March / April 2000

VECTOR

Pointing to Safer Aviation

CO-EXISTING WITH BIRDS

PILOT PRE-FLIGHT

GROWING OLD GRACEFULLY

STUDENT PILOT CROSS-COUNTRIES

CAA
CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

VECTOR

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Cover Photo: Tens of thousands of these birds, South Island Pied Oystercatchers, frequent the Firth of Thames. At an adult weight of 550 grams, they pose a significant hazard to low-flying aircraft.

Co-existing with Birds

Photograph courtesy of Departement of Conservation

There are a number of significant wildlife sites throughout New Zealand, some of which are protected by Restricted Areas. Birdlife sites which are not so protected are vulnerable to low-flying aircraft – and the low-flying aircraft are exposed to a bird-strike hazard.

Firth of Thames

The Firth of Thames is a very valuable - and vulnerable - ecological site. One of New Zealand's three most important coastal stretches for wading birds, it is listed under the Ramsar Convention as a wetland of international importance, and in 1996 it was officially designated a reserve site on the East Asia-Australasia Shorebird Reserve network. This network focuses attention on important breeding, migration refuelling stops, and wintering areas for shorebirds in 14 countries between Australasia and the tundra of Alaska and Siberia.

The Firth is particularly significant for birds, consisting of sand, silt and shell deposits used as high-tide roosts, as well as extensive intertidal flats and adjacent grass flats used for feeding. The shellbanks on the Miranda coast on the southwestern corner of the Firth provide the best high-tide roosting areas, and therefore the biggest concentrations tend to be on this coast. The southern coastline, from Miranda to the Waihou River mouth, consists of extensive soft mudflats beyond the mangrove zone and is an important feeding ground for coastal waders.

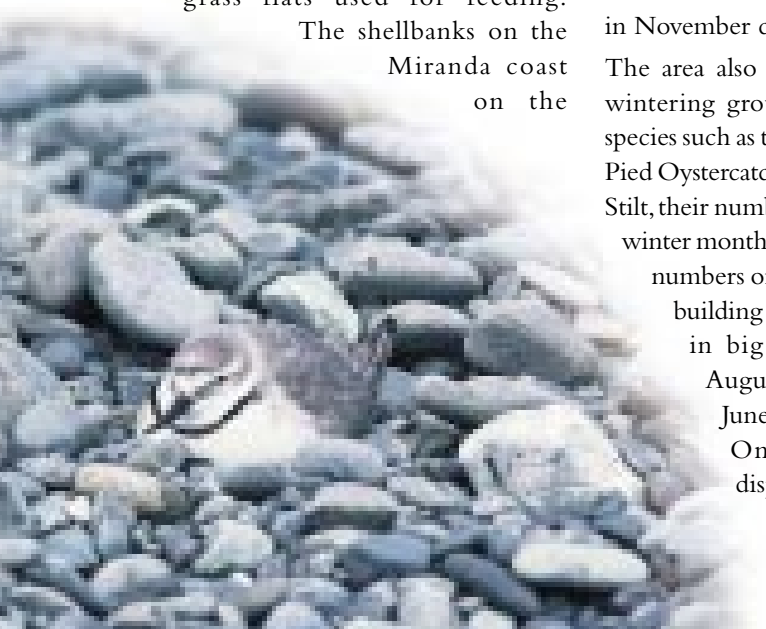
Many of the bird species are migratory, New Zealand being their destination for our summer (their northern winter), although a few of each species winter over each year.

The most abundant of the Arctic migrants are the Godwit and the Lesser Knot. These usually start arriving from late September through to early November and are then present on the Firth until late March. A summer census in November counted over 17,000.

The area also serves as an important wintering ground for New Zealand species such as the Wrybill, South Island Pied Oystercatcher (SIPO) and the Pied Stilt, their numbers being greater in the winter months. From early January the numbers of SIPO and Wrybill start building up and are then present in big numbers until early August. A winter census in June counted over 25,000. Once the flocks start dispersing to breed there are usually 3000 to 4000 remaining through the summer. In addition, several thousand Pied Stilts are usually present throughout the year.

Endangered species New Zealand Dotterel and Variable Oystercatcher are known to nest at Miranda.

But of particular concern is the status of the Miranda coast for Wrybill, the only species in the world with a beak bent sideways. Over half of the entire worldwide population of Wrybills are present at Miranda for much of the year. While the Firth of Thames is a major New Zealand site for all waders, it is this Wrybill factor which makes the area of critical international significance.



A Wrybill nests on the foreshore. Photograph courtesy of the Department of Conservation.

Birds Can Fight Back

Low-flying aircraft are construed as large birds of prey. Mayhem commonly occurs, frightening chicks and adults into adjoining territories, where fatalities often occur. Low flights can also interrupt the feeding patterns of the bird flocks.

Flights at legal heights can also disturb birds.

The average number of birds present over the year is 25,000, while the total number may peak at 40,000 birds during summer. Thus there are large bird

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concentrations on the Firth for much of the year, creating a significant hazard to low-flying aircraft. One incident occurred during a census of shorebirds between Miranda and Kaiaua. There were 11,500 birds along that shoreline that day - 10 tons of potential birdstrike hazard!

It should be noted that during winter, or after periods of heavy rain, many waders disperse into coastal paddocks up to two kilometres inland. Thus low-flying activity could be hazardous over these areas as well.

Messages for Pilots

Because of the area's ecological significance, an Education Centre has been established at Miranda by the Miranda Naturalists'Trust, and there are usually plenty of witnesses to any low-flying activity.

In recent times there has been a marked increase in aircraft activity observed over Miranda. Low-flying aircraft over the shoreline roosts are quite a problem at times. So are the regular (at times daily) visits of aircraft engaged in aerobatics.

We ask pilots to be aware of sensitive birdlife sites in their area, and to avoid flying over such sites if possible, or to pass over them at 1000 feet agl, preferably higher.

The Miranda Naturalists' Trust have advised us that they are interested in establishing a dialogue with the aviation community, and this is being explored. They say that they do not necessarily seek to exclude all aircraft activity from the Miranda area, but rather to ensure that they pass over at high altitude, and that activities such as aerobatics are excluded. They would welcome visits by aviators to the Shorebird Centre to see what they have at Miranda and why they are concerned.

We first ran an article about Miranda in 1995. Yet aircraft continue to cause danger to endangered species. If competing interests can not be accommodated, it is inevitable that there will be pressure to establish more Restricted Areas. ■

Warbirds Over Wanaka

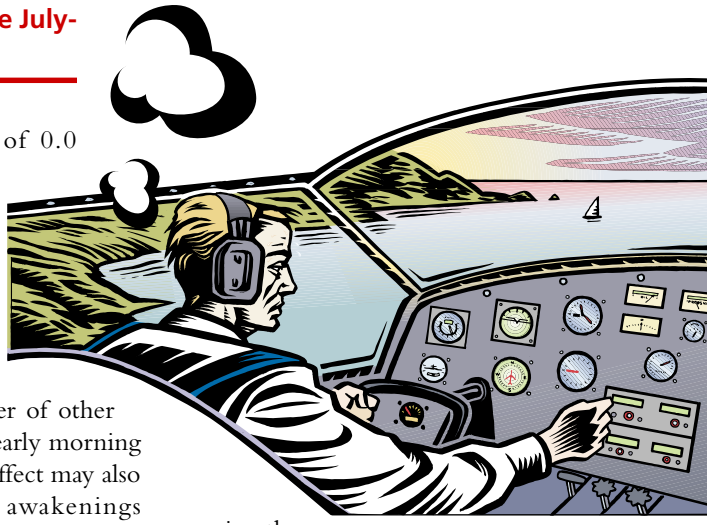
The Warbirds Over Wanaka airshow is nearly upon us once again – something that can't come around fast enough for many of us. Because of the magnitude and intensity of this event, *Vector* would like to remind pilots, planning to fly in to watch the show, of a few basic points that will help ensure that everything runs smoothly and without incident.

