January / February 2013

POINTING TO SAFER AVIATION

vector

Classic Fighters 2013

The Right Frequency

Decision Making

Wind Shear for the Light Aircraft Pilot

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

vector

In this issue...

Classic Fighters 2013

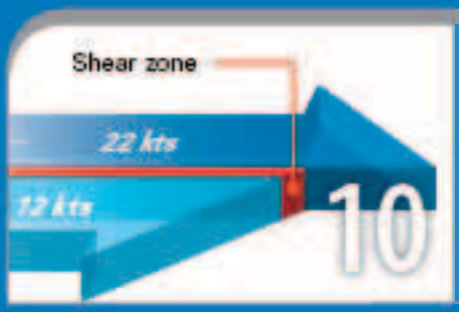
Classic Fighters is a major Easter event, attracting visiting pilots from all over New Zealand. The article gives an overview of the special procedures and airspace in place for the airshow.

The Right Frequency

Listening out and broadcasting on the correct radio frequency when flying in uncontrolled airspace might save your life some day. Here we take a look at the more common frequencies in use, and examine some of the advantages and pitfalls with each one.

Decision Making

With proper training, pilot judgement errors, and therefore accidents, can be significantly reduced. This article contains some examples which illustrate good and bad decision making, and gives some insights into how to enhance your decision making process.



Wind Shear for the Light Aircraft Pilot

Wind shear can provide some exciting moments for pilots of any size of aircraft. Here are some clues and indicators to help the light aircraft pilot to recognise and avoid possible wind shear.

Classic Fighters 2013	3
The Right Frequency	6
Decision Making	8
Wind Shear for the Light Aircraft Pilot	10
Who Needs an Ag Rating?	13
Part 115 – One Year On	14
Safety Inside	16
Helicopter Cargo Pod Security	17
Caution – Cleaning Products	18
Hold It	19
On the NOSE	19
New Products	20
RNAV and RNP – Operational Approvals	21
CAA Safety DVDs	21
Charging for Surveillance Risk Assessment	21
Purchasing CAA Products Online	22
Aviation Safety Advisers	22
How to Get Aviation Publications	22
Planning an Aviation Event?	22
Accident Briefs	23
GA Defects	25
Aviation Safety Coordinator Course	27
AvKiwi Safety Seminars - Get the Mental Picture	28

Cover: Albatros D.Va by The Vintage Aviator Limited flown by Kermit Weeks at Classic Fighters 2011. Photo by Gavin Conroy

Published by
Safety Promotion Unit of the Civil Aviation Authority of New Zealand, PO Box 3555, Wellington 6140.

Tel: +64 4 560 9400,
Fax: +64 4 569 2024,
Email: info@caa.govt.nz.

Published six times a year, in the last week of every odd month.

Manager Safety Promotion Bill Sommer.

Editor Peter Singleton.

The Vector Team
Charlie Brimmicombe, Alister Buckingham, Lakshmi Guda, Ken Mathews, Rose Wood.

Design Gusto.

Publication Content
Unless expressly stated as CAA policy, the views expressed in *Vector* do not necessarily reflect the policy of the Civil Aviation Authority. Articles are intended to stimulate discussion, and nothing in *Vector* is to be taken as overriding any New Zealand civil aviation legislation, or any statements issued by the Director of Civil Aviation, or the Civil Aviation Authority of New Zealand.

Reader comments and contributions are welcome and may be published, but the Editor reserves the right to edit or abridge them, and not to publish those that are judged not to contribute constructively towards safer aviation. Reader contributions and correspondence regarding the content of *Vector* should be addressed to: *Vector* Editor, PO Box 3555, Wellington 6140, or email: info@caa.govt.nz.

Free Distribution
Vector is distributed automatically to all New Zealand flight crew, air traffic controllers, aircraft maintenance engineer licence holders, aircraft owners, most organisations holding an aviation document, and to certain other persons and organisations interested in promoting safer aviation.

In the case of flight crew and air traffic controllers, a current aviation medical certificate must be held, and a current New Zealand address given, to ensure magazine entitlement.

Holders of Pilot Certificates issued by Part 149 certificated organisations can also apply to receive a free *Vector* (see the CAA web site for details). *Vector* also appears on the CAA's web site: www.caa.govt.nz.

Change of Address
Readers receiving *Vector* free of charge should notify info@caa.govt.nz of any change of address, quoting your CAA Client Number. Paying subscribers should notify Vertia.

Paid Subscriptions
Vector is available on subscription only from Vertia, www.vertia.co.nz, email: info@vertia.co.nz, or freephone 0800 GET RULES (0800 438 785).

Classic Fighters 2013

The biennial Classic Fighters airshow at Omaka is always popular with pilots and non-pilots alike. Many pilots fly themselves to the airshow, and with proper preparation, the flights to and from Omaka or Woodbourne should be a straightforward exercise.

Photo: Gavin Conroy

Pre-flight Preparation

In order to plan a safe flight to and from Classic Fighters, make sure you have an up-to-date *AIP New Zealand* Vol 4, Visual Navigation Charts covering your proposed and alternative routes, and AIP Supplements 53/13 and 54/13. On the day of your flight, also remember to obtain weather information and NOTAMs.

AIP Supplements 53/13 and 54/13

These cover procedures for operating in the Woodbourne and Omaka area from 28 March to 1 April 2013. They are available online at www.aip.net.nz. The importance of having read and understood them cannot be over-stressed. As you work your way through them, have a copy of the VNC to hand, with your planned route marked on it. Make sure you have them available for quick reference in the cockpit during your flights.

Can I Fly Into Omaka?

Yes! Visiting aircraft are invited to attend, subject to the following restrictions.

Practice Days

Between 1000 and 1600 NZDT on Thursday 28 and Friday 29 March, Omaka will be partially closed while practice sessions are conducted in the first and the third quarter of each hour (ie, 1000 to 1015, and 1030 to 1045). In the second and fourth quarter of each hour (ie, 1015 to 1030, and 1045 to 1100) arrival or departure slots will be available for general use. Delays could occur if a practice overruns its allotted time, for instance.

Airshow Days

From 1800 to 1945 NZDT on Friday 29 March, and from 0930 to 1630 on Saturday 30 and Sunday 31 March, Omaka aerodrome will be **closed to all aircraft.**

Temporary Restricted Area

R699 will extend from the surface to 4500 ft amsl and will be active daily from 0630 to 1830 on 28 March; 0630 to 1945 on Friday 29 March; 0630 to 1830 on 30 and 31 March; and 0630 to 1230, Monday 1 April 2013. When active, the airspace within R699 becomes Class G (uncontrolled).

You cannot operate in R699 during designated practice sessions and airshow times, unless you have the specific approval of the Administering Authority. While in R699, pilots must turn on landing and/or anti-collision lights if fitted, operate their transponder on Mode A and C, maintain a listening watch, make radio calls to "Omaka Traffic" on 126.75 MHz, and make sure they stay within R699 unless they have a clearance to enter the Woodbourne Control Zone (CTR/D). Non transponder-equipped aircraft must arrive and depart with a transponder and radio-equipped aircraft.

ATIS

Pilots must listen to the Woodbourne ATIS, 126.05 MHz, before entering R699 or the Woodbourne CTR/D.

Runways

From 26 March to 2 April 2013, Runway 01/19 at Omaka will be closed.

Woodbourne CTR/D

Fuel Considerations

Aircraft may be asked to hold outside controlled airspace if the weather falls below certain minima (see AIP Supplement 54/13 for details), so you must carry enough fuel to hold for 30 minutes and then divert to another aerodrome.

At Woodbourne, Avgas will be available on request from Air BP during the following periods only: 0800 to 1700 NZDT, Friday 29 March and Monday 1 April.

Anyone planning to fly in and out of Woodbourne on Saturday or Sunday will need to carry enough fuel for their flight to Woodbourne, 30 minutes holding fuel, plus the fuel required for their return flight home, with legal reserves.

VFR to Omaka

If you plan to fly one of the Omaka VFR arrival procedures published in *AIP New Zealand* Vol 4, you may need to enter the CTR/D (for example, on the Domes Arrival). Make sure you obtain a clearance from Woodbourne Tower before entering. Subject to traffic and weather, there should be no delay when requesting a clearance to transit the CTR/D and enter R699 on a published arrival procedure. Other procedures may be accommodated if weather, traffic, and safety permit.

VFR to Woodbourne

AIP Supplement 54/13 contains two VFR arrival procedures for Woodbourne, the River Arrival for Runway 06, and the Coast Arrival for Runway 24. Study them carefully. Subject to weather, there should be no delay for aircraft requesting a clearance to enter via these arrival procedures.

A landing sequence number will be given when you join the circuit. Simultaneous parallel operations are permitted on grass and sealed Runways 06/24 for aircraft less than 5700 kg. Light aircraft can expect to land on the grass.

IFR to Woodbourne

IFR aircraft will be accepted only for the RNAV (GNSS) RWY 24 approach or the VOR/DME RWY 06 approach, circling as required. For aircraft requiring a VOR/DME or VOR RWY 24 approach, the missed approach for each enters R699 and will not normally be available unless the Omaka Airshow is suspended.

Departing Omaka VFR

Expect to fly one of the Omaka VFR departure procedures published in Vol 4. If you need to enter the Woodbourne CTR/D, obtain a clearance from Woodbourne Tower before takeoff.

Departing Woodbourne VFR

There are two VFR departure procedures published in AIP Supplement 54/13, the River Departure for Runway 24 and the Coast Departure for Runway 06. Aircraft must report clear of the Woodbourne CTR/D on 122.8 MHz.

Flight Plans

Woodbourne Tower will not accept flight plan requests or terminations. Call the National Briefing Office (0800 626 756 or 0900 62 675) to cancel after landing, or Christchurch Information on 121.3 MHz.

Controlled VFR Requests

VFR pilots requesting a clearance to enter the Wellington CTA/C must:

» If in uncontrolled airspace, make their request at least five minutes before reaching the CTA/C boundary – contact Wellington Control on 122.3 MHz; or

» If controlled VFR with Christchurch Control or Ohakea Control, advise their intentions to that sector; and

» Have a serviceable Mode C transponder, and include a preferred altitude and route in their request.

