is available and accepted by the CAA to carry out experimental flight testing.

Before many STCs can be approved, the new design needs to be flight tested. This requires separate applications to the CAA for the Test Pilot Approval and Special Experimental Certificate of Airworthiness. The CAA wants to improve applicants' understanding of this process and *Vector* hopes to run an article about flight testing later in the year.

MIXING IT UP – **VFR AND IFR** AT UNCONTROLLED AERODROMES

// By CAA Flight Examiner, Guy Brooking

Perhaps the very essence of working together to stay apart at uncontrolled aerodromes are VFR and IFR pilots taking each other's needs into account.

// Barrier Air flies IFR to the uncontrolled aerodromes of Whitianga, Kaitaia, Great Barrier Island, and from August, Kerikeri.

You're flying into an uncontrolled aerodrome under IFR, in IMC. It may well be VMC below the cloud in the circuit, but you're not certain of the cloud base or ceiling. You can hear traffic in the circuit on the radio, but could there also be some non-radio traffic as well? Should you start an approach or do you need to hold?

Or, you're flying under VFR at the same circuit in the same weather conditions. An IFR flight has begun the approach and made a radio call giving their position. What should you be aware of, and what might you need to consider?

What the rules and guidance say about these situations is what this article is about. It's aimed at both VFR and IFR pilots.

When an IFR pilot flies an approach to join at an uncontrolled aerodrome, communication and cooperation with the circuit traffic is essential. This really encapsulates the intended meaning of the *Work Together, Stay Apart* campaign.

What the rules and the AIP say

Rule 91.229(f)

A pilot of an aircraft in flight or on the surface must— (1) give way to any aircraft that is in the final stages of an approach to land or is landing.

The term 'landing' is clear, while the phrase 'final stages' of an approach to land varies according to the type and size of aircraft concerned. It's referring to the very final stages before landing, where the aircraft is properly configured and slowed down.

For a microlight this might occur within 1NM of the runway, for a light twin it may be at 2NM, whereas for a large turboprop it may occur at 4NM.

Rule 91.223(a)(1)

Except as provided in paragraph (b), a pilot of an aeroplane operating on or in the vicinity of an aerodrome must — (1) observe other aerodrome traffic for the purpose of avoiding a collision.

Essentially, pilots of all flights must maintain a thorough lookout to avoid a collision. This rule is expressed more explicitly in the AIP, below.

AD 1.6 2.1.4

Regardless of whether the flight is performed under IFR or under VFR, pilots must maintain a visual lookout so as to see and avoid other aircraft whilst joining and operating within an unattended aerodrome circuit.

This is an important point for IFR pilots, in particular, to remember – because you may be more focussed on the approach procedure, and the navigation instruments, than on looking outside.

The messaging in the rule and the AIP is the same – *everyone* is to **look out** to avoid collisions.

Guidance from the AIP

The AIP guides pilots planning an IFR approach at unattended aerodromes.

ENR 1.5 4.28.3

It is important that the minimum altitude is not infringed and flight to the aerodrome is not continued unless the pilot is satisfied that integration with circuit traffic operating in flight visibilities down to 1500 m can be achieved. Where a traffic confliction is likely, descent in IMC should be restricted to 1200 ft above aerodrome elevation.

IFR pilots should be aware that circuit traffic may be operating in relatively poor weather conditions, and they should carefully consider their ability to integrate with any traffic. Initially this would be achieved with radio communication. »

Photo courtesy of Barrier Air

» In addition, if an approach is begun in IMC, and there's doubt about separation with circuit traffic, the approach should be abandoned before descending below 1200 feet above the aerodrome.

The AIP also determines priority when an IFR flight is making an approach at an unattended aerodrome.

AD 1.6 2.1.2

VFR traffic in the circuit should be aware that IFR aircraft conducting instrument approach procedures may join long final. Circuit traffic retains right of way unless weather conditions dictate priority to IFR aircraft on the instrument approach procedure, or if the IFR aircraft is in the final stages of an approach to land.