- Carefully read the *AIP Supplement* relating to the Warbirds Over Wanaka airshow (AIRAC 00/4 effective 20 April 2000). Particular attention should be given to understanding the associated Restricted Area, Control Zone, and arrival/departure procedures. It is important that you carry a copy of the *Supplement* with you in the aircraft for further reference when flying in and out of Wanaka.
- Allow plenty of time to plan your flight thoroughly. Your pre-flight preparation should include: familiarising yourself with the surrounding topography, airspace, and reporting points; obtaining a full weather and NOTAM briefing; and talking to other pilots with experience of flying in to the airshow. Plan to carry extra fuel in case of being required to hold – weather constraints and traffic density may necessitate this.
- Ensure that you have a full complement of up-to-date charts on board (this should include the Queenstown/Milford VTC – especially if you are planning to overnight in Queenstown). An informal survey of itinerant pilots at the 1998 Warbirds Over Wanaka airshow indicated that a great many did not have up-to-date charts or *VFGs* – a situation that *Vector* is keen to help improve.
- Finally, make sure that you file a flight plan, as failure to do so may mean that you are denied entry clearance into the Wanaka Control Zone established for the event. (Note that a SARWATCH will not suffice, as it does not provide ATC with an ETA for the Control Zone boundary.)

As with most things, preparation is the key – so make sure you have that key! ■

Pilot Pre-flight

The effects of alcohol on a pilot's performance should never be under-estimated, and it can last for many hours after the last glass has been consumed. The following article highlights the hidden dangers. Written by Dr David G.Newman, chief instructor at the RAAF Institute of Aviation Medicine, it was published in the July-August 1999 issue of *Flight Safety Australia.*



We all know that an intoxicated pilot presents a serious hazard to flight safety. In the US, approximately 16 percent of general aviation accidents are alcohol-associated, a rate which has been relatively constant since the 1970s. But that's just part of the story.

These statistics only account for those accidents where a pilot has had a blood alcohol concentration above zero. How many other accidents have been caused by alcohol's less-publicised after-effects, like fatigue, nausea and headache?

While the consequences of excessive alcohol intake on performance are well known, most people are less aware that their performance can be impaired long after their blood alcohol concentration returns to zero. For that matter, even low or moderate amounts of alcohol the night before can seriously jeopardise the safety of a flight the following morning.

Fatigue

Alcohol is a widely used and readily available aid to sleep. The problem with alcohol is that it interferes with normal sleep patterns. This results in poor quality sleep, even though the total hours of sleep may be in the normal range. The reason for this is that alcohol promotes early deep sleep and suppresses early REM (rapid eye movement) sleep, the phase in which dreaming occurs. This can occur with quite small doses of alcohol, that is, with blood alcohol concentrations as low as 0.025 percent. Larger doses may suppress REM sleep altogether. The change in sleep patterns or the deprivation of REM sleep causes subjective feelings of tiredness and impaired concentration the next day.

The news is not all bad however. Because the body will metabolise alcohol at the average rate of one standard drink per hour, alcohol can be safely consumed with an evening meal for example, providing enough time is allowed for your blood alcohol concentration to drop. The best target is to have a blood alcohol concentration of 0.0 percent before lights out!

This point is worth emphasising – a nightcap just before retiring to bed may make you feel more fatigued and less alert the next morning.

Alcohol also has a number of other effects on sleep. It causes early morning waking, and the diuretic effect may also promote a number of awakenings during the night as the requirement to empty one's bladder at frequent intervals becomes paramount. Alcohol will also accentuate the effects of jet lag. A few drinks after a flight across several time zones will certainly not help recovery from jet lag, and it may in fact make the situation worse by degrading the quality of any sleep that the pilot manages to get.

Disorientation

Orientation in flight depends on three basic mechanisms, sight, balance (vestibular system), and 'seat of the pants'. Even small amounts of alcohol can significantly impair all of these systems.

The impairment of the vestibular system by alcohol will be well known to anyone who has had a big night on the town and woken the next morning to find that even the slightest head movement results in dizziness and the room going into a high velocity spin. This is caused by alcohol entering the semicircular canals, which are responsible for sensing angular movements of the head. The alcohol dilutes the fluid in the canals, reducing its density by a considerable degree, meaning that with any given head movement the fluid will travel further and faster, resulting in exaggerated signals of head movement being sent to the brain. This phenomenon is extremely disorientating on the ground, but it is much worse in the three-dimensional environment of flight.

The Coriolis phenomenon is a severe tumbling sensation brought on by moving the head out of the plane of rotation, simultaneously stimulating one set of semicircular canals and deactivating another set. Even modest amounts of alcohol can induce this effect with even the slightest head movement while flying, causing significant tumbling feelings and disorientation. This is particularly dangerous in IFR flight, which is made significantly more difficult by this phenomenon.

The effect of alcohol on the vestibular system can persist for up to **several days** after blood alcohol levels have returned to zero.

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Test Your IQ

Take this simple test to find out how much you really know about alcohol.

1. A 12-ounce beer, a 4-ounce glass of wine, and a 1-ounce shot of whisky all contain the same amount of alcohol. **True/False.**
2. A couple of drinks before bed improves sleep quality. **True/False.**
3. Women react differently to alcohol than men, and generally can expect greater impairment from the same quantity of alcohol. **True/False.**
4. Pilots change their drinking patterns when away on a duty. **True/False.**
5. Modest amounts of alcohol don't affect your flying. **True/False.**

Answers Page 10

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Nystagmus affects the visual system and is described as a series of involuntary oscillatory eye movements generated by stimulation of the semi-circular canals. Nystagmus can be caused by spin recoveries, and its symptoms are amplified, in severity and duration, if there is alcohol in the system. Pilots suffering from nystagmus find it extremely difficult to focus on either the outside world or the instrument panel. The disorientating potential of such a situation is quite marked, and it can lead to complete loss of control of an aircraft. Nystagmus can be demonstrated up to 11 hours following the intake of a single dose of alcohol.

Performance

The hangover syndrome can last 24 to 48 hours (depending on the amount of alcohol consumed in the intervening period). Hangover includes symptoms such as headache, gastrointestinal disturbance, impaired mental ability, and fatigue. It can seriously degrade a pilot's performance, **even if** the blood alcohol level is **zero**. This is well illustrated by a study in which pilots flew a simulator profile 14 hours after achieving a blood alcohol level of 0.01 per cent. Their procedural error rate was 68 percent.

The general feelings of ill-health during the hangover period also have a negative effect on the performance of the pilot.

"While the consequences of excessive alcohol intake on performance are well known, most people are less aware that their performance can be impaired long after their blood alcohol concentration returns to zero."

For example, the headache is at best a distraction, but it can be severe enough to effectively incapacitate the pilot and limit his or her ability to control the aircraft safely.

Other Flight Stresses

Alcohol also interacts with other stresses of flight. It is a known risk factor for increasing the susceptibility to altitude hypoxia and decompression illness (the bends), and it also interferes with the regulation of body temperature.

Of importance to aerobatic pilots is the fact that alcohol reduces tolerance to G. Some studies have shown that even a moderate level of alcohol will reduce the G tolerance of the pilot by approximately 0.5 G. Alcohol relaxes smooth muscle and allows the veins and arteries to dilate. When G is applied, a greater percentage of the pilot's blood volume is driven to the lower body – hence away from the head. This effect is made worse by the dehydrating effect of alcohol, which reduces blood volume. Less overall blood volume and a greater percentage of blood heading into the legs will reduce tolerance to positive G and increase the risk of G-LOC (G-induced loss of consciousness). Increased levels of G also tend to exaggerate the nystagmus induced by alcohol, a situation that can persist for some 48 hours.

Conclusion

Alcohol has a number of persistent effects that can negatively impact on flight safety. There are significant problems in flying during the hangover period, and, as shown above, even flying the morning after a few drinks the night before may not necessarily be the safest option. Adherence to a simple bottle to throttle rule does not guarantee maximum performance in the air.

As safety-conscious pilots we should only fly when we are mentally and physically fit. In some cases that may mean not flying the morning after the night before. ■

Comments on Microlight Safety

*The following comments are from an item in Transport Canada's **Ultralight and Balloon** publication. They arose from interviews with ultralight dealers at a trade show in Toronto in 1997. Most of the concerns raised are relevant to the New Zealand scene (where we use the term microlight).*

Collectively, the people interviewed at the Show would represent approximately 150,000 hours of assembly, maintenance and flight time relating to ultralight aircraft. Each interviewee was asked the same general questions in an effort to glean some safety information from these experienced people.

In general, they all expressed concern about pilots' lack of training on type prior to attempting flight, and agreed that the safest course was to get a type check prior to gaining solo experience on a particular type of ultralight or advanced ultralight. They were concerned about risk-taking licensed pilots who, because they have the legal privilege, will attempt flight in ultralights without further training or a type check - a practice that has resulted in serious accidents. [In New Zealand, a licensed pilot must gain a type rating for a microlight, as for any other aircraft.]