Clearances will be subject to workload and should not be requested between 0900 and 0930, 1400 and 1500 and 1600 and 1800 NZDT. If a clearance is critical, contact the ATS Supervisor at Christchurch.

Summary

Thorough preparation will enhance your flying experience, making it safer and easier for you, your passengers, and other pilots. In the air, use your passengers to help out. Brief them to point out all the aircraft they spot. Keep your head on a swivel, keep radio calls accurate and to the point, and follow all ATC instructions. See you there! ■

Photo: Gavin Conroy

The Right **Frequency**

Listening out and broadcasting on the correct radio frequency when flying in uncontrolled airspace is good airmanship and a safety practice that may save your life some day. If you are on the wrong frequency, you run the risk of coming into conflict with other traffic, or of not being heard when you want someone to know about your emergency.

That said, choosing the appropriate radio frequency can be confusing at times, and does require some forethought, thorough pre-flight planning, and continuous monitoring during your flight using up-to-date charts. Here we take a look at the more common frequencies in use, and examine some of the advantages and pitfalls with each one.

Flight Information Service (FIS)

The FIS is established to give advice and information useful for the safe and efficient conduct of flights. Here you can get significant weather information, reported weather conditions and forecasts, changes to aerodromes and their facilities, traffic information, other useful safety information, and file and amend flight plans, and establish a SARTIME.

The FIS areas and FIS Communications (FISCOM) frequencies cover the entire country and are published in *AIP New Zealand*, Figures GEN 3.4-2 and 3.4-3. The Visual Navigation Charts (VNC) also depict the FISCOM frequencies in specific areas.

You should be on a FISCOM frequency for much of your flight, because it provides an alerting service and contact with a flight service operator (FSO) in the event of an emergency. You will hear other aircraft traffic broadcasting in your FISCOM area and you will be kept abreast of any relevant information that the FSO transmits.

To ensure clear reception you may need to be above 4000 feet, depending on your location and the surrounding terrain, remembering that there are some communication shadow areas around the Southern Alps where you may need to be even higher to make radio contact.

Unattended Aerodromes and 119.1 MHz

Frequency 119.1 was established to use only at unattended aerodromes, but it is no longer the universal unattended aerodrome frequency. Aerodromes with their details published in *AIP New Zealand* will have designated unattended frequencies allocated, unless there is an ATC service where the tower frequency is used. In some cases the unattended frequency will be 119.1, as it will be with most unpublished aerodromes.

There have been reports of pilots listening out on and using 119.1 everywhere, but this is a waste of time and not a lot of use to anyone because away from the aerodrome boundary other frequencies will be used. Using 119.1 adds yet another frequency unnecessarily to the mix, when a FISCOM frequency should probably be monitored.

Mandatory Broadcast Zones (MBZ)

These zones are established throughout the country to give increased protection to aircraft in uncontrolled airspace where high traffic density or special conditions may occur.

Pilots must broadcast their position and intentions on the MBZ frequency on entry, when joining an aerodrome circuit, prior to entering a runway and at regular intervals when in the MBZ. You can find information on these zones in *AIP New Zealand* ENR 5.3 Section 4, and on the VNCs.

Common Frequency Zones (CFZ)

These zones are there to encourage pilots to use a specified single radio frequency when in an area designated as a CFZ. The zones were introduced to assist in providing a common radio frequency where several frequency areas overlap.

Pilots should transmit all relevant information about their flight and their intentions at entry, or at other times for traffic safety when in the zone. This is not mandatory, but common sense and good airmanship says to do so. CFZ information is found in *AIP New Zealand* ENR 5.3 Section 5, and on the VNCs.

Note that CFZs are currently under review in consultation with the aviation community.

Aerodrome Flight Information Service (AFIS)

AFIS is an air traffic service, unlike UNICOM or aeronautical mobile services. An AFIS can be provided at aerodromes where the number of scheduled air transport operations doesn't justify an ATC service, but where flight safety can be improved for the mix and numbers of aircraft using the aerodrome. AFIS is not a control service, but the FSO can relay clearances from ATC and provide information useful to pilots for the safe and efficient conduct of their flights. AFIS is currently established only at Paraparaumu and Milford Sound, and be aware that Paraparaumu is also within the Paraparaumu MBZ.

Universal Communications (UNICOM)

UNICOM is established only at Ardmore Aerodrome and provides non-certificated air-ground communications regarding the local weather, wind, temperature, QNH setting, and provides weather and aerodrome condition broadcasts and can relay aircraft position reports.

With the array of different frequencies in use across the country, notwithstanding ATC frequencies, there is ample opportunity to get it wrong and be on the incorrect frequency.

Murray Fowler, CAA Aviation Safety Adviser, says he has heard reports of a number of close calls between aircraft near airspace boundaries, when pilots were using the wrong frequency and weren't aware of the other traffic.

"The risk is greatest at 'choke points' where numerous airspace boundaries converge, when aircraft could be on any one of several frequencies. To maintain safety, pilots must ensure they constantly listen out on the correct radio frequency and only switch frequencies at the airspace boundary, not a mile or so out.

"Pilots also need to be disciplined and not become preoccupied with the radio, or other gadgets, at the expense of a good lookout, and therefore miss seeing other aircraft in the area. Having two radios in your aircraft is a really good safety strategy, because it allows pilots to monitor more than one frequency at a time. With two radios, pilots can listen to the frequency of the area they are flying into and get an early 'heads up' about the traffic ahead," Murray says.

Further Reading

Plane Talking – A Guide to Good Radio Use GAP booklet – email info@caa.govt.nz for a free copy, or go to www.caa.govt.nz, "Publications". ■

Decision Making

To operate an aircraft safely, a pilot must continually make sound decisions, and take various actions, during the course of a flight. Here we consider the aviation decision making process, use some examples to illustrate good and bad decision making, and give some insights into how to enhance the process.

Studies have shown that approximately 75 per cent of aircraft accidents are human factors related, where a pilot's decision, or inaction, caused or contributed to an accident. The Flight Safety Foundation says that with proper training, pilot judgement errors, and therefore accidents, can be significantly reduced.

Usually it is not a single decision or action that leads to an accident, but a chain of events that is triggered by a number of factors. Breaking a link in the events chain is normally all that it takes to change the projected outcome of a sequence of events and prevent a serious incident or an accident, as illustrated in the following cases.

Examples

» Having previously flown a cross-country triangular route as dual instruction, including landing at two airfields, a student pilot was to fly the same route solo, but in the reverse direction.

The weather was suitable for the flight, and the student successfully completed the first leg of the cross-country and did a touch-and-go. However, at the start of the second leg he became disorientated when he flew in a different direction from that planned. Having the presence of mind not to continue and make the situation worse, he made an early decision to return to the nearby airfield. After landing, he contacted his instructor for assistance and subsequently completed the rest of his solo flight without incident.

» An instructor, newly rated on the tail-wheel aircraft, flew a female passenger to an airstrip. Wanting to impress his passenger, the instructor became distracted and didn't get a comprehensive weather briefing before the flight. At the airstrip he discovered that at his experience level on the tailwheel aircraft, the weather was marginal for landing, but rather than return to the departure aerodrome he attempted a landing. During the landing the instructor ground looped the aircraft, but no one was injured.

The embarrassed instructor, not wanting to worsen the situation, exercised sound judgement when he didn't attempt to take off, and contacted the chief flying instructor for guidance. The chief flying instructor wanted to take the opportunity to use the incident for further training and reinforce good decision making, so the instructor arranged ground transport to get him to the airstrip. At the airstrip they discussed the situation including recovering the aircraft, and together they returned it safely to the departure aerodrome.

» An experienced aerobatic pilot was killed when he attempted a low-level aerobatic manoeuvre with insufficient altitude and aircraft momentum (energy) to safely complete the planned manoeuvre. Despite his experience, he had allowed complacency to adversely affect his common sense and he made a fatal decision.

Improve the Process

Decision making can be described as a systematic mental process that people use to consistently determine the best course of action in response to a particular set of circumstances. Good judgement is the cognitive process of recognizing and analysing all the relevant information, rationally evaluating the known available actions, and making a timely decision on which action to take.

Carlton Campbell, an A-category flight instructor and Flight Examiner, and CAA Standards Development and Training Officer, says that teaching students the manipulative skills of flying is relatively easy, compared to instilling airmanship, discipline and prudence, which is somewhat more difficult.

"There are many variables that can conspire together to influence the successful outcome of any flight and hinder sound decision making. For example, the compressed time-frame when travelling at speed, the changeable nature of the weather, the challenges of a pilot's own currency, complacency, and a homing pigeon-like instinct to

return home, can all undermine the decision making process. Their combined pressure can grow with each passing minute and every drop of fuel consumed, all the while taxing the human mind.

"A common action that often leads to an accident is the determination to continue with a bad landing approach, rather than going around and setting up again," Carlton says.

Complacency is also an insidious creeping thing that should be guarded against, because it can negatively influence the decision-making process of even the most capable aviators. Impulsive or spur-of-the-moment decisions must be avoided because they too can have lifetime ramifications.

One bad decision can lead to another and set up a poor judgement chain. To combat this and break the chain, sound judgement and positive action must be taken, as seen in two of the three examples discussed.

A model that can be useful for encouraging sound decision making is the 'Decide' model.

- **D**etect that a change has occurred.
- **E**stimate the need to counter the change.
- **C**hoose a desirable outcome.
- **I**dentify the actions needed to control the change.
- **D**o the required actions.
- **E**valuate the effect of the action.

Research has shown that the earlier a decision is made to rectify a worsening situation, the more likelihood there is of a successful outcome.

"An early decision is often a conservative one. When changing weather or a decreasing fuel state creates concern, it is time to act. When a concern first enters the mind, it can begin to consume valuable thinking capacity that is needed for sound decision making. The further you fly into a worsening situation, the narrower your focus will become and the harder it will be to make good decisions. Turning back, diverting, or even doing a precautionary landing in a paddock may be inconvenient, but at least you are still in control and will live to fly another day," Carlton says.