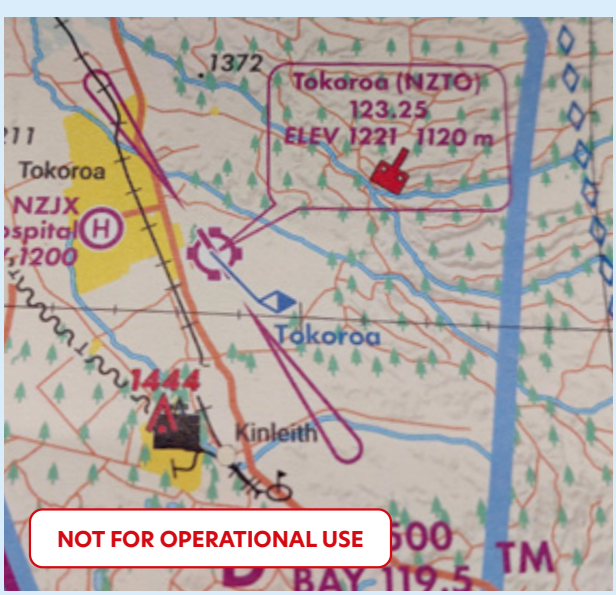
While this advice refers to 'right of way' and 'priority', it's important to remember the goal is more about integrating safely. It's packed with guidance, which can be divided into three areas.

AWARENESS – PRIORITY – WEATHER

Awareness

The first part of the statement, "*VFR traffic in the circuit should be aware that IFR aircraft conducting instrument approach procedures may join long final*", refers to good situational awareness.

VFR pilots operating in the circuit must prepare and plan properly before departure. Start by finding out if there's a published instrument approach at the aerodrome. Look for the aerodrome in the AIP, or by looking at the visual navigation chart where there's a symbol (in the form of an elongated teardrop) for showing instrument approaches at unattended aerodromes. An example of this symbol for Tokoroa can be seen below.



Once you know a published instrument approach exists at the aerodrome, you may want to look at the instrument approach published in the AIP.

If you're not used to looking at IFR charts, be aware that, as a rule of thumb, the final approach track of an instrument approach tends to begin between 10NM and 12NM from the aerodrome. This final portion of the approach is usually aligned to the runway – for instance, for Runway 02, the final portion of the instrument approach will be very close to 020°. But note that it can sometimes be slightly offset by a few degrees.

With this knowledge, VFR pilots should be aware that IFR traffic could be joining on a long final, which could be up to 12NM from the runway. Even when not operating in the circuit, VFR pilots should be aware of these instrument approach areas, and avoid flying too close, either laterally or vertically.

If your aircraft is equipped with a transponder, make sure it's turned on and in ALT mode.

IFR aircraft will be fitted with ADS-B, or even TCAS, and this will help them identify your position.

Priority

The next part of the AIP reference states, "*Circuit traffic retains right of way...*".

Considering the case where good visual conditions exist at the aerodrome, any aircraft joining on a long final – including IFR traffic flying the published instrument approach – must give way to traffic in the circuit.

Therefore, if you're operating under IFR and joining on a long final, you should keep a very good lookout and start listening out early.

As the types of aircraft flying IFR tend to be higher performance, it would be wise to also slow the aircraft down as much as practical. And, be prepared to go around, either into the missed approach, or into the visual circuit to join downwind.

Before arriving at the aerodrome, make a radio call giving your ETA for the initial approach fix, or start of the approach. Follow this with radio calls during the approach to help circuit traffic become aware of your intentions.

In these radio calls, refer to visual features or a bearing and distance from the aerodrome, rather than just the approach waypoints, which VFR circuit traffic may not be familiar with.

> **...pilots joining, or in the circuit of an unattended aerodrome, must display courtesy, airmanship, and cooperation, to ensure they stay safely separated.**

Photo: iStock.com/LazingBee

VFR pilots can also request a time to touchdown from the IFR pilot, to aid in their awareness. IFR pilots should carry the VNC, and as part of the approach briefing, include a review of the chart and the relevant visual reference points.

Whether IFR or VFR, pilots joining, or in the circuit of an unattended aerodrome, must display courtesy, airmanship, and cooperation, to ensure they stay safely separated.

