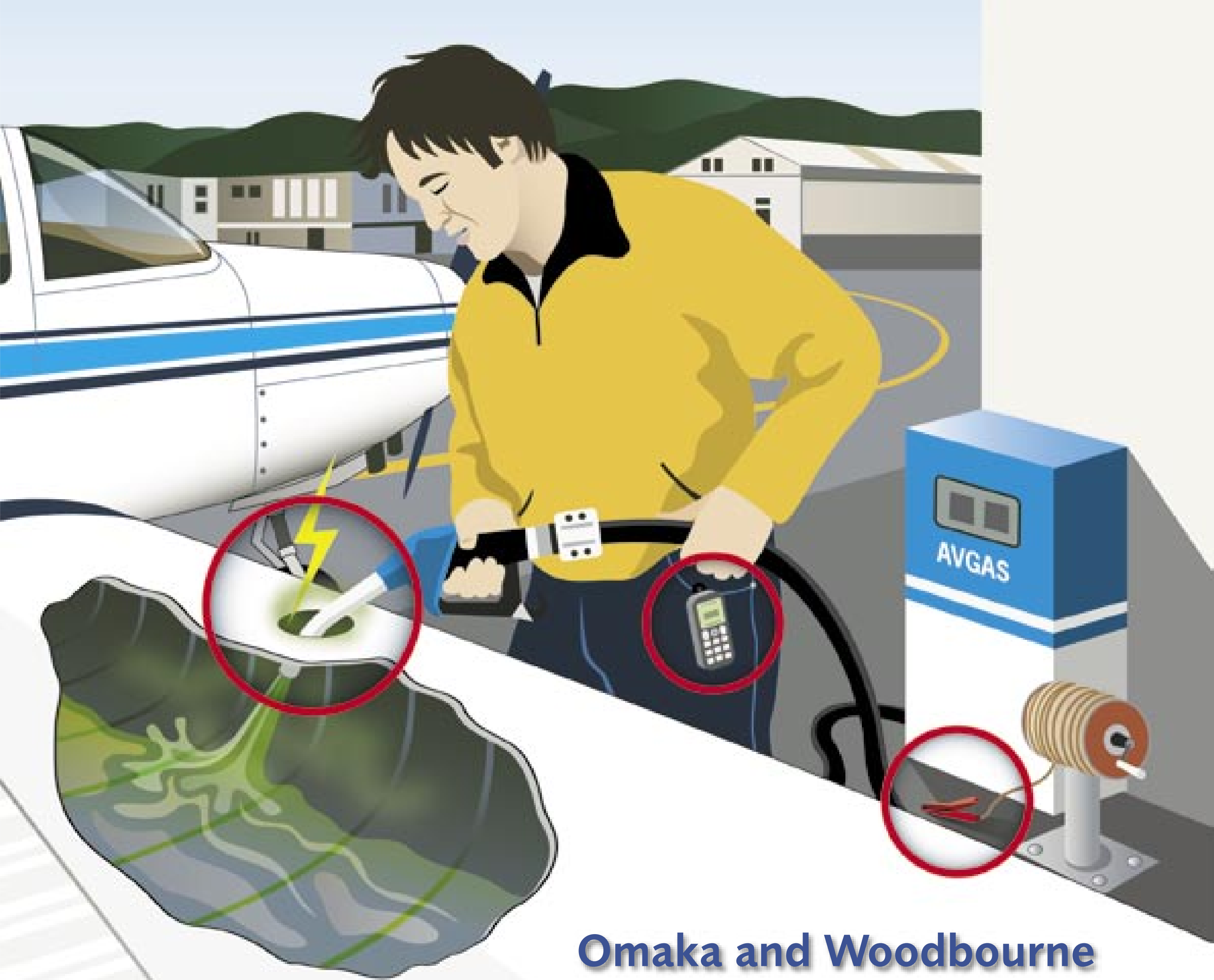
September / October 2005

VECTOR

Pointing to Safer Aviation

Dangers of Static



Omaka and Woodbourne

TCAS II Traffic Display

Enroute Frequencies in Uncontrolled Airspace

CAA
CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

VECTOR CAA NEWS

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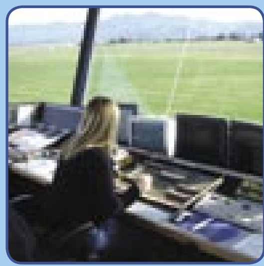
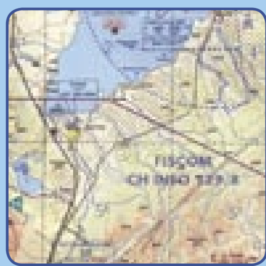


Flying safely and successfully into Omaka and Woodbourne comes down to correct preparation. To assist, this article discusses flying VFR at Omaka and IFR at Woodbourne.

In this article, we look at the dangers of flight crew using TCAS II traffic display for separation and sequencing with other aircraft.