Further Reading

Flight Safety Foundation web site, www.flightsafety.org, under, "Resources/Publications/Helicopter Safety/Helicopter Safety 1994 – *Improved Aeronautical Decision Making Can Reduce Accidents.*" ■

Wind Shear
for the Light Aircraft Pilot

Horizontal wind shear

Horizontal wind shear has a shear zone in the vertical plane.

Wind shear is a sudden change in wind speed, wind direction, or both, encountered in flight. In New Zealand, there are nine reported incidents involving wind shear per year on average.

Most of these incidents occur in or around the takeoff or landing phases of flight and involve all classes of aircraft from wide-body jets to microlights.

Although modern airline aircraft have technology that can alert pilots to the possibility of wind shear, the recreational pilot must rely on observation and reports. For all pilots, the same inherent dangers exist if wind shear is encountered close to the ground.

There are two types of wind shear - horizontal and vertical. Horizontal wind shear is a change in direction or speed at the same height, while vertical wind shear is a change in direction or speed with change of height.

If an aircraft descends into wind through a vertical wind shear zone, with lighter wind below, the aircraft's airspeed will reduce, its angle and rate of descent will increase. This is a dangerous position to be in with limited height to recover, such as during landing.

If an aircraft encounters a reduced headwind or a headwind that turns to a tailwind during takeoff, the aircraft will have an increased takeoff run, reduced rate of climb, and a shallower climb angle. This is also a dangerous position to be in if you need to out-climb terrain.

Causes of Wind Shear

The common causes of wind shear are:

» Thunderstorms
» Surface obstructions
» Frontal activity
» Sea breezes

Thunderstorms

Thunderstorms can produce a range of wind shear-related hazards to aircraft, including localised strong and gusty winds, downdraughts, downbursts, gust fronts, and tornadoes.

Downburst

A downburst is defined as a strong downdraught which produces an outflow of sometimes damaging winds on or near the ground.

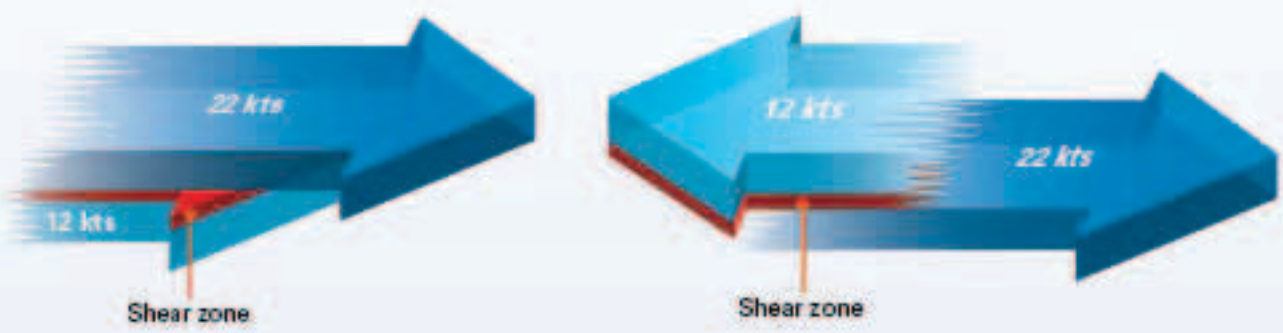
A microburst is a small downburst, having a horizontal range of between 400 m and 4 km. Microbursts normally reach their maximum shear values after 5 to 10 minutes of reaching the ground and usually dissipate within 20 minutes. The danger of microbursts is that the vertical speed can be as high as 6000 ft/min, and that they are not always obvious or easy to detect. In general, New Zealand does not have the type of climate that favours microburst activity, but it can happen.

Gust Fronts

The gust front is the leading edge of the cold dense air from a thunderstorm downdraught, which reaches the ground and spreads out in all directions, undercutting the surrounding

Vertical wind shear

Vertical wind shear has a shear zone in the horizontal plane.



warmer and less dense air. The gust front is usually located up to 15 NM ahead of the thunderstorm parent cell and travels in the same direction. There is a marked horizontal wind shear at ground level following the passage of the leading edge of the gust front. The change in wind surface direction is often as much as 180 degrees, and the wind speed can exceed 50 knots. Such a sudden change in the surface wind, some distance from the storm, can take pilots completely by surprise.

Surface Obstructions

Probably one of the more serious concerns, both in severity and in its likelihood of being encountered, is wind shear created by the wind flow around obstacles. These can range in size from isolated buildings to mountains. The effects increase with windspeed and the angle at which the wind strikes the obstruction.

Fronts and Sea Breezes

The severity of wind shear generated from sea breezes will generally not create unflyable conditions. Special caution is required however, if you are operating the aircraft at low speeds or altitudes, such as for takeoff and landing.

Frontal wind shear severity will depend to some extent on the nature of the front and the associated wind changes. Flying in bad weather configuration (low and slow) at the critical point of the passage of a front should be done with caution.

Coping with Wind Shear

The effects of wind shear on an aircraft are variable. Obviously, downdraughts and updraughts will have effects, but loss of airspeed – with resulting loss of lift – can accentuate these effects and, in the worst case, make recovery impossible.

Recognise

The first defence is to learn to recognise the likely presence of wind shear before flying into it. Some recognition cues are:

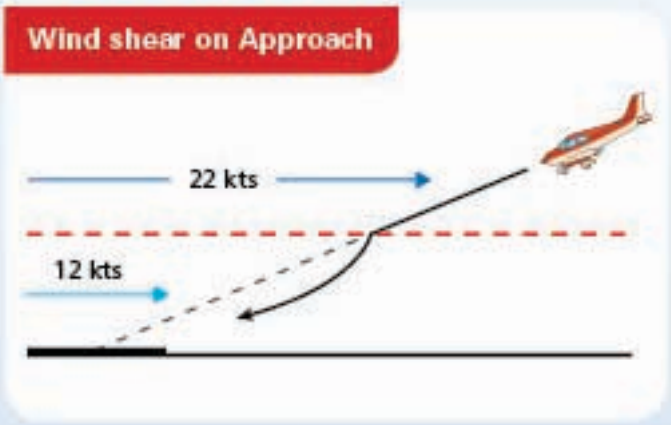
- Thunderstorms should always be assumed to be capable of producing hazardous wind shear.
- Areas of dust in the form of a ring below convective clouds can indicate the presence of a downburst.
- Roll cloud at the base of a thunderstorm and advancing ahead of the associated rain belt indicates the presence of a gust front.
- Shelf or wedge-shaped cloud attached to the base of the storm cloud.
- Look for the effects of wind 'dumping' on trees and crops, or in the ripple and spray patterns on water surfaces.
- When virga (precipitation that evaporates before reaching the ground) is associated with a 20-degree difference between temperature and dewpoint, so-called 'dry microbursts' may exist.
- Lenticular cloud (smooth lens-shaped altocumulus) indicates the presence of standing waves, usually with associated rotors (eddies) beneath, which produce strong updraughts and downdraughts.
- Strong, gusty surface winds, especially where an aerodrome is located near hills, or where there are comparatively large buildings near the runway, can cause local wind shear and turbulence. Visualise what effect such obstacles may be having on the airflow around them. Be particularly careful using airstrips carved out of a forest, as the wind below the treetops may differ markedly from that above them.
- Windsocks indicating different winds are an unmistakeable

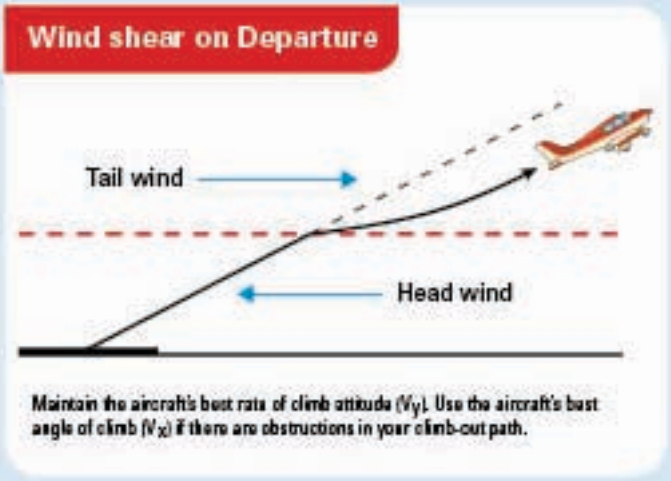
sign that wind shear exists.

» Smoke plumes can show the shear effect, with upper and lower sections of the plume moving in different directions.

» TAFs provide the surface and 2000-foot winds. A large variation between the two can indicate possible wind shear.

» Finally, a most important clue is a report from another pilot. If you experience significant wind shear, pass on details without delay.





Avoid

If any of these are apparent during takeoff or landing, the likely effects would have to be assessed on a case-by-case basis, including consideration of how close the wind shear is to the intended flight path.

Local knowledge of a particular aerodrome can be useful in making judgement calls. If the winds are strong and the aerodrome is unfamiliar, seek advice from other pilots or air traffic services (but remember, the decisions are still yours).

Some wind shear is simply impossible to fly through at low level without serious danger. Microbursts often fit into this category.

Learn to recognise the signs of hazardous wind shear and avoid them. Decide early to avoid an encounter by delaying the approach or takeoff until conditions improve. If the wind shear is strong and is likely to persist, do not take off or land. Divert if necessary.

Prepare

In New Zealand when there is wind, wind shear can be present in some form. Pilots should anticipate wind shear and be ready to take immediate action if required.

When taking off, configure the aircraft for maximum performance. Use all of the runway length available. If possible, do not reduce power too soon after takeoff. Plan the climb path to avoid high obstacles.

On approach, add half the gust magnitude to your approach speed, up to 20 knots, if runway length permits. Maintain the increased airspeed until the flare.

Recover

If wind shear is encountered unexpectedly, or is more severe than anticipated, the appropriate recovery action should be taken immediately. The earlier the recognition, the more effective the recovery action.