IFR pilots joining should remember that circuit traffic has priority. And, of course, consider the possibility of non-radio traffic in the circuit. Which brings us right back to a thorough lookout and being ready to go around.

VFR circuit pilots should also consider the size of IFR aircraft joining. For larger aircraft, it may be good airmanship to allow them to go first.

This leads us to the next part of the sentence, "*...unless weather conditions dictate priority to IFR aircraft on the instrument approach procedure*".

The tricky part here is, what or who determines these weather conditions? VFR traffic could still be in the circuit when the cloud base and/or visibility are relatively low, and in this case, early communication becomes even more important.

VFR circuit pilots must remember that when operating in poor weather conditions, you will need to give priority to IFR joining traffic – something to remember before flying circuits in such conditions. But once again, the possibility of non-radio traffic being in the circuit must be considered by IFR pilots joining on a long final.

The final phrase, "*...or if the IFR aircraft is in the final stages of an approach to land,*" refers to the rule mentioned at the beginning of this article. The final stages of an approach to land requires pilots to think about the aircraft type that's "in the final stages of an approach to land". It may be good airmanship for the pilots in the circuit to slow down, or extend downwind, to allow a larger aircraft to complete the final stage of an approach.

IFR training

Finally, in some parts of the country, instructors or examiners use uncontrolled aerodromes to train or test their students for instrument approaches, and they may be doing this under VFR.

In these circumstances it's vital they follow the published approach so that their actions are predictable to other aircraft. They should also use the same advice offered earlier to IFR pilots with regards to radio calls and position reporting.

As it's a training flight, the instructor must be aware of how the tasks are divided, ensure they're maintaining a very thorough lookout, and not spending too much time focusing on the instruments.

As they've chosen to operate VFR, there are no circumstances during the joining procedure where they have priority over traffic in the circuit.

This means a greater willingness to give way to the circuit traffic must be displayed, and they must be prepared to go around before causing any conflict.

These situations are not always clear-cut, and they require courtesy from both circuit traffic and IFR traffic, to prevent conflict.

Communicating early, and the readiness to give way from both IFR pilots and VFR circuit pilots, will reduce risk.

It's a perfect example of working together – to stay apart.

// LETTER TO *VECTOR*

Advice from the captain

I read *Vector* frequently.

The article, "Looking out consciously" (Spring, 2023) is very important.

Everyone should acquire the habit of counting to three every time they shift their gaze to a different scene.

It's important in every phase of life including when driving a car.

Another important habit I've acquired, is placing my little finger underneath a cup, or other object, when I pick it up.

Is this important when flying? Yes, it is. I've seen a pilot lift a cup of coffee, only to have the cup drop on to the cockpit's centre pedestal, spilling the contents.

On landing, the aircraft was grounded until everything on that pedestal was checked out.

Acquiring these two habits may save your life.

David Clemow
Captain, NAC/Air New Zealand (Retired)
Auckland

REGISTRATION FEE AND PARTICIPATION LEVY

On 1 July 2024 registered aircraft owners will be invoiced for the Annual Registration Fee and Participation Levy. **If an aircraft is registered in your name on 1 July 2024 you will be liable for that invoice issued.**

Ensure that any deregistration application, application to defer the Participation Levy, or change of possession paperwork, and the application fee is submitted in time for it to be processed before 1 July 2024 to **aircraftregistrar@caa.govt.nz**

For more information, go to **aviation.govt.nz/aircraft** > aircraft registration > fees and levies for aircraft

OCCURRENCES DASHBOARD

These are the number and type of occurrences reported to the CAA, 1 January 2024 to 31 March 2024.

Occurrence type

43	**Aerodrome incident**
24	**Aircraft accident**
602	**Airspace incident**
483	**Aviation-related concern** 71 laser strikes
558	**Bird strike**
12	**Dangerous goods occurrence**
243	**Defect**
20	**Hang glider accident** 1 Hang glider, 19 Paraglider
13	**Navigation installation occurrence** (for example, a transmitter failure)
626	**Operational incident** (for example, encountering severe icing)
3	**Parachute accident**
7	**Promulgated information occurrence** (for example, inaccurate weather information)
2634	**Total occurrences**
18	**Airborne conflict events at unattended aerodromes** (6 critical)

AVIATION SAFETY ADVISORS

Contact our aviation safety advisors for information and advice. They regularly travel around the country to keep in touch with the aviation community.