If you are flying VFR enroute in uncontrolled airspace, what frequency do you monitor?

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Dangers of Static

In June last year, New Zealand aviation had a dramatic and disastrous reminder of the dangers of static electricity discharge during fuel handling. While fuel was being poured into the empty tank of a Partenavia aircraft following extensive maintenance, an explosion occurred resulting in severe injuries to an engineer and extensive damage to the aircraft and surroundings.

We can carry out a refuel a hundred times or more without a problem, but static is very unpredictable and we should always be alert to the potential risk and take all possible precautions. Like many safety measures in aviation there is often no positive feedback that the precautions we are applying are definitely preventing an accident – but omit them, and the consequences can be sudden and permanent.

Accident Circumstances

As with most accidents, there was a combination of factors which added up to provide the opportunity for disaster.

Two engineers were preparing the Partenavia for test running of new engines. One of them was returning the fuel to the tanks which had been emptied for wing inspections. The aircraft was situated in the back of the large hangar rather than in the smaller workshop (with large adjacent doors) as it had been undergoing maintenance for some time, and would have tied up required space in the workshop.

Working in the cold hangar rather than the heated workshop, the engineer was wearing a synthetic polar fleece garment over his cotton overalls. To reach the fuel tank, he was standing on a metal ladder with insulated feet.

A plastic container was being used to transfer the fuel through a metal funnel with a chamois filter into the starboard tank of the Partenavia. (The plastic container was approved for flammable liquids, but for one use only.)

He proceeded to pour 10 to 12 litres of fuel into the tank when a huge explosion occurred inside the tank, blowing the top and the bottom out of the tank and the wing. A fireball erupted in both directions and the explosion blew the engineer off the ladder. He fell into the fire now burning on the floor. The fireball severely damaged the 6 metre high roofline and 75 square metres of roofing had to be replaced.

The aircraft was extensively damaged by explosion and fire.

Such was the magnitude of the explosion that a valued engineer and his family had their lives turned upside down for at least a year, workmates and friends were affected, and accumulated costs (direct and indirect) were estimated to be over half a million dollars.

The organisation involved is making all efforts to share the lessons learned, as similar scenarios could be happening in other maintenance workshops and aircraft hangars around the country.

The possibility of a fire or explosion created by static electricity is forever present – no matter how remote it may seem.

Some of the advice being shared with other organisations relates to obligations and investigation under the Health and Safety in Employment Act 1992. Any workplace accident resulting in serious harm will be investigated in terms of this Act, and the investigation will address actual and potential hazards, and the employer's means of addressing these.

Static and Fuel

Fuel is an extremely flammable liquid and explosive fuel/vapour mixtures may form at ambient temperatures. The presence of an ignition source can spell disaster.

Under certain conditions static electricity can be a potential ignition source.

The recent accident serves as a stark reminder of the potentially disastrous combination of static and fuel.

What is Static?

Static is experienced when materials, the environment, and our activities conspire to allow positively and negatively charged molecules to accumulate on different surfaces. If we then separate these surfaces, or move them relative to each other, a voltage difference will be set up.

Common examples of static build-up result from layers of clothing moving relative to one another, and also from contact with objects like car doors. There is generally no observable effect until the surfaces are separated; for example, clothing will start crackling only when garments are removed. Static can be generated when we separate our clothing surface from a car seat, which then leaves the car charged. We then provide a path for this accumulated charge to earth by touching the car door while standing on the ground, and receive a static shock.

Static and Aviation Fuel – A Bad Mix

Hydrocarbons, such as aviation fuels, are almost entirely made up of molecules which are not 'ionised' – that is, they are neither positively nor negatively charged. There are, however, some molecules present which are ionised – although the proportion

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is very small. In most situations these ionised molecules are undetectable.

These positively and negatively charged molecules will stay spread throughout the fuel, except where there is an interface with a different material, such as metal or plastic. In this situation, the charged molecules will separate and accumulate on different surfaces. The positively charged molecules will accumulate in the fuel and the negatively charged molecules on a surface – such as the inside of a metal pipe. This is not a problem, providing the metal and the molecules of fuel stay in contact.

If they separate, however (such as during refuelling), or move relative to each other, then the positively charged molecules are carried along with the fuel. This effectively means that there is an electric current flowing in the pipe. The negatively charged molecules will remain on the pipe, unless that particular part of the pipe is earthed, in which case it will be neutralised through a small current flow to ground. Thus a voltage difference is set up. As fuel itself is not a good conductor, this voltage difference remains, and it increases as the separation (ie, flow) increases.

Over a period of time these charges migrate and recombine with oppositely charged molecules – a process known as 'charge relaxation'. Eventually the voltage difference decays away to near zero, in a period known as the 'relaxation time' – which can be anything from a fraction of a second to a period of minutes. This means that the possibility of a static spark within a tank is always a short-term risk, following activity which has allowed the electrostatic field to develop. Relaxation times for avgas in light aircraft involved in refuelling will be very short – just a few seconds or less.