Additional safety concerns that interviewees raised included:

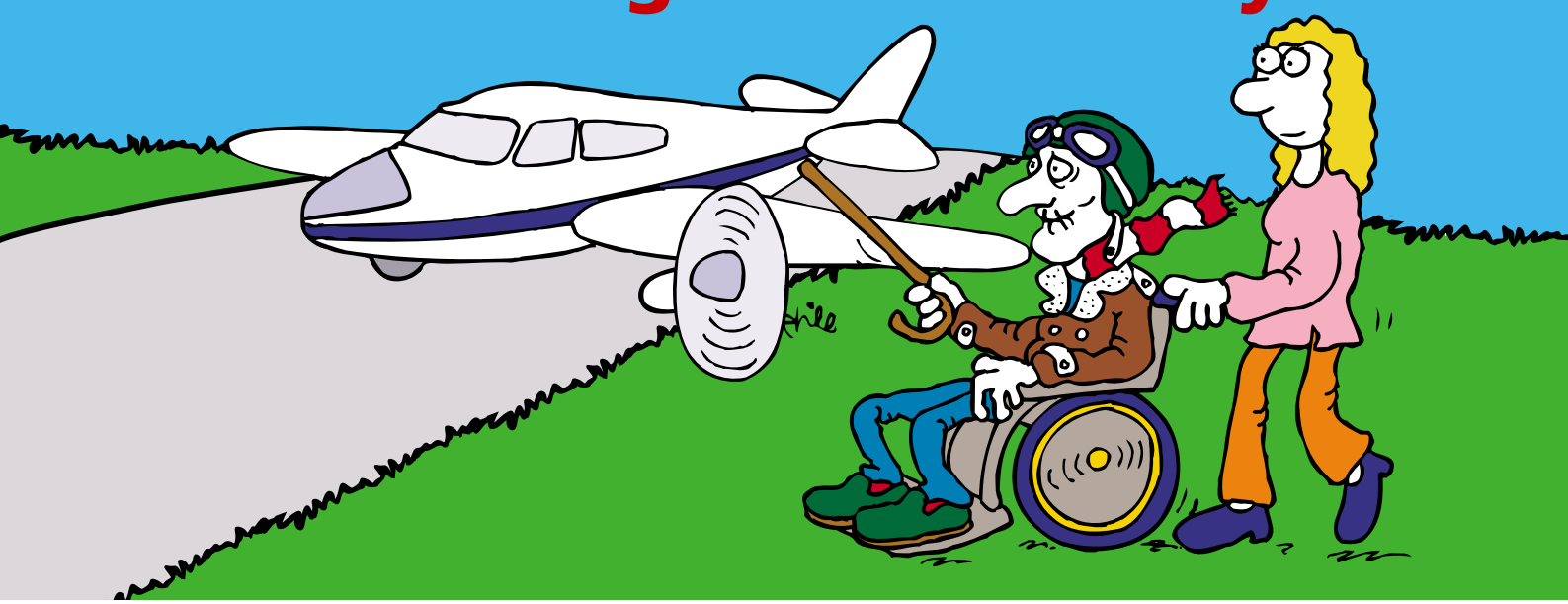
- improper pre-flight inspections after hauling or towing and re-assembly
- failure to secure items in the cockpit that could enter a pusher propeller during flight
- the major contribution of contaminated fuel, or water in fuel, to engine failure
- operation of the aircraft at speeds too close to the stall speed, particularly during low-level turns
- failure to control the aircraft after the loss of an engine, owing to distraction

It was considered that some general safety concerns are being alleviated by improved engines and the low stall speed of the new ultralights. The following points were made.

Rotax has improved its engine's safety and performance by making the bearings and crankshaft heavier and adding dual ignition.

The low stall speed and the addition of full-span ailerons and flaps on some new aircraft provide good low-speed handling in the event of an engine failure. This gives the properly trained pilot an excellent chance of getting the aircraft down safely in an emergency. The light weight and low stall speed keep the deceleration forces low during the touchdown and short rollout afterwards. Therefore, nearly all such forced landings are survivable and involve little or no injury to the occupants, even in rough or forested terrain - provided that the pilot maintains control and does not stall the aircraft during the forced approach. ■

Growing Old Gracefully



Do you need bright sun on the map to read the name of a small town? Do you start to read back the ATIS and, having concentrated on remembering the QNH, now can't remember what letter it was? Thinking of buying a better quality headset (nothing wrong with your hearing, of course)? Perhaps you are finding you don't have the stamina you used to. Join the over-50s club! (I don't think it is just me!)

On the tennis court, I find that old age (ie, experience) and cunning can still outdo youth and fitness (sometimes). Experience counts in aviation also – depth of experience can counteract (to some degree) the slowing down of thought processes and the ability to act quickly. Age certainly brings maturity and caution, not so evident in the young, and we use this experience to avoid situations with the potential for added stress and which may require rapid thought and action. A variation on the saying "A superior pilot uses his or her superior knowledge to avoid a situation which would require his or her superior skill".

Ageing has predictable and progressive physiological changes that start when we are in our 20s. From then on, our metabolic process drops about two percent each decade. Ageing is a gradual and progressive change, happening faster with some and slower with others, but it will affect all of us in due course.

There are measures we can take to improve our quality of life, to reduce risks and probably to increase our longevity. Naturally, a healthy diet and regular exercise would be at the top of the list.

Getting older can create problems for everyone, especially pilots. What are these problems?

Matters of the Heart

Coronary heart disease is the largest single killer of men and women. The risk of developing heart disease (including heart attacks, coronary artery disease and rhythm disturbances) increases with age (but these events can occur at any age). Age, however, is but one risk factor for heart disease, along with family history, gender, elevated cholesterol, smoking, and diabetes.

Hypertension (high blood pressure) is more prevalent as we age. Untreated high blood pressure is related to increased risk of strokes, the risk doubling each decade after age 55.

These problems generally have no early symptoms, and waiting for something to feel wrong is a poor indicator of your health and can mislead you into thinking your lifestyle is healthy. Only periodic testing will rule out the early existence of potential problems. We can't do anything about our age, gender or family history, but we can take charge of the other risk factors through diet, exercise, and medication.

There has been some controversy and misunderstanding recently about assessment of cardio-vascular risk, with some older pilots feeling threatened and apprehensive. Others have seen the positive side and been grateful for the chance to manage a condition that has come to light, or thankful for the knowledge that there is no problem at this time.

Diabetes

The incidence of diabetes in New Zealand is on the increase. It is a complex metabolic condition involving a persistent increase in the level of glucose in the blood. Diabetes is more common with increasing age, and early symptoms may go unrecognised. The onset of diabetes may be accompanied by symptoms of excessive thirst, frequent urination, weight loss, fatigue, blurred vision, and recurrent skin infections such as boils. Long-term effects include damage to the kidneys, cardiovascular system, arterial system and the eyes. Blindness is a particularly nasty complication.

These complications are serious and may mean the loss of your medical certificate. Diabetes needs to be diagnosed early and fully treated.

Vision

Your eye's ability to receive and focus light can deteriorate as you age.

Almost everyone will develop presbyopia as they age, when their ability to focus on near objects decreases. This can be recognised when you wish your arms were longer! Reading material has to be held further away to read, or more light is needed to read in low-contrast conditions. The solution is simple – wearing corrective lenses.

The speed of accommodation, the ability to change focus from near to distant, decreases with age. This affects not only near and distant vision, but also the intermediate range (eg, instrument panel distance).

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The chances of developing cataracts (opacities in the lens of the eye) or glaucoma (increased pressure in the eye) increase with age. Both glaucoma and cataracts can reduce a pilot's visual sensitivity in low-contrast situations. Your ability to pick out other aircraft against the background sky can be compromised and glaucoma can result in tunnel vision.

It is a good idea for pilots over the age of 50 to have the pressure in their eyes tested by an optometrist or ophthalmologist.

"The older we get the more sensitive we are to sleep deprivation... we become fatigued more easily and take longer to recover."

Hearing

Although hearing loss due to age is not as significant as that due to unprotected exposure to high levels of noise, there is a gradual change related solely to ageing. We can take measures to protect our hearing from exposure to noise by wearing suitable protection (ear-plugs and/or a good quality headset). Noise-induced hearing loss can be permanent and typically occurs gradually over a period of time.