How do you know if you've encountered wind shear? Sudden unexpected variations in airspeed of plus or minus 15 knots, and in vertical speed of plus or minus 500 ft/min are some indications of severe wind shear. On approach, if you need to significantly increase or decrease power, this can also indicate the presence of wind shear.

If a stabilised approach is your normal routine, then you will find it much easier to recognise any abnormal deviations in airspeed, glide slope, descent rate, or power requirements caused by wind shear.

If strong wind shear conditions are evident, and you experience deviation above the normal glide slope, be careful not to reduce power too soon. If the deviation is caused by an updraught, chances are you may soon encounter an equally strong downdraught.

If you encounter a high sink rate or a significant loss of airspeed near the ground, full power is called for without hesitation, whether after takeoff, on approach, or at any other time while flying at low level.

If at any stage of flight, recognition of the presence of wind shear and taking preventative or precautionary action is preferable to having to take recovery action.

Local Knowledge

At many aerodromes around New Zealand, low-level wind shear exists in strong wind conditions. This can be due to local topography or adjacent obstructions, and it is very important to anticipate the possibility and to have an exit plan.

Aerodromes where wind shear is more common include Dunedin, Wellington, Queenstown, and Nelson. All of these are subject to the effects of topography on wind flow, and at Nelson, a strong southeasterly may be undercut by a local sea breeze, resulting in a shear zone between the two airflows.

Further Reading

See the GAP booklets *VFR Met* and *Mountain Flying*, both available on the CAA web site, www.caa.govt.nz under "Publications" or by emailing info@caa.govt.nz. ■

Photo: John McCaw, McCaw Media Ltd

Who Needs an **Ag Rating**?

For safety's sake, and to protect the environment, an agricultural rating is a qualification the Rules require if you are spreading certain substances by helicopter or aeroplane. This applies equally to private operations on your own property.

Gary Langman is an experienced agricultural pilot and the CAA Team Leader Agricultural Flight Operations. Gary says that with the low level nature of agricultural flying, the associated risks are high, but with the right training and skill the risks can be managed and safety maintained. That said, Gary has discovered that some pilots have been flying agricultural operations without the requisite training, or knowledge that they even needed a rating.

"The flying activity itself calls for a high level of skill, a lot of precision and much self-discipline. For the untrained or unwary pilot, there is an ever present risk of spreading pollutants into waterways or protected areas, or dispensing poisons and other substances into unintended areas," Gary cautions.

To mitigate the risks and help protect the environment, an agricultural rating is required if you:

- spread any substance for plant nourishment, soil treatment, propagation of plant life, or pest control, or
- carry out any dispensing activity that directly affects agriculture, horticulture, or forest preservation, or
- reconnoitre the treatment area for the above types of operation.

Even though they are agricultural operations, you won't need an agricultural rating if you only drop farm supplies or materials, or feed or transfer livestock, on farms in rural areas, or fly below 500 feet to survey agricultural, forest, or areas of water.

If you distribute any type of agricultural chemical, a chemical rating is another qualification you will need in addition to an agricultural rating. A chemical is any substance that is used to prevent, destroy, repel, or mitigate pests. This includes those used to control rodents, worms, fungi, weeds or other forms of plant or animal life that are a national or regional pest. If the substance is used as a plant regulator, defoliant or desiccant, it is also a chemical.

To fly commercial (hire or reward) agricultural aircraft operations you will also need an agricultural aircraft operator certificate from the CAA, and a commercial pilot licence in the right category, but you won't for private non-commercial operations.

The Rating

The agricultural rating is a two tier system, a Grade 2 and a Grade 1.

For a Grade 2 rating, you require at least a private pilot licence in the appropriate aircraft category with 200 hours flying time, including 100 hours as pilot-in-command, before training. The training must include an approved course of ground and flight instruction by suitably qualified persons. A Grade 2 restricts pilots to flying as pilot-in-command only on those operations that don't create a hazard to any third party.

For an unrestricted Grade 1 rating, you will have a commercial pilot licence and 1000 hours flying agricultural operations.

For a chemical rating, you will have at least a private pilot licence in the appropriate aircraft category and have satisfactorily completed an approved chemical application training course.

Remember, once you are rated, there are currency requirements you will need to meet to continue to exercise the privileges of each rating.

The Rules

Part 137 *Agricultural Aircraft Operations*.

Part 61 *Pilot Licences and Ratings*. Subpart O – *Agricultural Ratings* and Subpart P – *Pilot Chemical Rating*.

AC 61-15 *Pilot Licences and Ratings – Agricultural Ratings*.

AC 61-16 *Pilot Licences and Ratings – Pilot Chemical Rating*. ■

Part 115 – One Year On

It's been just over a year now since the new Civil Aviation Rules, Part 115 *Adventure Aviation – Certification and Operations* came into effect.

Under the new rules, all operators conducting adventure aviation operations for hire or reward are required to hold an operator certificate, within various transitional timeframes.

Hot-air balloon, hang glider, paraglider, tandem parachute, and parachute drop aircraft operators were required to be certificated by 1 May 2012, and microlight aircraft operations by 1 Nov 2012. Glider operators have until 1 May 2013 to achieve certification.

Currently, most of the adventure aviation industry has achieved certification. A few of those operators across the industry tell us about their experience with the changes so far.

A Learning Curve

Martyn Stacey, Aoraki Balloon Safaris operator, and **Balloon Aviation Association of New Zealand** president, says, "It has taken a lot of understanding. But when the rule finally came, it was good, very good".

"The most challenging part of the journey was getting the exposition right. That took the most time. But the good thing even in that was that people would have to read the rules to get an understanding of what it meant. Now everything's in black and white and accountable. To me, the biggest advantage of Part 115 is that it defines what a company does and how it does it. It is a continuous improvement process. And the best thing is that it puts all operators on the same page, because everyone has to work at the same level and meet at least the same basic standards.

"Thanks to Part 115, New Zealand has led the way, and internationally others are now looking to us for building upon or emulating this rule. I've had overseas tourists asking me why their regulator can't do something similar."

Kelly Cullen of **Skydive Ballistic Blondes**, agrees.

"It is a good rule, we like it. But more time for achieving certification would have been better."

Kelly wrote her company's exposition herself.

"Writing the manual myself made me feel that we were on the right track. It gave me a better understanding of what the rules actually meant."

For **Ruth Presland** of **U-Fly**, the manual wasn't easy work.

"Complying with the Part 115 rule and matrix has cost us many hours of time

Part 115 Updates

Amendments

Amendments to Part 115 and consequential amendments to Parts 1 and 105, came into force 15 December 2012. The amendments introduce the requirement for an operator to establish a drug and alcohol programme for monitoring and managing risks relating to drug or alcohol consumption. The rule is available on the CAA web site, www.caa.govt.nz, under "Rules".

HSE Drug and Alcohol Audits

The CAA's Health and Safety Unit has now completed its Health and Safety in Employment (HSE) Act audits of all organisations with Part 115 certification as at 30 October 2012, to ensure that they have drug and alcohol management programmes in place.

Health and Safety Unit Manager Ed Randell, says that the results have been very encouraging, and all operators that were audited had policies and procedures that demonstrated the effectiveness of managing their drug and alcohol programmes. He says that compliance with the HSE requirements will effectively mean compliance with the new rule requirement without having to do anything further.

New AC

A new Draft Advisory Circular 115-1 *Adventure Aviation Operator Certification*, is open for comment until 31 January 2013, and is available on the CAA web site, under "Advisory Circulars - Draft Advisory Circulars".

This AC provides detailed guidance on interpreting Part 115 *Adventure Aviation – Certification and Operations*. It includes information on the process to be followed for certification, and on the Drug and Alcohol programme that operators need to have in place.

Photo courtesy of Aoraki Balloon Safaris

and a considerable sum of money. The Part 115 matrix is complicated and often refers back to initial training requirements, which had to be reflected in our manual. Our Part 115 manual reflects what we have always done. We have simply formalised the system we have always complied with. Apart from this, there has been no change in our operations and in the way we run it, from a safety perspective."

Frank Parker of **Warbird Adventure Rides**, says that for his company, the journey has been slow and expensive.

"As ours is a whole new operation, we have gone from being a private owner to a certificated operator. This has required an exposition, changes to aircraft certification and registration, pilot certification, etc. For warbird operations, a simpler process could have produced the same level of safety, similar to the Australian example where the certification and oversight is passed to the operators (Australian Warbirds)."

Stuart Bean, **CEO at Skydive Abel Tasman**, says, "Part 115 is here now. While we do feel that some of it, like defining a parachute as an aircraft, is over the top, we've embraced it and we're getting on with it".

Stuart, who chose to employ a specialist to assist in writing the manual, says he spent an enormous amount of time and money on it getting it right.

"However, we really didn't have to change much that we were already doing in the business. We just had to ensure that it matched with the Part 115 matrix. For example, we have had drug testing and Health and Safety policies for many years in our organisation," he says.

Pleasing Results

Rex Kenny, CAA Manager Fixed Wing, Recreation, Adventure, and Unmanned Aerial Systems, says, "A number of operators have taken the Part 115 certification opportunity to sit back and reassess the future of their organisations. In some cases, this has led to the operator re-branding the company, marketing themselves as achieving a Part 115 certification, and being openly subject to regulatory oversight.

"In fact, some smaller companies who had earlier indicated that they wouldn't want to operate in the Part 115 environment, have now decided to do so, which is very pleasing."

Rex notes that getting the exposition ready has been a mission for some operators.

"The exposition has to contain a documented record of everything the company does, and it's been difficult for operators to decide if they should use consultants to write it, or take on the mission themselves. While the exposition doesn't have to be an encyclopedia on the industry, it should match up to the Part 115 matrix. It needs to be a reference document, so the operator can refer to it to ensure they are doing business according to the rules.

"The early round of CAA initial audits has seen some very satisfactory results. However, there have also been one or two operations that need extra attention," says Rex.

For more information on Part 115, view the CAA web site, or contact Adventure Aviation Team Leader Flight Operations, Jeanette Lusty, email: Jeanette.Lusty@caa.govt.nz, Tel: 04 560 9512. ■

"To me, the biggest advantage of Part 115 is that it defines what a company does and how it does it."