Ignition Risk

There is always the risk that static electricity might ignite a flammable material, such as avgas, causing a fire or explosion. Although such stored static energy is too low to harm us directly, the same amount of electrical energy, when dissipated in a spark, is more than enough to ignite fuel vapour.

A flammable air/avgas vapour mix requires only 200 microjoules of spark energy to initiate an explosion. This could be provided by a pulse of electrical energy consisting of a fraction of an amp at 50 volts, but static sparks are of surprisingly high voltage – of the order of 3000 volts per millimetre of air gap. Note that the minimum spark energy for ignition of Jet A-1 vapour is similar to that for avgas.

Identifying Static Hazards

Aviation fuels are handled in a way that makes accumulation and separation of charge more likely. Two examples of this are the use of very fine filters during product transfer, and the need for fast refuelling of commercial aircraft.

The use of fine filters during refuelling is unavoidable within the aviation industry. The effect of having a fine filter in a fuel line is to bring more fuel molecules in contact with the dissimilar material of the filter, resulting in higher charge separation. Fuel flow in a line with a very fine filter will typically generate 10 to 100 times the charge separation of the same line without a filter.

Another area of concern is the speed of fuel transfer though a refuelling hose, where higher speeds result in greater charge separation and more fuel splashing. Generally speaking though, a 'professional' installation will have features in place to minimise these effects.

If splashing or spraying occurs during the refuelling process (most likely during top-loading of a tank) a charged mist or foam can be produced, which results in a voltage difference between different locations within the same tank. Such a potential difference can be dissipated in a static spark – in the worst case. Other processes, such as steam cleaning a tank with flammable vapours still present, also produce charged mists and are therefore hazardous.

Other sources of static are synthetic clothing, and (possibly) cellphones. The latter has been cited as an urban legend, but don't put it to the test. Fuel companies still regard cellphones (or any transmitting device) as a potential hazard. Did you see those signs on the service station forecourt last time you refuelled your car? And the warning in your cellphone handbook?

Always be aware of other ignition sources such as smoking, naked flame, unshielded electrical devices, pilot lights, grinding-wheel sparks, to name but a few. There should be none of these within 15 metres of the aircraft or fuelling equipment.

Preventing Static Hazards

All pilots will be familiar with the routine bonding when an aircraft is refuelled at the pumps – the bonding cable is reeled out and attached to a convenient metal part of the aircraft. When refuelling from drums, always ensure there is a bonding lead connected to both the aircraft and the drum in use. Make the necessary connections before removing **any** fuel caps. Additionally, it is safe practice to keep the fuelling nozzle in physical contact with the filler orifice at any time fuel is being pumped.

Attaching the bonding lead is the first action when refuelling, and removing it the last.

Keep nozzle in contact with orifice while fuel is flowing.

This also applies to the filling of portable containers – place the container on the ground, and maintain contact between the fuel nozzle and the container. Approved containers (these comply with Australian and New Zealand Standard 2906:2001) have this instruction on the label.

The question then arises as to how to deal with the static hazard when pouring from an approved container into an aircraft. One suggestion is to bond the container to the aircraft before opening the caps on either; a jumper lead could be used here if there is no dedicated bonding lead available. Another possibility is to place the container in contact with the aircraft, again before any caps are removed, and maintain that contact throughout the refuel. Some portable containers have an integral pouring spout with which contact can be maintained. If a funnel is used, ensure that there is continuity between the container, the funnel and the aircraft.

Filtering fuel through chamois leather is not recommended. Studies have found that **the use of a chamois can be a static hazard,** synthetic chamois even more so. If the use of a chamois is necessary as a last resort, do exercise extreme care, and ensure all items used are electrically bonded.

A drum pump should be fitted with an appropriate in-line filter, and the delivery hose must be fuel-specific. Your fuel supplier will be able to advise on the correct equipment.

The 'Wrong Stuff'

A helicopter pilot in Australia watched the twilight refuelling of a company Islander at the end of a day's flying. The fuel was sourced from a drum sitting on the back of a utility; the hand-pump and in-line filter were standard issue, but the delivery hose was a section of clear compressed-air hose with integral reinforcing. A large loop of the hose hung down from the pump, in contact with the side of the drum. As fuel was pumped, a spectacular "sound and light show" of static sparks erupted along the length of hose touching the drum. Our intrepid pilot retired to a safe distance – but not before offering some fairly forthright advice on the safety of the refuelling operation.