If you have to raise your voice to be heard then you should consider ear protection. Your options are to avoid the noise altogether, limit the time you are exposed to the noise, or to wear NZSO approved hearing defenders along with ear plugs for maximum protection. Aviation headsets offer varying degrees of noise protection, so make sure that you use a good quality set that is suited to the type of flying you do.

Mind ...

As we grow older we become slower at processing information. It can be more difficult to absorb new knowledge, especially technical knowledge, and we can be less receptive to change and to embracing new concepts.

We age, and so does our memory. Unfortunately the first thing to go is the part we like best, episodic memory, which tells us what we did last night or where we parked the car. The procedural memory for automatic actions, on the other hand, remains intact for a very long time. You are more likely to forget where you put your tie than how to knot it.

The deterioration begins in our 30s, but the difference in performance between the young and the less young is not attributable to memory deterioration alone. When people are required to perform more than one task at the same time, performance on at least one task often declines. Research has shown that older people have a poorer performance in multi-task situations, but the age-related gap decreased with practice. A specialist in ageing memories says that, if you force older people to pay close attention and process the information very deeply and give them a lot of good cues when they are recovering memories, a lot of the differences can be eliminated.

Concentrating, remaining attentive, being interested in what one is reading or hearing, and finding ways to recall a fact or a person's name, are methods to combat failing memory.

Reducing stress is another way to help prevent the memory problems that invariably accompany ageing. Paradoxically, the older we get, often the more responsibility we have and the harder we are required to work.

Because pilots, in general, are a group who are keen to learn new ideas and take on new challenges, they are in fact enhancing their chances of staying that way. As one expert has said "If you are using your brain, you are actually preserving your brain."

... and Movement

As we grow older our reflexes and reaction times become slower.

The older we get the more sensitive we are to sleep deprivation and, in particular, to jet lag. We become fatigued more easily and take longer to recover.

We need less calories to maintain our ideal weight, but our appetite for the tastier but less-nutritious foods increases (are you pleased there is a scientific reason for that!?). The same holds true for tolerance to alcohol in any form. It takes less to feel the effects, and there is more discomfort the next morning.

Hypoxia is more noticeable and gets worse with age. A 5000-foot differential is enough to become impaired, both mentally and visually, especially on long flights. Remember that many cockpit or cabin pressures are up to 8000 feet.

What Can We Do?

Obviously, we can't stop the clock. But studies say that exercise is the key to coping with many age-related problems. These studies suggest that older adults have more reason to exercise than any other age group.

In addition to increasing tolerance to the abuse we sometimes deal to our bodies (late nights, excesses, etc) hypertension, heart disease and diabetes are easier to control when associated with a good exercise programme. It does not need to be excessively strenuous – walking regularly (five hours per week) is one of the best and easiest forms of exercise.

Sensible eating (and drinking) habits will contribute to a longer life (and in the air for longer). A healthy diet low in fats and oils, moderate in meats and dairy products, and high in fruit, vegetables and cereals, is the way to go.

It can be reassuring to know that one's health is under scrutiny at regular intervals, and many pilots have reason to be grateful when medical conditions they were unaware of have been discovered at their pilot medical, and they have been able to be treated before significant problems occurred.

"A superior pilot uses his or her superior knowledge to avoid a situation which would require his or her superior skill"

We can not deny the march of time. We are all different, however, and age at different rates – and there are measures we can take to slow the rate down.

Being aware of the possible changes we can expect is half the battle. Stay attuned to your body, and use those years of experience to make an honest assessment of your 'fitness to fly'. Be prepared to listen to what others (your instructor, peers, doctor) may be trying to tactfully tell you. A healthy diet and regular exercise will help you answer 'yes' to the 'fit to fly?' question for a longer period of years. ■

Student Pilot Cross-countries

The Problem

There has been a noticeable upward trend over the last 12 months in the number of airspace infringements made by student pilots on solo cross-country training flights into aerodromes within controlled airspace. Students pilots who are undertaking their flight training from unattended aerodromes – numbers of which have been swelled by those that until recently had ATC or Aerodrome Flight Information Service (AFIS) in attendance – feature quite heavily in these statistics and are of particular concern.

Specific problems include: inability to report at designated reporting points, entering the Control Zone (CTR) without a clearance, straying into Terminal Control Areas (TMAs), entering the active runway without a clearance, taking off without a clearance, and generally being unfamiliar with basic RTF phraseology.

Student pilots are not getting the same level of exposure to ATC/AFIS procedures, and controlled airspace in general, as they used to before the withdrawal of these services from their home aerodrome. In fact, some student pilots are completing the PPL syllabus having flown into a controlled aerodrome only a few times – something that is also resulting in airspace infringements after they have gained their licences.

Instructors

It is the role of the supervising instructor to ensure that the student is adequately briefed before any solo training flight is authorised – especially a solo cross-country into unfamiliar controlled airspace. Even though the same (or similar) route may have been flown recently as a dual cross-country exercise, the student should still receive a thorough briefing from the instructor on what to expect during the flight.

A comprehensive brief for such a flight should include:

- Discussing the main topographical features and types of airspace that will be encountered along the route. This should include reviewing both the topographical and the visual terminal charts.
- An explanation of what ATC clearances they can expect to receive at each aerodrome and its associated airspace. It is a good idea to get the student to practice beforehand the RTF transmissions that they are likely to have to make. Reiterate that they must obtain the Automatic Terminal Information Service (ATIS) before requesting a clearance into the CTR, have their radio volume up, maintain a careful lookout and listening watch, and must fully understand and read back any ATC clearance before proceeding with any particular course of action.
- Reviewing the procedures for each aerodrome as outlined in the *VFG*. Discuss details such as circuit altitude, circuit direction (explain that the controller can alter these from what is published in the *VFG* in order to sequence traffic), and any special aerodrome procedures or features that might be applicable (eg, departure, arrival procedures). Particular attention should be paid to the "Ground Movements" chart in the *VFG*, and the need to obtain an ATC clearance **before** entering the active runway and **before** taking off.
- Check the student's flight log and flight plan/SARWATCH details to confirm that they are correct. Ensure that they have all the ATC and FISCOM frequencies to hand and that they have a contingency plan in the event of a deterioration in the weather.

It is important to record the flight as being a solo cross-country training flight in the "Other information" section of the flight plan form. Controllers can then make allowances for the student's level of experience. If the flight is to be conducted under a SARWATCH, ring each control tower to let them know that a student pilot is on the way (unlike a flight plan, control towers are not sent SARWATCH details by the National Briefing Office). A few minutes spent on the telephone will make life easier for both the controller and the student.

Try to build in as many flights into controlled airspace as possible over the course of the student's training syllabus – even if it is just to do a few circuits at a controlled aerodrome. The more exposure to entering/exiting the CTR, takeoff and landing clearances, and finding reporting points, the better.

Don't send a student off on a solo cross-country (especially one that involves operating in controlled airspace) if you have reservations about their overall flying ability. Just because a student is up to the cross-country stage of their training syllabus

Continued over...

... continued from previous page

does not mean that they are ready for the solo exercise – some students take longer to reach a safe standard that others. More dual cross-country training may be in order first.

Students

Pre-flight preparation is always the key to a successful and incident-free flight. The route, and its associated charts (including the *VFG*), should be carefully studied the night before and the bulk of the flight log completed. Doing this will allow you plenty of time to identify any aspects of the flight that you are not sure about and to discuss them with your instructor well before the flight. If you are still not sure about something, then ask! Don't feel embarrassed about your level of knowledge; your instructor was once in the same position as you.

It is also a good idea to include the phrase "first solo cross-country" at the end of your radio transmission upon making first contact with each Control Tower along the route. This will remind the controller to deliver simple clearances and instructions at a speed that you can understand. If you are unsure of what is being asked of you, it is **very** important that you say so and ask the controller to repeat the clearance or instruction. You must **never** read back a clearance or instruction that you don't understand – it will almost certainly result in an airspace infringement.

Controllers

Make a point of checking the "Other information" section of each flight plan form, and keep a list of aircraft known to be on a SARWATCH that are under the command of a student pilot. Doing this will remind you that they may need special consideration upon making first contact with you at the CTR boundary – especially when things get busy.

If a pilot has indicated that they are unfamiliar with the area, whether it be on the flight plan form or during an RTF transmission, then respect their level of experience by keeping things simple. Don't give complex clearances and instructions (even when it is busy) – an overloaded pilot can sometimes 'lose the plot completely' and do something dangerous. Remember to deliver clearances and instructions slowly. Be prepared to break the clearance or instruction into several phrases, and allow the pilot to read it back portion by portion – that way they will then have a far better chance of actually understanding what you want them to do.