Safety **Inside**

Do you want to replace a seat in your Pacific Aerospace 750XL? Or did you buy some seat covers that would look good in your Cessna 172? In either case, before making changes, ensure that any intended modifications comply with all appropriate rules and aircraft certification standards.

Changes to cabin materials or components can have the potential to create a significant safety hazard if rules and standards are not adhered to. When repairing, replacing, or modifying any of the interior components in an existing aircraft, make sure that the maintenance conducted, and any changes made, comply with the applicable Civil Aviation Rules.

If you want to repair or refurbish the interior of a type-certificated aircraft, you must ensure that the aircraft and its affected components will continue to comply with the aircraft's type certificate.

Original Flammability Standard

In 1996, the CAA published a *Vector* article, "Interior Safety" for general aviation aircraft. The article said that so long as you ensured any interior replacement materials met the original flammability certification standards for the aircraft, any changes made were considered maintenance and a modification approval was not required.

There are now a couple of additional considerations that need to be addressed when making changes to the cabin interior.

Since the original *Vector* article, the Federal Aviation Administration (FAA) has published Advisory Circular AC 43.13-1B, which gives additional clarification of the flammability standards applicable to US aircraft interior fabrics (see section 9-61 of the AC). The original FAA certification basis of the aircraft (either the older Civil Air Regulations CAR 3, or the later Federal Aviation Regulations FAR 23) determines which flammability standard is applicable.

This flammability standard will either be 'flash-resistant' or 'flame-resistant', depending on the date of certification. A horizontal burn test is used to determine whether materials meet these flammability standards, as detailed in FAA AC 23-2A Flammability Tests.

The FAA AC 43.13-1B also advises that as AC23-2A had not been developed at the time aircraft were certified under CAR 3, for these aircraft only, the FAA will accept a manufacturer's statement that materials meet any national standard for "flame resistant" materials. In practice, it is unlikely that such materials will be available in New Zealand, and the CAA recommends that all materials be tested or certified as "flame resistant" under FAA AC 23-2A.

Crash-tested Seats

Many modern aircraft are fitted with so-called crash-tested seats, which have been dynamically tested against the design requirements in FAR2x.562 – *Emergency dynamic landing conditions*. These requirements have been complied with as part of the aircraft's type certification.

For these seats, the foam seat cushion is an integral part of the energy absorption mechanism and cannot be changed. It is possible to change the seat-cover, but this would need to be done as part of an approved modification.

So how do you know if the seats in your aircraft are dynamically tested seats?

If the seat has a Technical Standard Order (TSO) plate identifying it as a TSO C.127a seat, then it is dynamically tested. You can also determine if the seats are dynamically tested by reviewing the aircraft's type certificate data sheet. If the aircraft certification basis is FAR 23 at amendment 23-36 or later (fixed wing), or FAR 27 at amendment 27-25 or later (helicopter), then yes, they are – even if the seat doesn't have a TSO plate which shows this. Any aircraft type certificated after 1988 is likely to be fitted with dynamically tested seats.

Further Information

The "Interior Safety" *Vector* article can be accessed online by selecting "Publications" on the CAA web site, www.caa.govt.nz.

For any inquiries, email the CAA Aircraft Certification Unit: 337@caa.govt.nz. ■

Photo by Gavin Conroy

Helicopter **Cargo Pod Security**

Helicopter external cargo pods are used for transporting all manner of goods, including livestock. Because of this diversity, the safety of the helicopter can be compromised if the cargo pod is not properly secured and items are free to depart and strike, or entangle themselves in, the main or tail rotor. People and property on the ground can also be endangered by falling items.

To ensure safety, helicopter pod lids must be properly latched and checked before departure, otherwise unpleasant and life-threatening experiences could result, as illustrated by the following two examples.

In one case, a helicopter pilot was working with two experienced loaders to fly goods to a remote hut, using a series of flights. During a loading operation, the pilot remained at the controls in the cockpit while the loader put a coiled, but unbound, long-line sling cable into the pod. Thinking that he would fly in the helicopter to the hut, and needing to put another item in the pod first, the loader left the pod lid unlatched and walked from the helicopter to the second loader a short distance away.

When the second loader saw the loader leave the helicopter, he assumed that the pod lid was secured and the helicopter ready to depart, so he signalled for the pilot to take off. During the flight the long line uncoiled and trailed about 30 metres behind the helicopter, past the tail rotor. No damage occurred, but the situation could have been a lot worse had the cable entangled itself in the tail rotor or snagged on the ground. In most cases, the pilot assisted with loading and did a final check of the pod for security. However, in this case he didn't and after getting an incorrect signal to depart there could have been an accident.

In another example, two heliski guides were working around the helicopter at the end of the day's activities. One guide had opened the helicopter ski basket to remove the skis when the second guide signalled him not to unload. The guide then walked away from the helicopter leaving the basket lid unlatched, and the second guide, not realising the lid was unlatched, signalled for the pilot to depart. The pilot had remained at the controls and was unable to see whether or not the basket was secure. No cargo was lost, but there was potential for the skis or other items to have exited the basket and ended up in the tail rotor.

Safety Message

Marty Gambrill, an experienced helicopter pilot and CAA Helicopter Flight Operators Inspector, says that in both examples with two loaders involved there was confusion over who had the responsibility for the security of the pod.

"If the pilot can't check the pod for security, then one properly trained and nominated loader must have this responsibility. Using a prearranged signal, only that loader must indicate to the pilot the pod is shut and latched, and the helicopter free to depart. Cables and ropes should also be bound to prevent them from uncoiling, and items stacked so that they are unlikely to fly out of the pod if the lid should inadvertently come open during flight," Marty cautions. ■

Caution – **Cleaning Products**

Don't just buy the first aircraft cleaning agent you see on the shelf – read the aircraft manufacturer's recommendations first, as some cleaning products with a high pH have the potential to cause corrosion, especially when used on aluminium surfaces.

As most dirt is acidic in nature, aircraft cleaning agents are formulated on the alkaline side of the pH scale to help neutralise the pH of any built up dirt on an aircraft surface. The pH scale ranges from 1 to 14 with 1 being highly acidic, 7 being neutral, and 14 being highly alkaline. Many off-the-shelf cleaners have a pH of 11 to 12, or even higher. A common misconception is that the higher the pH of a cleaning product, the more effective at cleaning it is.

A cleaning agent with a high pH that is effective at removing dirt from the exterior paint job may not be suitable for some surfaces because it could seep into areas such as a propeller hub. The danger is that after these cleaning agents with a high pH enter the systems of any aircraft, the water can evaporate and leave behind tiny spots of concentrated chemical, which may cause corrosion.

A Nasty Surprise

During an inspection recently, a New Zealand maintenance provider rejected a 5-year old propeller, hub and blades, because of corrosion pitting damage. The corrosion was apparent only after the propeller was disassembled. Following consultation, the aircraft manufacturer suggested the diluted dishwashing liquid, which was used when cleaning the aircraft, may have caused the corrosion and subsequent damage to the propeller.

This year, another propeller was rejected during its initial 5-yearly inspection for the same reason – corrosion damage to the blade butt circlip grooves and the hub faces. Once again, there was no evidence of corrosion prior to disassembly. The owner was surprised, since he had been using a well-known "general aircraft cleaning product". The propeller operator's manual states, "Use care when choosing a cleaning solvent to ensure that it does not contain any ingredients that could be caustic to aluminium".

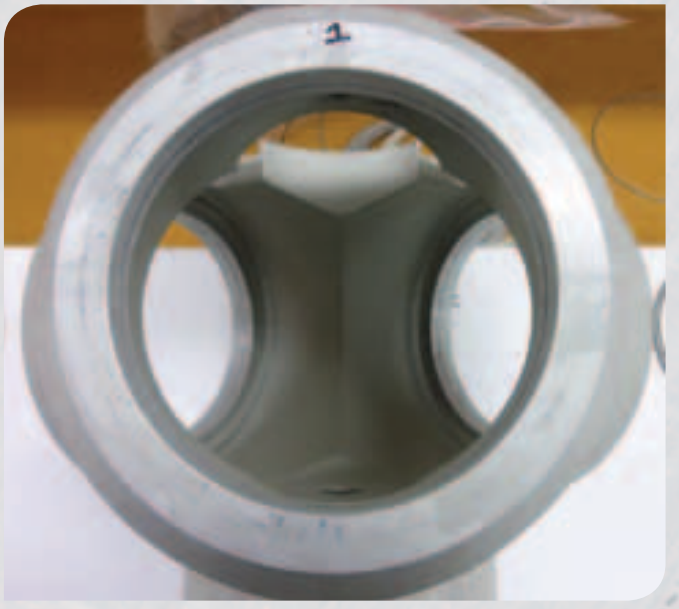
As a result, both of these owners have incurred considerable expense.

Suitable Cleaning Products

In general, owners should avoid using fluoride and chlorine based cleaners on aluminium surfaces, and use only a cleaning product with a neutral pH.

Ray Hibbs, a licensed aircraft maintenance engineer and the manager of Flightline Aviation Dunedin, recommends reviewing manufacturers' Materials Safety Data Sheets and component manufacturers' service data when selecting cleaning agents.

Corrosion damage to the hub face.