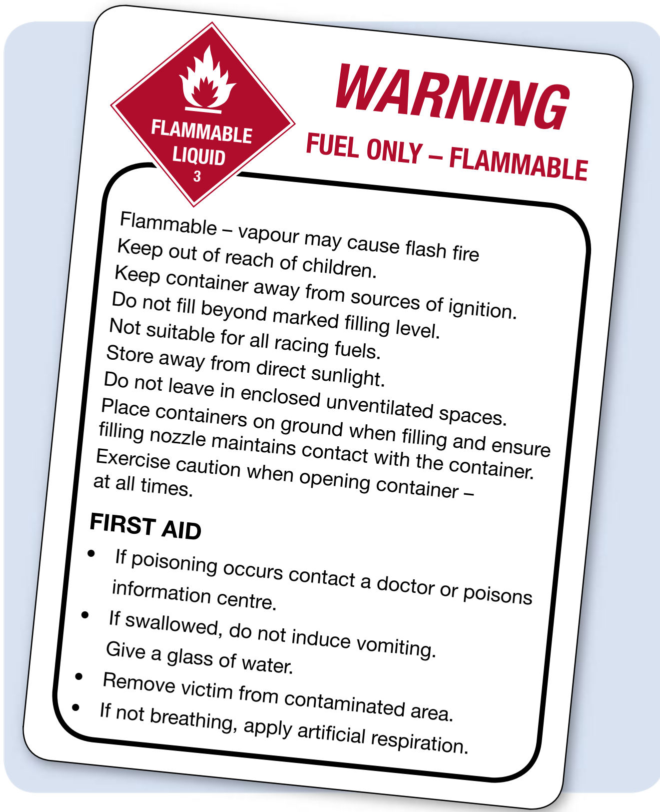
Be aware of the type of clothing you are wearing – some synthetics are especially prone to the generation of static, especially in the dry conditions encountered on frosty mornings, and in the classic nor'westerly conditions that east-coasters know well. Do not remove clothing near a refuelling operation.

The GAP booklet *Fuel Management* contains advice on fuelling procedures and precautions.

Beware of Out-of-Norm Situations

There may be a temptation to 'just drain a bit of fuel' – possibly if the tanks are over-full for a particular flight – into a handy clean container, then pour it back in later. (However, once the fuel is drained, it's never a good idea to put it back, regardless of the container used).

How do you know if you are using an approved container? Approved containers will have embossed on them the legends "Flammable", "Fuel Only", the capacity in litres with a mark indicating that level, a "LAB" number (an approval number issued by the Department of Labour) and a label complying with the Standard. Plastic containers meeting the Standard will be made of high-density polyethylene in a distinctive red colour.



Example label from AS/NZ Standard 2906:2001

Do **not** refuel or defuel inside a hangar or other enclosed space except in an emergency. Fuel vapour is heavier than air, and can flow a considerable distance (even down drains) to an ignition source. It can also 'pool' in confined spaces and remain a hazard long after refuelling or defuelling is finished.

Some years ago, a restored vintage aeroplane was being fuelled in an air-conditioned hangar (dry air), with all other known precautions in place, when a static spark ignited the fuel vapour. The aeroplane was destroyed in the resulting fire, but fortunately nobody was injured. The static spark was attributed to the type of overalls worn by one of the engineers.

Some workshops have used avgas as a cleaning medium, both in washbasin-type and compressed-air gun equipment. The latter practice is exceedingly dangerous, as the atomisation at the spray nozzle is a possible source of static in itself, not to mention the dispensing of large quantities of fuel vapour.

When in doubt — stop and think — and take all possible safety precautions.

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Human Factors

There can never be any 'positive reinforcement' that a static fuel fire has been prevented every time an aircraft has been bonded, especially if we have not experienced a fuel fire on the occasions where we have neglected to bond an aircraft. It is therefore easy to become complacent about the need to static bond an aircraft, and the day you think it won't happen could be the very day that it does!

Static electricity 'cause and effect' is not always emphasised enough during pilot, engineer and ground handler training. Because we have 'got away with it' so often, some of us may have developed an attitude that we are impervious to the problem.

Summary

A number of factors must be present for a fire to start as a result of a static discharge. This makes it (thankfully) a rare event. Because of this, however, awareness of the hazards involved can tend to diminish over time.

The possibility of a fire or explosion created by static electricity is forever present – no matter how remote it may seem.

Always remember these key points:

- Refuel and defuel outdoors.
- Ensure electrical bonding is in place prior to removing any fuel caps.
- Use only approved containers.
- Use only approved filters.
- When in doubt, consult your fuel supplier. ■

Further reading:

GAP booklet *Fuel Management*

NZ Flight Safety, Vol 16 No 2, September 1989 – "Do-it-yourself Refuelling"
NZ Flight Safety, Vol 16 No 3, December 1989 – "No Kidding"
NZ Flight Safety, Vol 17 No 1, March 1990 – "Playing with Fire"
Vector 1998, Issue 4 – "Static in the Fuel?"
Vector 1998, Issue 5 – "Static in the Operation"
Vector 1999 Issue 3 – "More on Static"
Vector, July /August 2002 – "Fuel Containers Ignite"

Material Safety Data Sheet (MSDS) for Avgas or Jet A-1 – available from your fuel supplier (or via an Internet search)

Radio Calls at Unattended Aerodromes

Most pilots will have, at some time, been uncertain from an aircraft's radio call whether that call represents traffic pertinent to the aerodrome they are at.