"The more exposure to entering/exiting the CTR, takeoff and landing clearances, and finding reporting points, the better."

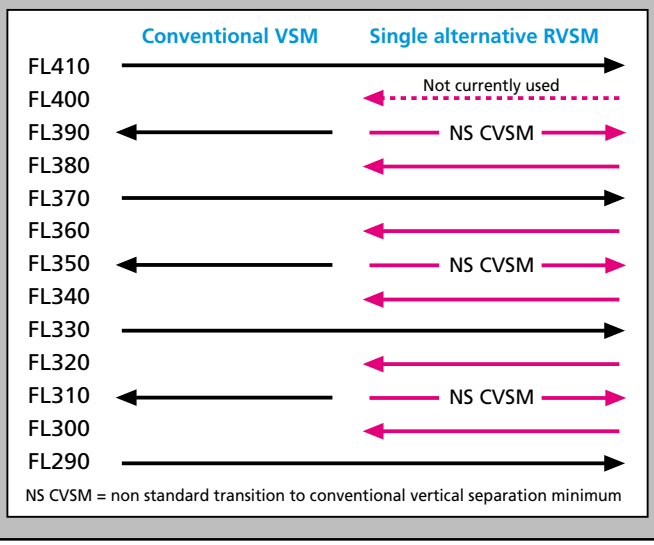
Summary

Over the past few years, a number of the larger North Island flight training organisations have found themselves operating in an uncontrolled aerodrome environment following the withdrawal of AFIS or ATC. This situation must not be allowed to cause flight-training standards to slip with regard to a pilot's overall competence to operate in controlled airspace – particularly that associated with busy controlled aerodromes.

It is likely that most of these aerodromes will remain uncontrolled, so the only way to maintain adequate flight-training standards in this area is to increase the level of exposure that a student receives to the controlled environment. This, coupled with a thorough pre-flight briefing by the supervising instructor and adequate preparation by the student, should see a reduction in the number of – largely preventable – airspace infringements. ■

RVSM Erratum

In *Vector* November/December 1999, Issue 7, page 4, the RVSM table had two flaws in the flight-level column at left. First, FL330 was missed out of the list; second, the flight-level figures should have stretched out so that each lined up with an arrow or pair of arrows. Here is a corrected version.



IQ Test Answers

1. True. You can get just as drunk by drinking beer or wine as you can by drinking distilled sprits.
2. False. A drink may help you fall asleep faster, but suppresses the hours you spend in REM sleep, reducing overall sleep quality. This causes subjective feelings of tiredness and impaired concentration the next day.
3. True. For a number of reasons, women are more susceptible than men to the harmful effects of alcohol. Body size, body composition and metabolism all play a part.
4. True. A NASA study found that short-haul pilots consumed three times more alcohol on trips than at home.
5. False. Even modest amounts of alcohol can impair your flying, through the Coriolis phenomenon and other medical effects.

You've Not Got Mail!

For a brief moment in time, the case for questioning the natural ability of *Vector* readers in the lower North Island looked quite strong. Within days of the January/February 2000 issue of *Vector* hitting the mailboxes, email requests for the New Zealand Cloud Types poster, advertised on page 15, came in to the CAA's Field Safety Advisers (FSAs). The trouble was, a number of people rushed to their keyboards and dashed off a request but forgot to attach a postal address.

Seventy-five percent of the requests to Ross St.George (Lower North Island FSA) on the first day had no postal address. This figure was about fifty percent in the other regions. The situation is more balanced now.

If you are making a request by email to the CAA for material that requires mailing out, please remember to include a postal address, otherwise **you will not get mail**. ■

New Poster – Think Aeroplane Safety

The CAA has released a new poster targeted at passenger safety on the flight line. *Think Aeroplane Safety* is aimed at raising passenger awareness of the dangers of the busy aerodrome environment – from airline schedules to small fixed-wing scenic operations. Its humorous and colourful cartoon style (similar to the earlier helicopter poster) is designed to capture the imagination of those passengers most at risk – children and tourists (particularly those for whom English is a second language).

These posters have already been mailed out to the major aerodromes, along with a note asking the aerodrome operator to place them in prominent locations where passengers are likely to see them. If you did not receive a poster, and think that your operation would benefit from having one, then contact your local Field Safety Adviser (their contact details can be found in this magazine) or the Safety Education and Publishing Unit.

The Safety Education and Publishing Unit
CAA
PO Box 31-441 Lower Hutt
Tel: 0–4–560 9400

Aviation Safety Coordinator Courses

Attention all aviation organisations!

Two Aviation Safety Coordinator training courses are planned for May 2000. These two-day courses will be held in Christchurch on 4–5 May and in Auckland on 11–12 May.

An Aviation Safety Coordinator runs the safety programme in an organisation. Your organisation should have a properly administered and active safety programme.

If you are involved in commuter services, general aviation scenic operations, flight training, or sport aviation, this course is relevant for your organisation.

For further information and enrolment forms contact: Rose Wood, SEPU Administrator, Civil Aviation Authority, P O Box 31-441, Lower Hutt, e-mail **woodr@caa.govt.nz**

Please apply now for an enrolment form to book a place on the course!

What Is an Aviation Safety Programme?

An aviation safety programme is a formalised and documented plan that focuses on creating safety awareness and reducing accidents. It achieves this through two primary functions, risk management and safety awareness.

The safety programme includes all activities carried out within an organisation in order to maintain and promote safe practices. Such activities will usually include a hazard identification system, an occurrence reporting system, and safety surveys. Awareness will be raised by seminars, videos, magazines, meetings, posters, etc. A good safety programme will stimulate good communication.

A safety programme is a very important part of sound professional work practices. Safety should be very much a part of all aspects of your organisation's activities.

A Safety Coordinator can advise and make recommendations – the authority and instructions for implementation must come from a management level. The success or failure of any aviation safety programme rests at that level.

The first step must be top management commitment to a safety programme.

The CAA can provide formal training for your Aviation Safety Coordinator.

Why Have a Safety Programme?

The short answer is, "If you think safety is expensive, try having an accident!"

You may be insured for direct costs, but the indirect costs of an accident are many times greater (latest figures suggest 4:1). A safe operation could be critical to staying in business.

The benefits are many and include a safer operating environment for employees and passengers, a more cost-efficient operation, and a positive image leading to public confidence and business opportunities.

Letters to the Editor

Wire Strike Avoidance

Congratulations on the recent article in *Vector* on wire strike avoidance. If pilots apply the information in it, it should help reduce these avoidable accidents. Having investigated a number of them, I would like to add some further thoughts.

As you rightly point out, wires can be quite invisible from the air, no matter how diligent the aerial reconnaissance. Supporting structures can also sometimes be invisible, as in a number of cases that I have investigated. In one case, where a power line spanned a valley, the supporting structures on both sides were in bush and were thus not visible. In another instance, an electric fence supply was supported on old railway rails set into the ground; you would think these would be readily detectable, but they weren't because all around them were burnt tree stumps of the same thickness, colour, and height. (The year before this particular accident occurred, the area had been sprayed by another very experienced pilot who had come within a few metres of the line without being aware of its presence.)

In all the cases I have seen or investigated, the wires were readily visible from the ground. The moral here is obvious. It is easy to miss wires and their supporting structures when doing an airborne reconnaissance, but one can be sure of seeing them from the ground, so what is needed is a reconnaissance **on foot**. For a helicopter pilot this does not even involve a loss of time, since he/she can land in the area. Matters are not so easy for a fixed-wing pilot though, who would have to drive to the area first, but this is cheap insurance compared with the cost of an accident.

It seems to me that an airborne reconnaissance is little more than 'going through the motions'. If you want to be sure of spotting concealed wires, **go and have a look from the ground –** like the accident investigator does.

Dmitri Zotov, Northland
January 2000

Vector Comment

Thank you for giving us a different point of view – literally! Your point certainly warrants serious consideration by pilots.

Fuel Management

I flew a 1974 Cessna 172 Skyhawk in Malawi for more than 600 hours over a period of six years. Your recent article "Fuel Starvation with Quarter Tanks" caught my attention.

Malawi is mountainous country with a central plateau over 4000 feet and peaks up to 8000 feet. There are only two Avgas fuel points in the whole country. Thus fuel management was of high priority, and it was not uncommon to be in the position that your article describes – descents of over 5000 feet to be made in a fairly short distance.