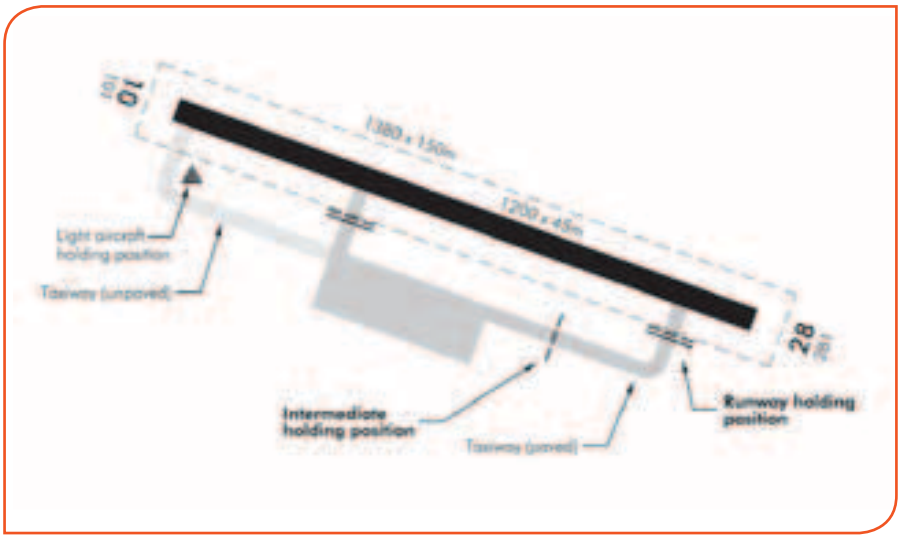
"The aircraft or component manufacturer will recommend specific cleaning products. Service letters, such as the McCauley service letter 1995-5A, also highlight other preventative measures which I don't believe are familiar to all maintenance providers. In addition, consider having propellers disassembled and checked ahead of the 5-yearly inspections", says Ray.

When cleaning your propeller blades, make sure they are in the 'down' position as this will minimise the amount of cleaning solution that could potentially seep past the O-ring at the hub. Avoid using high-pressure cleaning equipment, because the pressure could force the cleaning solutions past the blade O-rings and into the propeller hub. This could break down the internal lubricants, leading to increased wear and corrosion.

Remember, high-pressure spraying can also force water into sensitive areas such as static vents, or angle of attack vanes. To prevent any problems when washing, always follow the recommended procedures in the maintenance manual. ■

Hold it

AIP Supplement recipients will have already noticed (in 183/12) a change in the way holding positions will be depicted on aerodrome and ground movements charts.



Currently, all holding positions are shown on the charts as two lines, one solid, one dashed, but this format will apply only to runway holding positions, ie, those at the entrance to a runway. This will distinguish them from intermediate holding positions, which will be shown as a single dashed line.

Intermediate holding positions can be established at the intersection of two paved taxiways, or at the exit from an apron area to a taxiway, such as on the western apron at Wellington. Normally, where an intermediate holding position marking is displayed at the intersection of two taxiways, it is placed far enough back from the intersection to ensure safe clearance between taxiing aircraft. These can be combined with stop bar lighting, such as at Auckland, or intermediate holding position lights as required.

For a general refresher on aerodrome markings and signage, see the stand-alone *Vector* articles *Aerodrome Markings* (Nov/Dec 2007) and *Aerodrome Signs* (Jan/Feb 2008) on the CAA web site, www.caa.govt.nz, under "Aerodromes". See also Advisory Circular AC139-6 *Aerodrome Design Requirements: All Aeroplanes conducting Air Transport Operations; All aeroplanes above 5700 kg MCTOW.* ■

On the **NOSE**

Remembering the simple mnemonic NOSE will avoid having to recall at short notice all those references to how high you fly when on a particular track – such as rules 91.313 and 91.425 relating to VFR and IFR cruise altitudes and flight levels; and the *Magnetic Track Altitude Requirements* and Table of Cruising Levels in the ENR section of *AIP New Zealand.*

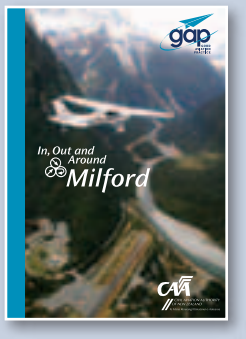
North **O**dd – **S**outh **E**ven, north being any track between 270 and 089 degrees magnetic, and south any between 090 and 269 degrees. Add 500 feet for VFR levels, and there you have the answer in thousands of feet or flight levels as appropriate, with, naturally, a few provisos.

The requirement for flying at the appropriate altitude applies above 3000 ft amsl or 1000 ft agl, whichever is the higher. The transition layer, that is the height band between 13,000 feet and flight level 150, is not generally available for level flight except when specifically cleared by Air Traffic Control in controlled airspace. Outside controlled airspace, other provisos apply, and you will need to look these up in *AIP New Zealand.* Flight levels 150 and 155 are not available for cruise when the zone QNH is 980 hPa or less.

The basic requirements are set out in the "Operating Criteria" panel adjacent to the "Legend" panel on each VNC, and in diagram form on the (IFR) enroute and area charts. That is, if you really need to look. Use your NOSE and you won't be far wrong. ■

New Products

Revised Good Aviation Practice (GAP) Booklets

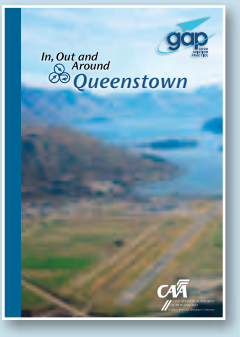


In, Out and Around Milford

Stunning, awesome, marvellous, are but three terms for the scenery in the Milford Sound area, yet it can be intimidating, even frightening, for pilots on their first visit.

The booklet introduces the terrain, routes, and the unique circuit procedures, and also cautions the reader to seek professional advice from local users before venturing into the area.

Revised in September 2012, *In, Out, and Around Milford* should be read in conjunction with *In, Out, and Around Queenstown* and *Mountain Flying*.



In, Out and Around Queenstown

Queenstown is a popular destination at any time of the year. Flying in and out of Queenstown presents some unique challenges, no matter what type of aircraft you fly. Mountainous terrain, complex airspace, a busy mix of IFR and VFR traffic, and 'character-building' weather can all keep visiting pilots on their mettle.

The Queenstown GAP booklet, revised in November 2012 to reflect recent airspace changes, contains useful advice on planning your flight in, out and around this remarkable area.

Helicopter Performance

This booklet is an excellent resource if you want to refresh your knowledge of helicopter performance, regardless of your experience as a pilot.

The booklet provides guidance to help pilots operate safely by analysing the many factors that affect performance, such as weight, air density, wind, ground effect, slope, and the surface influence. Power available, power assurance checks and other considerations, including speed control, decision points, overpitching, pilot technique, and helicopter condition are also covered.

This booklet was revised in October 2012, and retains the worked performance examples and self-help advice used in the previous version.

For a free copy of a GAP booklet or the I'M SAFE TO FLY poster, email:

info@caa.govt.nz

I'm SAFE to Fly Poster

Before jumping into the cockpit, you should ask yourself, "Am I fit to fly?"

With new visuals, the I'M SAFE poster is back and better than ever. Look out for the new version at your local training organisation.

RNAV and RNP – Operational Approvals

Not for operational use

Advisory Circular AC91-21 *RNAV 1, RNAV 2, RNP 2, RNP APCH AND BARO VNAV – Operational Approvals* became effective on 12 October 2012, and once you get past the title, the AC details acceptable means of compliance with RNAV and RNP requirements to obtain operational approval from the Director. (A brief introduction to RNAV and RNP was presented in the November/December 2012 issue of *Vector*.)

Getting operational approval takes a bit more work than just throwing a basic GPS into your aircraft and blasting off into the wild grey yonder. These three elements must be addressed:

» Aircraft capability. The aircraft must be eligible for the desired type of navigation specification, and the instruments and equipment must meet the relevant rules requirements. See Part 2 of the AC.

» Operator procedures. These must be documented in an RNAV/RNP manual or the operator's exposition. Part 3 of the AC refers.

» Pilot training and qualifications. An applicant must have adequate systems for pilot training and qualification in accordance with the appropriate rules for RNAV and RNP operations.

Clearly, getting it all together is not going to happen overnight, so the AC provides for the continued use of existing procedures until 14 November 2013. Current RNAV GNSS arrivals and SIDs will be replaced then by RNAV 1 or RNP 1 procedures; and aircraft with existing GNSS IFR enroute approvals may operate RNAV 2 up to the same date, after which they must be specifically approved for RNAV 2.

Any queries regarding the AC content should be directed to Aeronautical Engineer, Ray Harvey, email: ray.harvey@caa.govt.nz. ■

CAA Safety DVDs

www.videonz.co.nz

The CAA has a range of safety videos that can help you get a quick refresher on a variety of topics. Here are a few recent examples:

The CAA's *Plane Talking* radio course on CD comes with the related GAP booklet *Plane Talking*. It covers the basics of good radio operating practice and techniques.

The *Mountain Flying* DVD helps pilots visualise essential mountain flying concepts before they begin training with an appropriately qualified instructor. This DVD features air-to-air and in-cockpit footage with some separate sections for fixed wing and rotary aircraft.

Safety Around Helicopters provides safety information for anyone who operates around helicopters. The DVD has an introduction with general information, and then specific modules, such as, All at Sea, The Mountains, Going Bush, and Rescue on the Land.

See the complete list of safety DVDs on the CAA web site, www.caa.govt.nz, "Safety Info – CAA Safety DVDs". All the DVDs can be borrowed from the CAA library, by emailing library@caa.govt.nz, or purchased from Video NZ, www.videonz.co.nz. ■

Charging for Surveillance Risk Assessment

Risk assessments are now part of the CAA surveillance process. The risk assessment will result in a participant risk profile, and from that, the scope, frequency and depth of audits will be determined.

The risk-based surveillance process is designed to target safety interventions more effectively, and in doing so, reduce interventions (and costs) for participants with excellent safety performance.

Participants managing their risk well can expect reduced CAA auditing, particularly in areas assessed as being low risk. The risk assessment, however, is part of the audit preparation, and so will be charged for at the standard rate. This means that a participant may receive an invoice for the risk assessment, even if an audit is not carried out at that time.

For further information on the surveillance process, see the CAA web site, www.caa.govt.nz, "CAA Surveillance", and the article "Surveillance Process Developments" in the March/April 2012 edition of *Vector*. ■

Purchasing CAA Products **Online**

You can now purchase CAA products such as, Pilot Logbooks, the Flight Instructor Guide, Rules, and, Aircraft Logbooks, online.

Vertia (formerly known as The Colour Guy) now have an online purchasing system on their web site, www.vertia.co.nz.

The system lists all the CAA products available online, offers a product preview, and a price quote before the order is actually processed.