There are two main difficulties:

- Often, when concentrating on flying, and possibly with a high listening workload of mainly irrelevant information as can occur in areas where calls for more than one aerodrome can be heard, the first word of the transmission is missed – the vital word identifying the location. For example, in the Canterbury area there are three aerodromes and a busy training area on the same frequency. This can make it difficult to distinguish relevant aircraft activity in your area. When you are in the downwind leg at one aerodrome, a circuit call may cause a quick heart flutter and sky search when you didn't quite catch the first word, but then the runway direction means the aircraft is at another airfield, and you can relax again. This situation can be exacerbated by pilots talking too quickly, particularly in saying those important first two words.
- Sometimes, a pilot can be slow to depress the mike button and instead of a clear "Ashburton Traffic" we get just "…on Traffic". Again, one goes on full alert.

The uncertainty caused by both these scenarios could be removed by adopting the practice of repeating the aerodrome name at the end of the transmission. For example, "Rangiora Traffic, XYZ downwind [runway] 25 **Rangiora.**" Although wordier, it could alleviate possible confusion. This practice is common in the United States where pilots also identify what type of aircraft they are. This helps other pilots to gauge their speed and any possible wake, etc. For example, "Rangiora Traffic, Chieftain XYZ downwind [runway] 25 Rangiora".

At a busy unattended aerodrome where there is unlikely to be confusion with others, the repetition may be unnecessary on every call.

Another option is to adopt the practice used in Australia of preceding the location with the words "All stations". For example, "All stations Rangiora, XYZ downwind [runway] 25." The first two words get the listeners' attention and the third then prompts either more attention, or relaxation! Again, aircraft type should be included, at least for an initial call. This option is more of a change from our present practice, but would offer trans-Tasman consistency.

As the radio calls for unattended aerodromes are not governed by any specific ICAO phraseology standard, a change could be made reasonably easily for the New Zealand environment.

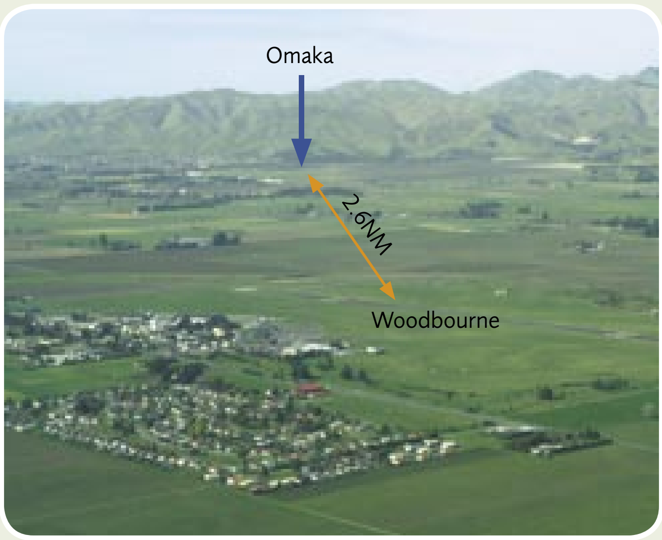
Vector would welcome readers' comments.

Introduction

Woodbourne and Omaka are two busy aerodromes located within the Woodbourne Control Zone (CTR/D).

Woodbourne is a controlled aerodrome, with mainly scheduled IFR flights and military activity. Omaka is an uncontrolled aerodrome located only 2.6 NM to the southeast of Woodbourne. It has a wide range of aircraft activity, including flight training, gliding, and warbird flying. The wide range of aircraft activity, combined with Omaka aerodrome using unattended radio procedures inside the control zone, can make it unsettling for an itinerant pilot.

To assist with flying safely in the Woodbourne CTR/D, this article discusses flying VFR at Omaka and IFR at Woodbourne.



Omaka aerodrome is located only 2.6 NM southeast of Woodbourne.

VFR into Omaka

Before flying into Omaka, it is very important to be familiar with the arrival and departure procedures in the current *AIP New Zealand, Vol 4*, and to have a current Visual Navigation Chart (VNC). It is good aviation practice to spend time **before** flying into the area becoming familiar with the topography and the airspace of the Woodbourne CTR/D. In particular, be aware that the Wairau Valley is aligned approximately east to west.

Some pilots, however, have a mindset that the Wairau Valley is aligned north to south. This can result in errors in position reporting. For example, sometimes pilots flying from the North Island believe that they are approaching the CTR/D from the north when in fact they are approaching from the east. This can result in aircraft holding to the east of the Woodbourne aerodrome (ie, in the middle of the instrument approach sector) when they have been asked to hold to the north of it.

When making a position report approaching any aerodrome, it is good practice to check the compass and directional indicator (DI) to confirm your bearing (eg, if the DI indicates a northwest heading, then you are southeast of the aerodrome) before making the radio call. If you are reporting your position using a geographical point, it is still important to monitor the compass and DI to ensure that you maintain an awareness of your position relative to the aerodrome.