The aircraft I flew had one outlet per tank only, and the Pilot Operating Handbook clearly, but not very prominently, cautions against sustained steep descents with quarter-fuel tanks or less – especially during unbalanced flight.

May I make a few small comments on your excellent article?

- All tanks must be 'topped off' with the aircraft on level ground – this is especially important, I believe, with the C206 and C210.
- All flights should be conducted with the fuel system selected to BOTH. It is still permissible, however, to taxi on one tank, run up on the other, and then switch to BOTH before takeoff (part of my own personal DVAs).
- Avoid continuous prolonged steep descents, and stay balanced. My own practice, with say 5000 feet to lose within 5 or 6 miles, was to level out and 'warm' the engine for a short period every 1500 feet or so and, if necessary, circling level (in balance), to stay within the required distance.

Even with just the VFR reserve (30 minutes in Malawi) I never had the slightest evidence of a fuel delivery problem – I hope because of my behaviour rather than just pure luck!

It must be very easy, however, to slip or skid even slightly during the long spiralling descents involved in parachute dropping or similar activities, thus providing the ideal circumstances for fuel flow to be interrupted. As usual, the problem can easily be avoided provided that the pilot is aware of the possibility of the situation developing – thorough digestion of the Pilot Operating Handbook is critical in this regard.

David Hay, Taumarunui
December 1999

Vector Comment

Thank you for taking the time to share these extra points with readers – we think that they are valid and constructive.

Overhead Rejoins

Your *Vector* comment patch [in Letters to the Editor] in the last issue of the magazine states that North Shore airfield has opposite-direction circuits. This is not correct with regard to fixed-wing aircraft. All circuits at North Shore are lefthand regardless of the runway in use. The only exceptions are helicopters that operate low-level on two of the vectors, remaining clear of all other circuit traffic.

It was pleasing to see students bringing the subject up – just goes to show that they read *Vector*! Keep up the good work; we all look forward to reading each new issue.

Patrick Hollands, CFI North Shore Aero Club
February 2000

Vector Comment

The original article on this topic in the July/August 1999 issue explained that opposite-direction circuit patterns are usually prescribed to provide a greater degree of separation between powered fixed-wing aircraft and other aircraft types (such as gliders and helicopters) and noted that North Shore was an example where helicopters can operate in an opposite-direction circuit to fixed-wing aircraft.

In commenting on the letter received about that article, we did not elaborate on the aircraft types (usually glider or helicopter) in the opposite-direction circuit. It appears that this has raised an opportunity to review the aerodrome chart with your students (and possibly acquaint them with the original article). The height difference between the circuits should normally prevent any conflict, but it could be useful to emphasise to students (both fixed-wing and helicopter) the importance of maintaining correct circuit height to ensure this.

We too find it pleasing that *Vector* articles are promoting discussion – proving that they are read! Thanks for your comments.

How To – Fill the gap

The CAA publishes two series of information booklets.

The **How To** series aims to help interested people navigate their way through the aviation system to reach their goals. The following titles have been published so far in the years indicated:

How to be a Pilot	*Published*	*1998*
How to Own an Aircraft	*Published*	*1999*
How to Charter an Aircraft	*Published*	*1999*
How to Navigate the CAA web site	*Published*	*1999*
How to be an Aircraft Maintenance Engineer	*Published*	*1999*
How to be a Good IA	*Published*	*2000*

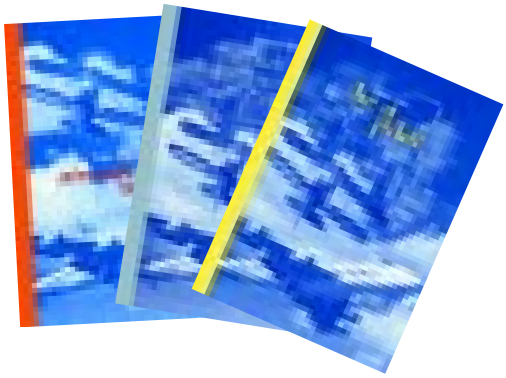
The **GAP** (**G**ood **A**viation **P**ractice) series aim to provide the best safety advice possible to pilots. The following titles have been published so far in the years indicated:

Winter Operations	*Published*	*1998*
Bird Hazards	*Published*	*1998*
Wake Turbulence	*Published*	*1998*
Weight and Balance	*Published*	*1998*
Mountain Flying	*Published*	*1999*
**Flight Instructor's Guide*	*Published*	*1999*
Chief Pilot	*Published*	*2000*
New Zealand Airspace	*Published*	*2000*

How To and **GAP** booklets (but not *Flight Instructor's Guide*) are available from most aero clubs, training schools or from Field Safety Advisers (whose contact details are usually printed in each issue of *Vector*). Note that *How to be a Pilot* is also available from your local high school.

Bulk orders (but not *Flight Instructor's Guide*) can be obtained from:

The Safety Education and Publishing Unit
Civil Aviation Authority
P O Box 31-441, Lower Hutt
Phone 0-4-560 9400



The Flight Instructor's Guide can be obtained from either:

- Expo Digital Document Centre, P O Box 30-716, Lower Hutt. Tel: 0-4-569 7788, Fax: 0-4-569 2424, Email: expolhutt@expo.co.nz
- The Colour Guy, P O Box 30-464, Lower Hutt. Tel: 0800 438 785, Fax 0-4-570 1299, Email: orders@colourguy.co.nz

New Zealand Airspace GAP

Thoroughly understanding New Zealand's airspace is a vital aspect of aviation safety. Airspace structure and function are something that should be learned on the ground before you go flying, rather than following an airspace infringement.

To help you with this, the CAA has released a new GAP, *New Zealand Airspace*, which complements its two airspace posters. This booklet steps you through the different types of designated and special use airspace and outlines your obligations as pilot in command when operating within them. It contains numerous computer-generated illustrations of each airspace type, which are accompanied by useful explanatory text.

This easy-to-follow GAP should be part of every pilot's reference library.

0508 ACCIDENT

The CAA is still receiving a considerable number of accident notification calls on the old 0800 number. We remind readers that the correct toll-free accident notification number is 0508 ACCIDENT (0508 222 433). You should call this number as soon as practicable if you are involved in, or witness, an aircraft accident. The number is staffed 24-hours a day, seven days a week (via the CAA's National Rescue Coordination Centre). The 0508 ACCIDENT number is published in every issue of *Vector*. If you have an 0800 accident number written down somewhere handy, we hope very much you never need to refer to it, but **please update it** – just in case.

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

CA Act requires notification "as soon as practicable".

Field Safety Advisers

John Fogden
(North Island, north of line, and including, New Plymouth-Taupo-East Cape)
Ph: 0–9–425 0077 Fax: 0–9–425 7945 Mob: 025–852 096
email: fogdenj@caa.govt.nz

Ross St George
(North Island, south of line, New Plymouth-Taupo-East Cape)
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Murray Fowler
(South Island)
Ph: 0–3–349 8687 Fax: 0–3–349 5851 Mob: 025–852 098
email: fowlerm@caa.govt.nz

Owen Walker
(Maintenance, New Zealand-wide)
Ph: 0–7–866 0236 Fax: 0–7–866 0235 Mob: 025–244 1425
email: walkero@caa.govt.nz

OCCURRENCE BRIEFS

Lessons For Safer Aviation

The content of *"Occurrence Briefs"* comprises all notified aircraft accidents, GA defect incidents (submitted by the aviation industry to the CAA), and selected foreign occurrences that we believe will most benefit engineers and operators. Statistical analyses of occurrences will normally be published in *CAA News*.

Individual Accident Reports (but not GA Defect Incidents) – as reported in "*Occurrence Briefs*" – are now accessible on the Internet at CAA's web site (http://www.caa.govt.nz/). These include all those that have been published in *"Occurrence Briefs"*, and some that have been released but not yet published. (Note that "*Occurrence Briefs*" and the web site are limited only to those accidents, which have occurred since 1 January 1996.)

Accidents

The pilot in command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form CAA 005 to the CAA Safety Investigation and Analysis Group.

Some accidents are investigated by the Transport Accident Investigation Commission, and it is the CAA's responsibility to notify TAIC of all accidents. The reports which follow are the results of either CAA or TAIC investigations.

ZK-FEL, Piper PA-28-180, 18 Feb 99 at 1905, Nelson. 3 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 52 yrs, flying hours 16500 total, 300 on type, 160 in last 90 days.