Products can be purchased by setting up a company/individual account or by credit card. Contact Vertia: email, info@vertia.co.nz, phone: 0800 GET RULES (438 785).

www.vertia.co.nz

How to Get Aviation Publications

AIP New Zealand

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

Pilot and Aircraft Logbooks

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

Rules, Advisory Circulars (ACs), Airworthiness Directives

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

Planning an Aviation Event?

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

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

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

CAA Cut-off Date	*Airways Cut-off Date*	*Effective Date*
18 Feb 2013	25 Feb 2013	2 May 2013
18 Mar 2013	25 Mar 2013	30 May 2013
15 Apr 2013	22 Apr 2013	27 Jun 2013

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2012–2013.

Aviation Safety Advisers

Aviation Safety Advisers are located around New Zealand to provide safety advice to the aviation community. You can contact them for information and advice.

Don Waters (North Island)
Tel: +64 7 376 9342
Fax: +64 7 376 9350
Mobile: +64 27 485 2096
Email: Don.Waters@caa.govt.nz

Murray Fowler (South Island)
Tel: +64 3 349 8687
Fax: +64 3 349 5851
Mobile: +64 27 485 2098
Email: Murray.Fowler@caa.govt.nz

John Keyzer (Maintenance, North Island)
Tel: +64 9 267 8063
Fax: +64 9 267 8063
Mobile: +64 27 213 0507
Email: John.Keyzer@caa.govt.nz

Bob Jelley (Maintenance, South Island)
Tel: +64 3 322 6388
Fax: +64 3 322 6379
Mobile: +64 27 285 2022
Email: Bob.Jelley@caa.govt.nz

Aviation Safety & Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)
isi@caa.govt.nz

For all aviationzrelated safety and security concerns

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)
www.caa.govt.nz/report

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

Accident Briefs

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

ZK-NPI Reims/Cessna F152

Date and Time:	21-Jul-09 at 19:25
Location:	Te Kuiti 40 km W
POB:	1
Injuries (Fatal):	1
Damage:	Destroyed
Nature of flight:	Training Solo
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	28 yrs
Flying Hours (Total):	285
Flying Hours (on Type):	50
Last 90 Days:	50

The pilot, the sole occupant of the aircraft, was making an unauthorised night VFR cross-country flight from North Shore Aerodrome to New Plymouth Aerodrome. The weather at the time of the accident was not suitable for night VFR flight, with an active cold front passing through the area. The aircraft collided with a ridge near Tirua Point, about 40 km west of Te Kuiti. The aircraft was destroyed and the pilot was killed.

A full accident report is available on the CAA web site.

CAA Occurrence Ref 09/2776

ZK-JPE G Pereira GP-4

Date and Time:	20-Mar-11 at 13:59
Location:	Orewa Beach
POB:	1
Injuries (Fatal):	1
Damage:	Destroyed
Nature of flight:	Private Other

The pilot of the amateur-built aeroplane was conducting a test flight at approximately 2000 feet in the vicinity of Orewa Beach, north of Auckland. Witnesses saw the aircraft suddenly flick over from straight and level flight and spin into the sea. The pilot was killed in the accident.

The investigation found that the pilot had altered elements of the engine cooling system before the flight, and that he had a pre-existing heart condition, myocarditis. It could not be determined whether these factors contributed to the accident.

A full report is available on the CAA web site.

CAA Occurrence Ref 11/1148

ZK-MDM Solo Wings Windlass Aquilla

Date and Time:	27-Sep-10 at 8:30
Location:	Tauranga
POB:	1
Injuries (Fatal):	1
Damage:	Destroyed
Nature of flight:	Private Other
Age:	56 yrs
Flying Hours (Total):	44
Flying Hours (on Type):	40
Last 90 Days:	8

The pilot was carrying out circuit training at Tauranga Aerodrome. The aircraft was seen to take off and climb at a relatively steep angle, before entering a steep left-hand descending turn through almost 180 degrees. It then seemed to recover from the descent into another climb, before entering another steep left-hand descending turn and striking the ground. The pilot was found dead in the wreckage.

Subsequent investigation determined that the pilot had suffered an in-flight incapacitation. A full report is available on the CAA web site.

CAA Occurrence Ref 10/3704

ZK-HMU Robinson R22 Beta

Date and Time:	27-Apr-11 at 12:30
Location:	Arawata Saddle
POB:	2
Injuries (Fatal):	2
Damage:	Destroyed
Nature of flight:	Training Dual
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	31 yrs
Flying Hours (Total):	1950
Flying Hours (on Type):	1300
Last 90 Days:	145

The helicopter was on a dual cross-country training flight, and after it became overdue, SAR action was initiated. The helicopter wreckage was subsequently located in the Arawata Saddle area, with both pilots having died in the accident.

The accident was investigated by the Transport Accident Investigation Commission, and a full report will be available on their web site, www.taic.org.nz (ref 11-003).

CAA Occurrence Ref 11/1861

ZK-TOD Cessna 152

Date and Time:	26-Jul-10 at 15:25
Location:	Feilding
POB:	2
Injuries (Fatal):	2
Damage:	Destroyed
Nature of flight:	Training Dual
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	27 yrs
Flying Hours (Total):	1400
Flying Hours (on Type):	1000
Last 90 Days:	30

The aircraft was approaching Feilding Aerodrome from the north-northwest when it collided with ZK-JGB, another Cessna 152, which had taken off from Runway 28 and was climbing on a northeasterly heading. ZK-TOD sustained damage to the left wing that rendered it uncontrollable, and it struck the ground in a spiral descent, killing both occupants. In the collision, the carburettor of ZK-JGB was dislocated, together with the fuel supply line, resulting in a total loss of engine power.

The pilot of ZK-JGB was able to glide his aircraft back to the aerodrome and land safely, despite a damaged nose wheel.

A full report will be available on the TAIC web site, www.taic.org.nz (ref 10-008).

CAA Occurrence Ref 10/2867

ZK-JFI Cessna 172N

Date and Time:	17-Oct-11 at 15:15
Location:	Arrowtown
POB:	3
Injuries (Fatal):	1
Injuries (Serious):	2
Damage:	Destroyed
Nature of flight:	Private Other
Pilot Licence:	Private Pilot Licence (Aeroplane)
Age:	59 yrs
Flying Hours (Total):	315
Flying Hours (on Type):	204
Last 90 Days:	37

The aircraft with three persons on board made an approach to land at a private airstrip 1 NM south of Arrowtown, near Queenstown. Following a touchdown well into the airstrip, the pilot applied full power to take off again. The aircraft did not gain any appreciable altitude after becoming airborne, and stalled, rolled to the left, and struck the ground. The pilot died at the scene, and the two passengers were seriously injured.

Factors contributing to the accident were strong crosswind conditions and associated turbulence at the airstrip, a late decision by the pilot to go around, and his continuing to raise the nose attitude of the aircraft after takeoff, leading to a stall in the turbulent conditions with insufficient height to recover.

A full report is available on the CAA web site.

CAA Occurrence Ref 11/4678

ZK-IXR Robinson R22 Beta

Date and Time:	06-Apr-11 at 10:30
Location:	Rakaia River Valley
POB:	2
Injuries (Fatal):	1
Injuries (Serious):	1
Damage:	Destroyed
Nature of flight:	Private Other
Pilot Licence:	Private Pilot Licence (Helicopter)
Age:	59 yrs

The flight was to transport a hunting party of two into the headwaters of Mistake Creek, and drop them at separate locations. During the second landing, the snowshoe on the left skid penetrated the vertical banked edge of the landing site, resulting in dynamic rollover to the left.

The helicopter tumbled 123 metres down the steep hillside. The pilot was killed in the accident and the passenger was seriously injured.

A full report is available on the CAA web site.

CAA Occurrence Ref 11/1471

ZK-NEB Bombardier DHC-8-311

Date and Time:	30-Sep-10 at 17:15
Location:	Woodbourne
POB:	42
Injuries:	0
Damage:	Minor
Nature of flight:	Transport passenger A to B

On 30 September 2010, a Bombardier DHC-8-311 aeroplane departed from Wellington International Airport on a scheduled flight to Nelson Aerodrome. The aeroplane diverted to Woodbourne Aerodrome (Blenheim) because of poor weather at Nelson.

When the pilots moved the landing gear selector lever to DOWN, the left and right main landing gear legs extended normally, but the nose landing gear stopped before it had fully extended.

When the aircraft touched down and the pilot lowered the nose, the nose landing gear was pushed into the wheel well and the aeroplane completed the landing roll skidding on the nose landing gear doors. Damage to the aeroplane was minimal and no one was injured.

The Transport Accident Investigation Commission found that debris in the aircraft hydraulic fluid prevented normal extension of the nose landing gear.

The operator, aeroplane manufacturer, and CAA accepted the recommended safety actions to address issues raised in the TAIC report.

Abstract from TAIC report 10-010 (available on TAIC web site www.taic.org.nz).

CAA Occurrence Ref 10/3784

GA Defects

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

Key to abbreviations:

AD = Airworthiness Directive
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

Bell 206B

Crosshead nut

Part Number:	NAS 1022A8
ATA Chapter:	6420
TSI hours:	100

During routine maintenance, when the tail rotor crosshead centre nut was being removed, the nut fractured with minimal torque applied. The pieces of the nut were sent to the manufacturer for examination. They determined that the failure was caused by stress corrosion. The helicopter had been used extensively for agricultural work, which may have been a factor in the corrosion.

Transport Canada, who oversees the continued airworthiness of the Bell 206, was contacted. After consideration, they advised that they would not be pursuing this matter with the manufacturer, confident that the instructions for continued airworthiness were adequate to detect this condition. It is suggested that operators and maintainers pay particular attention to the condition of the tail rotor crosshead nut during routine inspections and cleaning, and report any anomalies found to the CAA.

CAA Occurrence Ref 12/2196

De Havilland DH82A Tiger Moth

Crankshaft

Part Model:	Gypsy Major I
Part Manufacturer:	GM Holden
ATA Chapter:	8520

Approximately 25 minutes into the flight, a massive engine vibration was felt, which lasted approximately 5 seconds, then propeller rotation stopped. The pilot transmitted a MAYDAY call to Ardmore Unicom, which was relayed by another aircraft. The pilot then carried out a successful forced landing into a paddock without further damage to the aircraft.