Carlton Campbell – Operations, South Island
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Richard Lane – Maintenance, South Island
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Pete Gordon – Operations, North Island
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John Keyzer – Maintenance, North Island
027 213 0507 / john.keyzer@caa.govt.nz

AIRSPACE OCCURRENCES

Airspace occurrences can be read on the CAA website, **aviation.govt.nz > safety > airspace occurrence briefs.**

Date:	1 January 2024
Time:	15:25 NZDT
Location:	Napier
Airspace:	NR CTA/D

The pilot was departing Hastings to the north when he infringed the lower levels (LL) of several different CTA/D sectors associated with Napier aerodrome. Airways reported that they tried to contact the aircraft on the FISCOM (and CTA) frequencies. The pilot was only made aware that Airways were trying to contact him via another pilot who heard FISCOM trying to contact the aircraft. That pilot assisted by successfully trying 119.1 and advised the pilot to contact FISCOM. The aircraft then descended clear of the CTA sector it was in at that time.

It is noted the CTA sector airspace in that area is more complex than most other CTAs with up to six different LL sectors depending on the route and altitudes flown.

After engagement with CAA the pilot is now fully conversant with the need to plan better especially near CTA airspace in complex areas such as around Napier, and as another example, the Palmerston North and Ohakea CTAs.

He was also spoken to about the use of 119.1 as a cross country radio frequency. 119.1 is only intended for use at unattended aerodromes when there is no dedicated radio frequency.

The multiple advantages of using FISCOM as the primary cross-country frequency (when not in a MBZ, CFZ, CTR, CTA, or near an unattended aerodrome) were also explained. The pilot has given an undertaking to use FISCOM 'when practicable' on future cross-country flights.

The FISCOM charts published in the AIP also state a countrywide 'aircraft to aircraft' radio frequency 128.95.

CAA occurrence number 24/34

Date:	10 February 2023
Time:	12:59 NZDT
Location:	Whanganui
Airspace:	ASP – airspace
Nature of flight:	Training solo

The student had just joined overhead and was mid-downwind for runway 11 when an IFR aircraft advised it was on a visual approach from the south, and would join right base for 11.

The student decided to extend downwind to give that aircraft space to land ahead, and advised his intentions. He continued downwind and vacated the circuit towards Castlecliff while looking for the traffic.

Unfortunately, the IFR traffic was tracking to join a 5NM final (as per NZWU procedure for aircraft above 5000kg MCTOW) and the student inadvertently flew to a position of conflict. The two pilots saw each other and altered their respective courses. Both pilots then communicated directly and agreed to their respective landing sequences.

The primary cause of this occurrence was that the student became confused about the IFR aircraft's position and did not visually see it, before deciding to extend downwind.

He has since received remedial training, while the IFR operator has elected to conduct full IFR approaches into Whanganui in the future.

Whanganui aerodrome and the associated CFZ and MBZ can be very busy airspace due to a mix of VFR and IFR training flights, transit flights, helicopter operations, medivac flights, and other IFR flights including scheduled airline movements. The AIP aerodrome charts provide guidance and information regarding all operations in and around Whanganui.

NOTE: IFR aircraft flying the full WU RNP RWY 11 approach essentially fly a descending track down the coastline from KAI IWI BEACH VRP to the aerodrome.

They will first cross a point named DUDED (not below 2200 feet AMSL). DUDED is 2NM up the coast and just inland from KAI IWI BEACH VRP (and 10NM from NZWU).

The next point they cross is the Final Fix [FF] point. The FF is approximately 1NM up the coast from Castlecliff and 700m offshore (5NM from NZWU). They will not descend below 1490 feet AMSL until after crossing FF.

5NM is also the distance where all aircraft above 5000kg MCTOW on a visual approach should position and report, as they join for the runway in use.