The aircraft was on a short-final approach when its engine failed. The pilot made a Mayday call and conducted a successful forced landing onto mudflats just short of the runway.

Inspection of the aircraft revealed that there was no fuel was remaining. The pilot had planned the flight using a fuel consumption rate less than that used by the operator.

Main sources of information: Accident details submitted by pilot plus CAA engineering investigation.

CAA Occurrence Ref 99/362

ZK-DNM, Cessna 172M, 9 Mar 99 at 1930, Maketu. 1 POB, injuries nil, damage substantial. Nature of flight, prviate other. Pilot CAA licence CPL (Aeroplane), age 54 yrs, flying hours 27141 total, 25768 on type, 399 in last 90 days.

The pilot was landing on his home strip in light rain conditions. With visibility degraded by rain on the windshield, he did not notice that touchdown was slightly to the left of the normal landing path. The longer grass to the side of the strip caused the aeroplane to yaw further to the left, and the left wing snagged on a clump of toetoe. This caused a loss of directional control and the aeroplane skidded off the strip into a deep drain.

Although the aeroplane suffered little physical damage, it was written off because of its immersion in salt water.

Main sources of information: Accident details submitted by pilot plus further enquiries by CAA.

CAA Occurrence Ref 99/558

ZK-DOA, Cessna U206F, 18 Mar 99 at 1645, nr Pitt Island. 5 POB, injuries 5 minor, aircraft destroyed. Nature of flight, transport passenger A to A. Pilot CAA licence CPL (Aeroplane), age 42 yrs, flying hours 610 total, 150 on type, 71 in last 90 days.

On Thursday 18 March 1999 at about 1645 hours, ZK-DOA, a Cessna 206 on an aerial surveillance air transport flight around Pitt Island, had a sudden engine failure and ditched in the sea. The pilot and four passengers escaped from the aircraft and swam to shore without the aid of life-jackets. Life-jackets were on board the aircraft for the occupants' use but there was insufficient time for them to locate and don the jackets.

The aircraft was not recovered from the sea, and the cause of the engine failure was not established.

Main sources of information: Abstract from TAIC Accident Report 99-001.

CAA Occurrence Ref 99/623

ZK-EMV, NZ Aerospace FU24-954, 27 Mar 99 at 1435, nr Riversdale Beach. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 36 yrs, flying hours 8175 total, 4500 on type, 210 in last 90 days.

On Saturday 27 March 1999 at about 1435 hours ZK-EMV, a Fletcher FU24-954, had taken off from a grass airstrip on a routine sowing run, 5 kilometres southwest of Riversdale in the Wairarapa, when it was observed to sink rapidly before hitting a fence. After hitting the fence the aircraft ballooned up and rolled, striking the ground inverted. The aircraft was destroyed and the pilot died as a result of the second impact.

Main sources of information: Abstract from TAIC Accident Report 99-002.

CAA Occurrence Ref 99/732

ZK-ARM, De Havilland Canada DHC-1A-1, 28 Mar 99 at 0845, nr Picton. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 70 yrs, flying hours 1975 total, 400 on type, 9 in last 90 days.

The engine failed in cruise flight, and the pilot ditched the aircraft in Whatamango Bay near Picton. The aircraft nosed over on landing, but damage was limited to the nose cowl and left aileron.

The DHC-1 has a float-type, direct-reading fuel gauge mounted adjacent to the fuel filler cap on each wing. The gauge and filler cap share a common mounting panel. On ZK-ARM, the panel gasket on the right wing had failed, enabling fuel to escape by suction. Additionally, the gauge glass O-ring had become distorted, jamming the gauge at about the five-eighths mark.

The pilot had not detected the in-flight fuel loss, and the fuel tank ran dry prematurely as a result. The fuel system on this particular aircraft incorporates individually selectable tanks, not the common-feed type found on many other Chipmunks. The pilot was unable to select the other tank before ditching.

Main sources of information: Accident details submitted by pilot plus further enquiries by CAA.

CAA Occurrence Ref 99/733

ZK-LAL, Partenavia P 68B, 1 Apr 99 at 0430, Okiwi. 5 POB, injuries nil, damage substantial. Nature of flight, transport passenger A to B. Pilot CAA licence CPL (Aeroplane), age 39 yrs, flying hours 1300 total, 650 on type, 100 in last 90 days.

The pilot reported that a tyre had burst on landing. This was followed by the lefthand landing gear collapsing. The aircraft sustained propeller damage as well as significant damage to the lower fuselage skins and control cable runs.

Further investigation revealed that the left main gear attach bolt had failed at touchdown, causing the gear to disengage from the aircraft and impact the propeller, which cut the tyre and gave the pilot the impression of a blown tyre. The aircraft slewed off the runway and came to rest adjacent to the runway perimeter, next to a drainage ditch.

The bolt failure was due to a slow propagation fatigue crack, which had initiated at a wear scratch on the shank of the bolt.

It is suggested that, in addition to the existing 500-hour inspection, maintenance providers remove and inspect the inboard attach bolts and reject them if surface damage or cracking is detected. A recommendation has been made to the manufacturer to alter the aircraft inspection requirements to reflect this change.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 99/767

ZK-HGU, Robinson R22 Beta, 4 Apr 99 at 1520, Greymouth. 1 POB, injuries nil, damage substantial. Nature of flight, freight only. Pilot CAA licence CPL (Helicopter), age 48 yrs, flying hours 3600 total, 2500 on type, 20 in last 90 days.

During a rearward hover taxi, while lifting a 70-80 kilogram load in a restricted operating environment with the tail into a 10-knot wind, the engine failed. The pilot carried out an emergency landing.

Further investigation revealed no fault with the engine after a test run. Only 13 litres of fuel remained in the fuel tank at the time of the failure.

With this quantity of fuel remaining, and the fact that the fuel outlet unports at a 17-degree tail-down attitude, it is likely that the way in which the helicopter was manoeuvred prior to the failure caused an interruption to the fuel flow. This resulted in fuel starvation and engine failure.

Main sources of information: Accident details submitted by pilot plus CAA engineering investigation.

CAA Occurrence Ref 99/766

ZK-HBG, Robinson R22, 26 Apr 99 at 0800, Waimana Valley. 2 POB, injuries nil, aircraft destroyed. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 26 yrs, flying hours 1430 total, 145 on type, 12 in last 90 days.

The helicopter was on a venison recovery operation, and while in pursuit of a deer, the main rotor struck a tree. Rotor rpm was lost and the helicopter crashed out of control into a ravine. The ELT activated and was detected by satellite, although the position was inaccurate.

Main sources of information: Accident details submitted by pilot plus further enquiries by CAA.

CAA Occurrence Ref 99/1102

ZK-FMC, Gippsland GA200C, 2 May 99 at 1700, 7 NM SW Akaroa. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 45 yrs, flying hours 8500 total, 4000 on type, 150 in last 90 days.

During the transit between operating sites, the pilot encountered an approaching front. He turned back to his departure point only to find that the weather behind had deteriorated. He landed on a farm property, the aeroplane sustaining damage to the undercarriage, one wing, the forward fuselage, and the propeller.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 99/1200

ZK-HWQ, Bell 206B, 3 May 99 at 1655, nr Geraldine. 2 POB, injuries nil, aircraft destroyed. Nature of flight, survey/inspection. Pilot CAA licence CPL (Helicopter), age 36 yrs, flying hours 3600 total, 475 on type, 95 in last 90 days.

The helicopter was being used by a power transmission company to check pylons for sabotage. In a six-foot hover near a pylon, the helicopter began shaking violently and the pilot lost control. During the subsequent revolutions the main rotor struck and severed a domestic feeder line, which was not part of the network being inspected. The helicopter landed on its side and was destroyed.

One tail rotor blade had failed in the area of the doubler, and the blade portion was flung some distance from the hover point. The blade was found to have sustained leading edge damage from an unknown object. The object was probably small, hard and spherical, possibly a steel ball bearing, travelling at a significant speed. The failure originated from this damage.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 99/1206

ZK-JES, Cessna 172N, 2 Sep 99 at 1130, Southern Alps. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 26 yrs, flying hours 172 total, 86 on type, 48 in last 90 days.

The pilot was on an area familiarisation flight in the headwaters of the Havelock River. Cruising at about 7000 feet, she decided to enter a side valley (the Edison Valley) in order to take some photographs. Once in the valley, she felt that she had encountered downdraughting air and decided to turn out to the main valley again.