Arrivals

Before entering the Woodbourne CTR/D, listen to the ATIS (128.2 MHz) for conditions at Woodbourne. Be aware that the reported surface wind at Woodbourne can be significantly different from the surface wind at Omaka.

When you request entry into the CTR/D, depending upon aircraft activity, an arrival procedure will be issued to you. During quieter periods, a clearance to track direct to Omaka may be given.

If you are arriving from the east, expect the Ponds Arrival. Unless otherwise instructed, track 1000 feet and below in the Ponds VFR transit lane until passing Vernon Works. Track **south** of the Vernon Works to ensure you remain clear of the Instrument Sector. After Vernon Works (weather permitting) climb to 1500 feet to join overhead at Omaka. Watch out for aircraft departing from Omaka.

If you are arriving from the south, you can track around the coast and request an entry into the CTR/D from the east normally before White Bluffs. This can be sensible during conditions of low cloud and strong northwesterly winds, as an arrival via the Taylor Pass may not be possible. If the weather conditions allow, request entry into the CTR/D via the Taylor Arrival (2500 feet and below), or through the Dashwood Pass.

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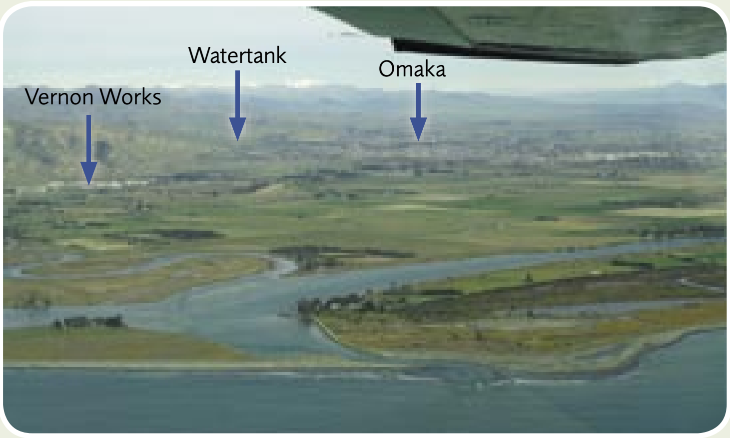
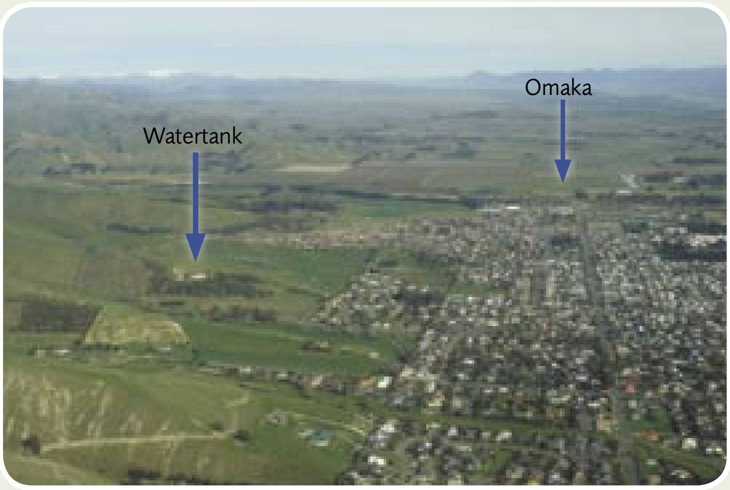
Standard arrival procedures for VFR flights entering the Woodbourne CTR/D during hours of watch of Woodbourne Tower and landing at Omaka. For more information refer to the AIP New Zealand, Vol 4.

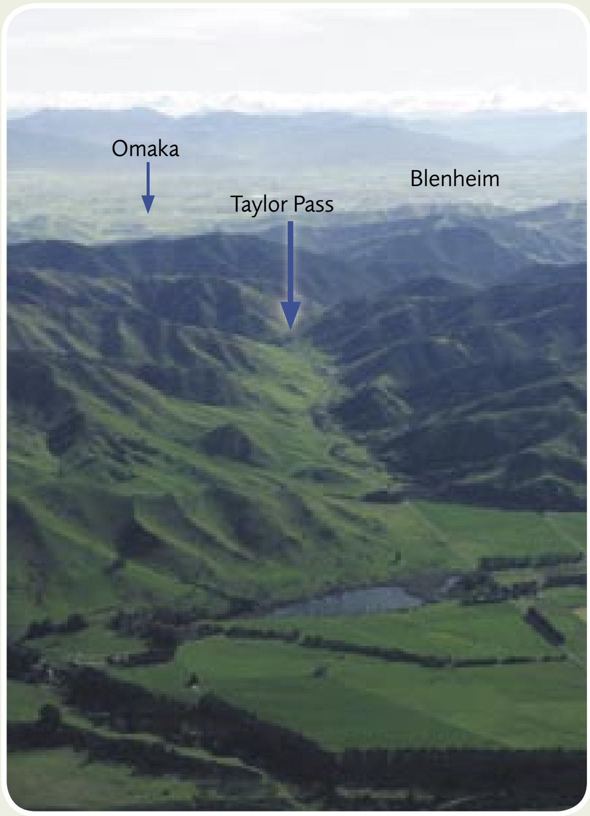


The Wairau Bar looking southwest over Blenheim, towards Omaka aerodrome. The marked reporting points are associated with the Ponds Arrival.