A partial engine strip found that the crankshaft had broken between the main bearing and number 3 crankshaft journal. No reason for the failure could be found.

It is possible that two propeller strike occurrences earlier in the engine's life could have contributed to the failure.

CAA Occurrence Ref 12/1777

Robinson R22 Beta

Main transmission

ATA Chapter:	6320

During flight, the main rotor gearbox chip warning light illuminated. Engineering examination found a significant amount of metal chips deposited on the chip detector, and the gearbox oil was contaminated. The gearbox was removed and was found not to turn over freely. The gearbox was sent to an overhaul agency for further investigation. It was discovered that the input pinion gear 'nose' bearing was significantly spalled, which had caused the metal chips. Robinson Helicopter Company was contacted and they advised that a spalled nose bearing has not previously resulted in a loss of drive to the main or tail rotor. Most failures were detected by the metal chips setting off the chip warning light. Operators should be aware that in cases where operators had failed to properly clean the build-up of varnish deposits from the chip detectors, chips going through gear mesh caused gear spalling. Then the resulting rumbling noises from the gearbox as the main rotor coasted to a stop after engine shut down alerted the pilot to the problem. The FAA was informed of this issue.

CAA Occurrence Ref 12/3080

Cessna 421C

Cylinder 5 rocker cover

Part Model:	GTSIO-520-L2B
Part Manufacturer:	Continental
ATA Chapter:	7900

During cruise, a significant flow of oil was observed from the right-hand cowling of the left engine. The pilot requested immediate descent and transmitted a distress call due to concern of fire and engine shutdown. The aircraft made a successful landing.

Maintenance investigation determined that the left engine No 5 rocker cover screws were loose and one was completely missing, which had led to four litres of oil being lost. During reinstallation of the No 5 rocker cover after the last scheduled 50-hour inspection, the lock washers were not replaced, the old washers being visually checked and reused. The screws had also not been tightened using a torque screwdriver, with engineers using their own experience and knowledge to determine the correct torque, due to untrusted manufacturer's instructions.

A policy to replace lock washers with new ones after maintenance activity has been introduced, and the screws are to be tightened with a torque screwdriver to manufacturer's instructions. The supplier of the gasket has also been changed to one who could provide appropriate installation instructions, and a ground run should be added to the worksheet as a separate item.

CAA Occurrence Ref 12/711

Aerospatiale AS 355 F1

Power turbine governor

Part Model:	A250
Part Manufacturer:	Honeywell
Part Number:	23065123
ATA Chapter:	7320
TSO hours:	158

On descent, number 2 engine torque indication was observed to be 0%. A single-engine landing was made.

The operator's engineering investigation revealed that the power turbine governor (PTG) was showing blue grease from the lower witness hole. Further stripdown established that this was not a factor in the engine power loss. The fuel control unit (FCU) by that time had been sent for overhaul but a strip report was not forthcoming. The PTG and FCU were replaced and the aircraft was returned to service.

CAA Occurrence Ref 12/691

Gippsland GA200C

Oil filter

Part Manufacturer:	Champion
Part Number:	CH48110-2
ATA Chapter:	7920

Recently the CAA received two reports of CH48110-2 oil filter failures on two different GA200 aircraft in New Zealand, which resulted in a sudden and substantial loss of engine oil in flight. Both aircraft landed safely.

Investigation revealed the sudden loss of oil was due to a crack at the seam where the filter can meets the bottom of the threaded base. This type of failure is considered to be a very unusual occurrence.

The two defective filters were returned to Champion for inspection, and extensive testing of the batch was performed. The manufacturer determined that it is extremely improbable that the failures are related to a batch defect of the filters.

The New Zealand suppliers have recalled the affected batch of filters for exchange across the NZ customer base. The majority of filters have been returned for exchange while those remaining are expected to have been cycled through by now.

CAA Occurrence Ref 11/5650

McDonnell Douglas 500N

Manual release cable

Part Manufacturer:	MD
Part Number:	14323-2
ATA Chapter:	2550
TTIS hours:	13.9

The fertilizer bucket was inadvertently released during an underslung operation. Maintenance inspection of the hook manual release cable found corrosion in the outer sheath. The maintenance provider subsequently changed the inspection programme from 'on condition' to 100-hourly and a three-yearly major inspection.

CAA Occurrence Ref 11/5847

Cessna 180J

Hydraulic lifters

Part Model:	O-470R
Part Manufacturer:	TCM – Modified by ECI NZ Regro
Part Number:	646277R
ATA Chapter:	8530
TSI hours:	110
TSO hours:	1200
TTIS hours:	1200

During 100-hourly scheduled maintenance, metallic particles were detected in the aircraft oil filter, and again on a subsequent 10-hour recheck. Oil analysis was carried out, and confirmed elevated levels of steel, chromium and aluminium. The engine was bulk stripped, and it was found that the cam contact face on several of the inlet and exhaust lifters was breaking up and depositing the material collected by the oil filter. The camshaft lobes were also damaged. The cause of the damage to the cam lifters contact faces may be due to normal wear mechanisms such as spalling, stress induced cracks, or dissimilar metal corrosion. The affected filters were removed and cleared, and the damaged parts are to be replaced.

CAA Occurrence Ref 12/718

Cessna 172M

Circuit breaker

ATA Chapter:	2450

During flight, smoke was observed in the cockpit, accompanied by a popping noise and heat from behind the instrument panel. Suspecting an electrical fire, the pilot turned off the alternator and all non-essential electrical systems, and made a precautionary landing at the nearest aerodrome.

The 60-amp alternator circuit breaker had failed internally, causing the symptoms observed by the pilot. The cause of the failure could not be established.

CAA Occurrence Ref 11/5483

Britten-Norman BN2B-26

Carburettor

Part Model:	MA4-5
Part Manufacturer:	AVSTAR
Part Number:	AV10-4404
ATA Chapter:	7320
TTIS hours:	71.6

As the aircraft went through turbulence, the left engine began to run rough and would produce only partial power. This condition did not improve throughout the remainder of the flight.

The carburettor was removed and sent to a maintenance provider for further investigation. It was found that a small piece of gasket material from the centre of a punch hole was located in the main fuel nozzle, restricting fuel flow.

The manufacturer was advised, and the carburettor repaired and released to operator.

CAA Occurrence Ref 12/576

FREE!

Aviation Safety Coordinator Course

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

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

Attend this free two-day course to train new aviation safety coordinators, and to refresh and re-inspire existing ones –

- you will get a comprehensive safety manual;
- access to all of the latest CAA safety resources and support; and
- lunch is provided (accommodation, transport and other meals are not provided).

Auckland

21 to 22 February 2013

Sudima Auckland Airport
18 Airpark Drive, Airport Oaks
Mangere, Auckland

Check the CAA web site, www.caa.govt.nz, under "Seminars and Courses" for an enrolment form and further information. Places are limited and they fill up quickly, so enrol early.

Get the Mental Picture

If I can't picture it, I can't understand it. – Einstein

- **Have you ever come way too close for comfort to another aircraft?**
- **Have you ever landed after a flight and wondered, "How on earth did I get myself into that?"**
- **Have you ever lost track of what's going on around you, especially in busy airspace?**
- **Have you ever relied on luck to keep you safe?**

This year, the AvKiwi Safety Seminar is looking at collision avoidance, with specific emphasis on situational awareness – building and maintaining that all important mental picture of what's going on around you – because it's this incredibly important set of skills that will keep you out of the statistics.

But wait there's more! Not only will you gain amazing insight into how situational awareness can save your life, you will also come away with some skills to improve your situational awareness, and (as if that's not already enough) a CD-ROM to teach you even more about situational awareness, including some games to practise those skills on.

But wait, there's even more – for those of you with smartphones, and other such devices, we will be launching a situational awareness app, to help you continuously improve your situational awareness skills.

AvKiwi seminars are FREE to attend. More North Island venues will be advertised in the next *Vector*. For a complete schedule of dates and locations, check out the CAA web site, www.caa.govt.nz.

AV KIWI SAFETY SEMINARS

Feilding
Wednesday 6 March, 6:00 pm
Flight Training Manawatu,
Cardinal Hangar
Followed by fish and chip supper

New Plymouth
Monday 4 March, 7:00 pm
New Plymouth Aero Club

Palmerston North
Tuesday 5 March, 3:00 pm
Massey University Campus,
Japanese Lecture Theatre
(Opposite commercial complex)

Paraparaumu
Thursday 7 March, 7:00 pm
Otaihanga Boating Club,
Makora Road, Otaihanga

Nelson
Thursday 18 April, 7:00 pm
Nelson Aero Club

Wellington
Friday 8 March, 7:00 pm
CAA, Asteron Centre, Level 15,
55 Featherston Street

Motueka
Wednesday 17 April, 4:15 pm
Nelson Aviation College

Blenheim (Omaka Aerodrome)
Friday 19 April, 7:00 pm
Marlborough Aero Club

Greymouth
Tuesday 19 March, 7:00 pm
Greymouth Aero Club Flight Centre

Christchurch
Monday 18 March, 3:00 pm
International Aviation Academy
Monday 18 March, 7:00 pm
Canterbury Aero Club

Franz Josef
Wednesday 20 March, 7:00 pm
Air Safaris Terminal Building

Ashburton
Friday 12 April, 7:00 pm
Mid-Canterbury Aero Club

Wanaka
Thursday 21 March, 7:00 pm
St John Ambulance Building
4 Link Way, Wanaka

Timaru
Thursday 11 April, 7:00 pm
South Canterbury Aero Club

Queenstown
Friday 22 March, 7:00 pm
St John Ambulance Centre,
10 Douglas Street, Frankton
Followed by refreshments
across the road at the
Wakatipu Aero Club

Oamaru
Wednesday 10 April, 7:00 pm
North Otago Aero Club

Invercargill
Monday 8 April, 7:00 pm
Southern Wings,
Airport Avenue

Dunedin
Tuesday 9 April, 7:00 pm
Mercure Dunedin Leisure
Lodge Hotel
30 Duke Street

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