As the aeroplane descended in the downdraught, the turn became constrained by the terrain, and the aeroplane's main wheels touched the snow surface, retarding the aeroplane enough so that it settled into the snow. When the nosewheel contacted the snow, the aeroplane tipped on to its back.

The pilot was uninjured, and decided to walk downhill to a nearby hut, from where she was picked up by a rescue helicopter.

The ELT operated on impact and was detected by satellite. An aircraft dispatched from Tekapo located the Cessna, and two rescue helicopters were on the scene some time later.

Main sources of information: Accident details submitted by pilot plus further enquiries by CAA.

CAA Occurrence Ref 99/2536

GA Defect Incidents

The reports and recommendations which follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rule, *Part 12 Accidents, Incidents, and Statistics*. They relate only to aircraft of maximum certificated takeoff weight of 5700 kg or less. Details of defects should normally be submitted on Form CAA 005 to the CAA Safety Investigation and Analysis Group.

The CAA Occurrence Number at the end of each report should be quoted in any enquiries.

Piper PA-28-140

Internal corrosion

While performing scheduled maintenance, engineers discovered moderate to severe corrosion on the flap, main spars, forward ribs, and hinge attachment areas. Most of these areas could not normally be inspected, and it appeared that they had not been primed at assembly.

The corrosion has since been removed and components replaced where necessary. All components were also primed on re-assembly.

ATA 2750 CAA Occurrence Ref 98/2528

Piper PA34-200

Incorrect air filter fitted

An engineering investigation into why limited engine power was available revealed that the Fram engine air filter had degraded into pieces.

Further investigation revealed that the Fram air filter is in fact the same part number (CA 161) as the Purolator air filter approved by Piper for the Seneca. The maintenance provider stated that the Fram filter was fitted to the Seneca on the assumption that the approval for use on the other aircraft was an indication of being adequate for the task. The Fram filter material was, however, not sufficiently durable for the Piper application, although it was subsequently determined that the cause of the limited power was valve seat deterioration.

ATA 7160 CAA Occurrence Ref 99/908

Piper PA-34-200T

Cleveland 40-120 mainwheel cracks, P/N 161-93B

One of the aircraft wheels was emitting an unusual noise while taxiing. The aircraft became increasingly difficult to taxi. The control tower was advised, and the pilot alighted to inspect the wheel. It appeared to have been jamming. An engineer had to dismantle the brake so the aircraft could be towed to the apron. Further investigation revealed that the wheel rim had cracked around its circumference, causing fouling and wheel lock-up. Pitting corrosion on the inside of the rim had caused the crack. This problem has been prevalent on Seneca types.

It is recommended that engineers be extra vigilant at tyre replacement when inspecting the condition of the wheel rims for pitting corrosion.

ATA 3200 CAA Occurrence Ref 98/228

Piper PA-34-200T

Mixture cable jams, P/N 554293

While conducting a type rating in the New Brighton Training Area, the mixture leaver was pulled to idle cut-off to simulate an engine failure. The mixture leaver became jammed in this position. The lever became free again only when the lefthand throttle lever was moved. The flight was then terminated.

Initially, no fault was found during a ground run. After the engine cooled, however, the mixture cable became stiff again. The cable was renewed and a satisfactory test flight carried out.

ATA 7320 CAA Occurrence Ref 98/880

Operational Discrepancy

Aileron corrosion

The CAA received a report that the aircraft was being operated with significant discrepancies.

Upon inspection it became apparent that the aileron skins were substantially corroded at the trailing edge. A review of the maintenance documentation revealed that the certifying engineer, and his supervisors, were aware of this discrepancy and had decided that the aircraft could continue to operate pending the availability of spares.

The engineer's decision to release the aircraft to service was weighted in favour of operator's commercial interests and based substantially on the LAME's experience and judgement rather than specific approved data.

ATA 2900 CAA Occurrence Ref 98/1126

International Occurrences

Lessons from aviation experience cross international boundaries. In this section, we bring to your attention items from abroad which we believe could be relevant to New Zealand operations.

Australia

Occurrences

The following occurrences come from the December 1998 edition of *Asia-Pacific Air Safety*, which is published by the Bureau of Air Safety Investigation (BASI), Australia

Avtech Jabiru – Water in the fuel tanks

Before departing Bankstown, the pilot detected bubbles of water in a sample of fuel that had been drained from the fuel tank sump. A further three samples were taken and, as the pilot considered these showed no signs of water, he elected to commence the flight.

The pilot reported that as he reduced power during the approach to Goulburn, the engine began to run roughly, prompting him to land the aircraft as soon as possible.

A fuel sample taken by the pilot from the fuel tank sump showed evidence of further water contamination. He subsequently drained several litres from the sump and considered there was no more water present in the fuel. The aircraft was then refuelled. However, a sample of fuel from the fuel tank again indicated the presence of a small amount of water. A further six samples, as well as a sample taken direct from the fuel bowser, failed to reveal any additional evidence of water contamination. After carrying out a ground-run and flight test, the pilot considered the engine was operating satisfactorily and continued his flight to Bankstown.

Whilst on final approach to Runway 29R, the engine suffered a complete loss of power when the pilot reduced power below 2000 rpm. The aircraft landed heavily, pitched forward and overturned, coming to rest 270 metres before the runway threshold. The pilot was able to evacuate without injury.

A subsequent inspection of the fuel system indicated there was water in the carburettor float bowl, fuel tank, and the interconnecting lines. The fuel tank of the Jabiru has a flat bottom, with the sump located to the right and forward of centre. It is considered possible that any water in the tank may have pooled in one area away from the tank sump, particularly if the aircraft had been parked on a surface that was not level. During flight, as a result of flight attitude changes, previously undetected water may have shifted within the tank and flowed into the sump and associated fuel-line outlet, thence to the carburettor.

The investigation was not able to determine the reason for the presence of water in the fuel system, but it has been recommended that the Civil Aviation Safety Authority review the Jabiru's fuel system design.

Robinson R22 BETA – Cattle beast contacts tail rotor

The pilot was trying to muster a herd of about 12 cattle away from a bore to yards a couple of miles away. The cattle persisted in trying to return to the bore for water. The pilot hoped to overcome the cattle's reluctance to move by flaring the helicopter low and close to the herd. He flared down to about five feet and five knots across the herd's direction of movement.

During the flare, one bullock darted from the herd towards the right-rear of the helicopter. The pilot felt a slight thump through the airframe. He immediately increased power to move on, but the helicopter yawed rapidly right. By the time the pilot managed to close the throttle, the helicopter had turned through 360 degrees. Once the throttle was closed, the rate of yaw diminished and the helicopter rapidly settled to the ground contacting first with the right skid, which broke. It rolled onto its right side and the main rotors were destroyed.

When the bullock darted towards the rear of the helicopter, it impacted the spinning tail rotor with its back and broke off both of the tail rotor blades.

United Kingdom

Occurrences

The following occurrences come from the March 1999 edition of *Flight Safety, Fixed Wing* and *Rotary Wing Occurrence Lists*, published by the Safety Data Department, United Kingdom CAA.

Piper PA28-R – Landing gear fails to extend

The aircraft landing gear failed to extend by the normal means, so the emergency extension system was activated and a successful landing made.

Further investigation revealed that the hydraulic reservoir was empty, the fluid having drained away from a corroded aluminium pipe in the cockpit. A second aircraft was examined and the same pipe was found to also exhibit signs of corrosion pitting.

SDD Occurrence No 9900992G

Robinson R22 – Transmission drive belt fails

During approach the pilot heard a scraping noise, which was followed by a continuous transmission clutch warning. The clutch circuit breaker was pulled and the approach continued for a successful run-on landing. After the aircraft came to rest a fire ignited in the engine compartment. The engine was shut down, a Mayday call transmitted, and the fire extinguished with a hand-held fire extinguisher.

Subsequent inspection found part of one transmission drive belt in the engine compartment, with the remainder being recovered from the taxiway. The other belt was not found. The supply and return lines to the oil cooler had fractured as a result of having being struck by the flailing belt. This caused oil to be sprayed onto the exhaust, leading to a fire in the engine compartment. A small 'nick' on one of the upper pulley rims, probably caused by a foreign object, is believed to have been responsible for the belt failure.

The belts had accumulated some 500 hours since new, with 10 hours having elapsed since the last 100-hour inspection. Belts are presently maintained 'on-condition' and do not have a finite service life imposed on them. Enquires established that belts usually last at least 600–700 hours.