VFR aircraft tracking up or down the coastline from NZWU must therefore be mindful of:

1. any IFR traffic inbound on the above approach
2. where they will commence final from if on a visual approach, and
3. knowing, and complying with, the VFR MET minima for that airspace.

CAA occurrence number 23/1339

ACCIDENT BRIEFS

More accident briefs can be seen on the CAA website, **aviation.govt.nz** > **safety** > **aircraft accident briefs**. Some accidents are investigated by the Transport Accident Investigation Commission, **taic.org.nz**.

Titan Tornado I	
Date and time:	26-Jan-2024 at 09:46
Location:	Snow River
POB:	1
Nature of flight:	Private other

While flying over bush and climbing, the aircraft sustained a sudden power loss. The pilot tried to regain engine power while manoeuvring to perform a forced landing. After an unsuccessful effort to regain power, the pilot deployed flaps, shut down the engine, and performed a forced landing into the river. The left wing struck the top of a tree, causing the aircraft to spin as it contacted the river. The pilot exited the aircraft without significant injury and activated their PLB. The aircraft was destroyed and the pilot was extracted by rescue services.

CAA occurrence number 24/665

MD Helicopters 500N	
Date and time:	03-Jun-2023 at 09:49
Location:	Glenorchy
Nature of flight:	Transport passenger A to A
Pilot licence:	Commercial Pilot Licence (Helicopter)
Age:	51 yrs
Flying hours (total):	11050
Flying hours (on type):	2500
Last 90 days:	74

During a commercial flight with passengers onboard, while climbing through 4500 feet AMSL, a sudden and significant power loss occurred. The pilot conducted a forced landing on sloping ground. The aircraft rolled over and the occupants, who were uninjured, were able to extract themselves from the aircraft.

The engine was removed and sent to a test and overhaul facility where, with CAA oversight, it was determined that the fuel control unit governor spring had failed, causing the metered fuel supply to reduce to minimum flow. Rolls-Royce in the USA is working to determine the reason for the spring failure.

CAA occurrence number 23/3948

De Havilland DH 82A Tiger Moth	
Date and time:	07-Jan-2024 at 12:59
Location:	Forest Field
POB:	2
Damage:	Substantial
Nature of flight:	Private other
Pilot licence:	Private Pilot Licence (Aeroplane)
Age:	56 yrs
Flying hours (total):	1846
Flying hours (on type):	61
Last 90 days:	113

The aircraft had just lifted off when the pilot felt the engine was not giving full power. He hesitated for a few seconds before starting his trouble checks. He was then startled as the aircraft dropped a wing, dove into the ground, and tipped over.

Both occupants were wearing helmets and were fully restrained by their seatbelts. They were able to free themselves immediately and move clear of the aircraft.

At this time there is no indication of the cause for the reduced engine power output, however if anything conclusive is found later the pilot will notify the CAA.

The pilot attributed the survivability of this accident to several factors:

- Modified seatbelts by Thompson Aviation (the belts restrained both occupants during the accident and when hanging upside down).
- A kevlar helmet by Ivan Campbell (the pilot felt he would have been knocked out without it).
- A modern replica fuel tank from Croydon Aircraft Company (original tanks often split open but this one did not leak at all).
- His ELT activated immediately and was correctly registered to him, so RCCNZ was in contact within a few minutes of the accident.

CAA occurrence number 24/28

ACCIDENT NOTIFICATION
24-hour 7-day toll-free telephone
0508 ACCIDENT (0508 222 433)
aviation.govt.nz/report

GA DEFECTS

GA defect reports relate only to aircraft of maximum certificated take-off weight of 9000 lb (4082 kg) or less. More GA defect reports can be seen on the CAA website, **aviation.govt.nz > aircraft > GA defect reports**.

KEY TO ABBREVIATIONS:

AD = airworthiness directive
NDT = non-destructive testing
P/N = part number
SB = service bulletin
TIS = time in service
TSI = time since installation
TSO = time since overhaul
TTIS = total time in service

Alpi Aviation Pioneer 200

Engine

Part model:	2200A
Part manufacturer:	Jabiru
TSO Hours:	870
TTIS hours:	1470

The pilot reported hearing a metallic rattle several seconds before the propeller stopped in cruise at 2800RPM. The pilot carried out a forced landing, resulting in minor damage to the airframe.