The Watertank reporting point looking west towards Omaka aerodrome.

If there is a strong westerly or northwesterly wind, it may be advisable to request a higher altitude due to the presence of downdraughts and turbulence in the area. Watch out for gliders operating in the Maxwell Sector (particularly around the Taylor Dam) up to 3500 feet.



Taylor Pass looking north into the Wairau Valley and Blenheim.

Taylor Dam looking north towards Omaka aerodrome.

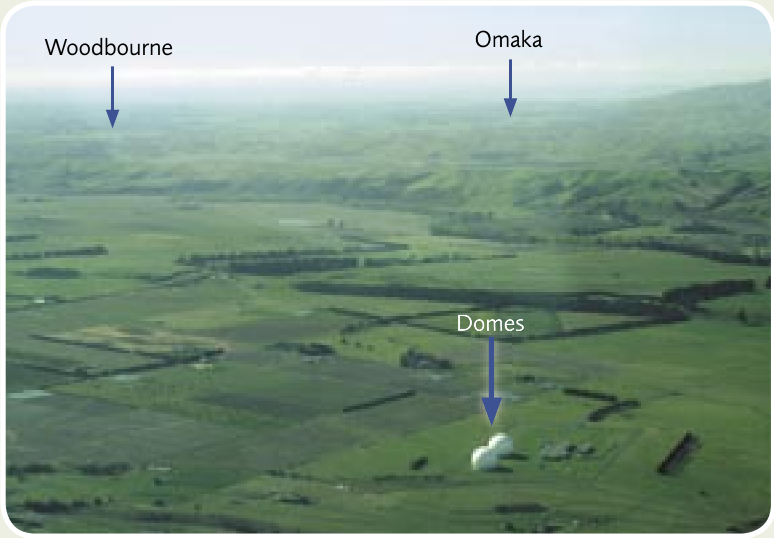
- NORDO aircraft may be operating in the circuit and in the Fairhall Sector (to the north of Omaka).
- Gliders and the tow-plane use righthand circuits.
- There may be crosswind circuit training.

The most commonly used Runways are 25 and 30 due to the prevailing northwesterly and westerly winds. Be aware that local operators may be using different runways from those published in the *AIP New Zealand, Vol 4*. For example, gliders land to the right of Runway 30, when Runway 30 is in use. Be careful if you are using the 01 or 12 circuit, to not get too close to the final approach for Runway 25 at Woodbourne.

It is important to keep the circuits reasonably tight. Be aware of the rising terrain immediately east of Omaka. This can be imposing in the late downwind and base legs for Runways 01 and 30.

If you are arriving from the west, expect a Domes Arrival. Enter the CTR/D via the Domes and track to Omaka at 1500 feet and below. Be on the lookout for training aircraft in the vicinity of the Domes and to the south.

If arriving from the north, typically via Okaramio, be aware that this is a popular route used by VFR aircraft flying between Woodbourne and Nelson. If you are flying at lower altitudes you may not be able to contact Woodbourne Tower until you are south of Okaramio and are on the border of the CTR/D. Be prepared to orbit while waiting for a clearance into the CTR/D. If Woodbourne is busy with IFR arrivals and departures, you may be required to enter the CTR/D via the Domes Arrival. This requires you to track **direct** to the Domes before turning towards Omaka. During quieter periods you may be able to track direct to Omaka overhead Woodbourne Tower.



Domes reporting point looking east down the Wairau Valley towards Omaka.

If you are arriving from the north via Tuamarina Bridge and Woodbourne is busy, you may be required to hold in the River Sector until you can cross the Instrument Sector for Omaka.

When entering the CTR/D, it is important to have traffic arriving at or departing from Woodbourne in sight, as it will speed up your arrival to Omaka. If you are unable to sight the traffic, ATC may hold you at the nearest reporting point until you have established visual contact.

Omaka Aerodrome

After being issued with a clearance to enter the CTR/D for Omaka, unless otherwise advised or contacted by Woodbourne Tower, make standard unattended position and joining radio calls for Omaka on the same frequency (122.8 MHz), eg, "Omaka Traffic, Bravo Charlie Delta, Vernon Works, 1500 feet, joining overhead". To avoid jamming the frequency, ensure the unattended radio calls are precise.

It is strongly recommended that you join **overhead** Omaka for the following reasons:

- The wind direction reported on the Woodbourne ATIS can be different from the Omaka surface wind.