There was no external evidence of engine failure, but there was damage to the prop and nose wheel due to the wire strike on landing.

Movement of the propeller was limited to about 10–15 degrees of rotation and was locked in both directions.

The oil filter was removed with no immediate evidence of failure. The filter was cut open and found to be heavily contaminated with metal. Cooling ducts were removed, to allow the removal of the spark plugs. The #4 cylinder aft plug was removed and the electrode tip was missing. Severe damage to ceramic was noted.

Plugs removed from all other cylinders all appeared normal. Borescope of the #4 cylinder revealed catastrophic failure of the piston with a massive amount of debris in the cylinder barrel. The induction system was removed and debris including piston gudgeon pin circlip was noted in the induction tube from the #4 cylinder.

The exhaust system was removed with debris found inside as well, which was not able to be identified. The #4 cylinder head was removed, and the inlet valve was missing and the exhaust valve was bent. There was also impact damage on the face of the head and signs of recession around the sealing area of head to barrel. In the cylinder barrel were the gudgeon pin, inlet valve head, and remains of piston and rings.

The connecting rod was bent back on itself, which caused the lock up but remained in one piece.

Without further investigation by a laboratory it's difficult to determine exactly why the #4 cylinder failed. But it's likely that the overheated head and associated recession of the head led to a leak of combustion in that cylinder, which caused an excessively lean condition, followed by detonation, and ultimately failure of the piston.

The aircraft was fitted with a rudimentary CHT gauge which was likely under reading or not functioning correctly so the pilot(s) would most likely have been unaware that the cylinder was in distress. The engineer has recommended, and the operator agrees, that a digital engine monitor will be fitted to this aircraft when the new engine is installed.

CAA occurrence number 23/4792

Robinson R44 II

While carrying out a reconnaissance flight, the pilot felt a 'slight bump' and noticed that the bucket, strops, and spreader bar had fallen from the hook. The pilot contacted the engineer and took the helicopter to the maintenance facility for inspection.

The investigation determined that the spreader bar that connects to the helicopter external load hook directly, and is part of the bucket assembly, was potentially too big for the Robinson R44 undercarriage. This carries a risk of contact from the spreader bar on landing if the end of the spreader bar were to dig into the ground.

The design of the spreader bar has an offset attachment that connects directly to the helicopter hook mechanism. This offset attachment means the bucket/load sits more level when in flight. However, when in the hover or landing, it means the spreader bar is angled down and could potentially end up with one end digging into the ground on landing, resulting in the other end contacting the hook mechanism, potentially causing enough damage to result in the uncommanded release of the hook.

The operator has determined that a smaller level spreader bar design would be more suitable for the Robinson R44 profile and hook mechanism. They have also introduced more frequent bucket/spreader and hook inspections as part of general ag operations procedures which may help to identify damaged equipment earlier.

CAA occurrence number 23/5308

Upcoming 2024

COURSES, WORKSHOPS, AND SEMINARS

To find out more about the courses and workshops below, and to register, go to ***aviation.govt.nz/education*** > courses and workshops.

For the *Work Together, Stay Apart* (WTSA) seminars, head to ***aviation.govt.nz/wtsa*** > events.

Airworthiness and maintenance workshop
Nelson > 13–14 June
Wellington > 23–24 July
Taupō > 3–4 September

Dangerous goods course
Dunedin > 11–12 June
Gisborne > 25–26 June
Auckland > 6–7 August

Occurrence investigation workshop
Auckland > 18 July
Christchurch > 12 September

WTSA – Aerodrome users seminar
Omaka > 12 June
North Shore > 20 June
Wānaka > 25 June
Kaikoura > 10 July

WTSA – Circuit certainty seminar
Rangiora > 31 July
Timaru > 1 August
Oamaru > 6 August
Taieri > 7 August
Invercargill > 8 August
Hokitika > 20 August
Motueka > 21 August
Nelson > 22 August
Wellington > 2 September
Kapiti > 3 September
Masterton > 4 September

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Work together
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