It is important to keep a sharp lookout when taxiing towards the clubhouse after landing, as other aircraft may join on another runway. This is particularly important if you have landed on Runway 12 or 19, as you will have to taxi across all runways to the fuel pump. **Remember to notify Woodbourne Tower that you have landed at Omaka.**

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If you are arriving at Omaka, remember to notify Woodbourne Tower after landing. When you are ready for departure, obtain clearance from Woodbourne Tower before takeoff.

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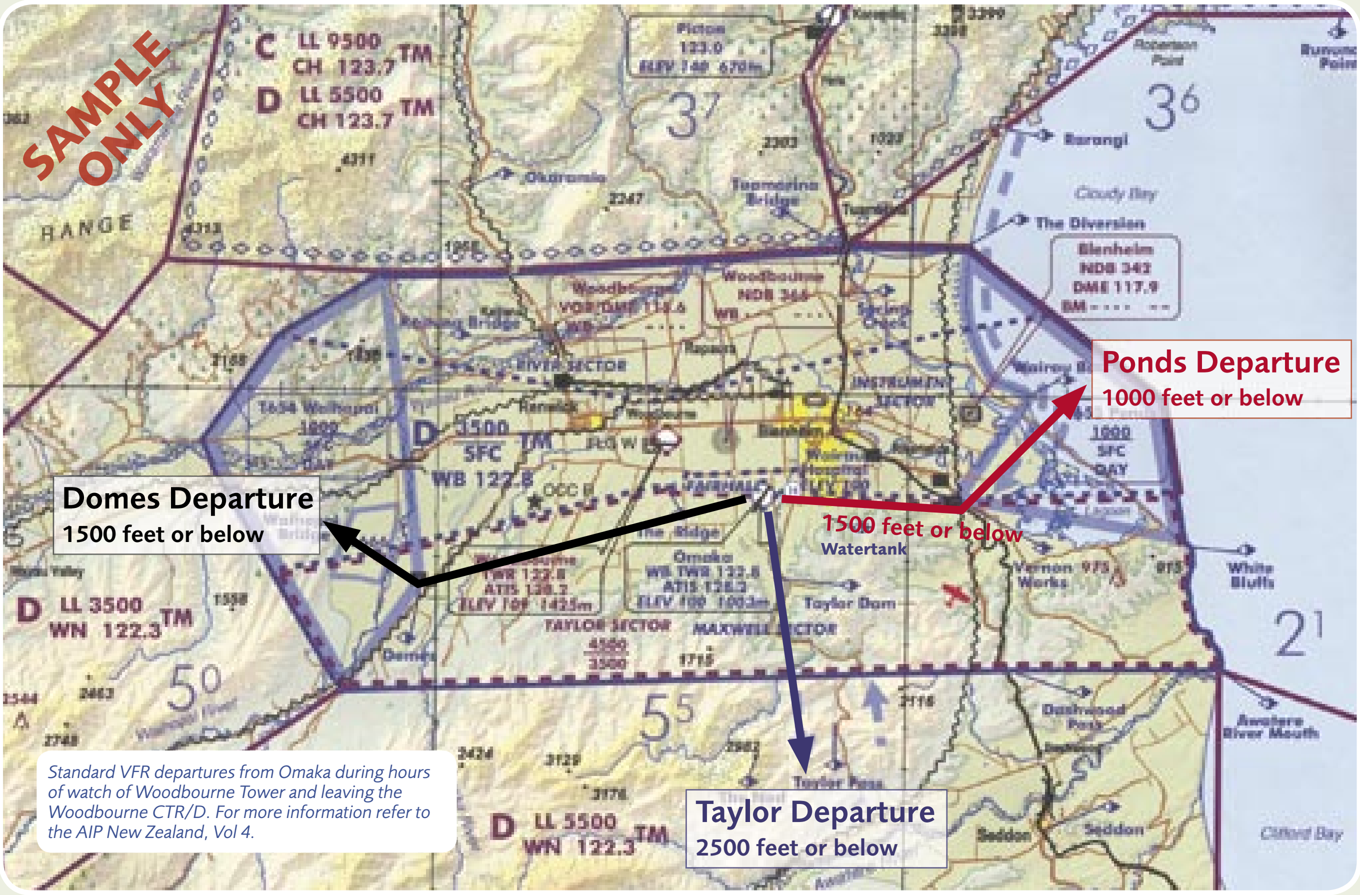

Standard VFR departures from Omaka during hours of watch of Woodbourne Tower and leaving the Woodbourne CTR/D. For more information refer to the AIP New Zealand, Vol 4.

Omaka aerodrome from the west.

Departures

Before departure, listen to the Woodbourne ATIS (128.2 MHz) before contacting Woodbourne Tower (122.8 MHz). All aircraft wishing to depart the Omaka circuit must obtain a clearance from Woodbourne Tower before takeoff (during hours of service). You may be instructed to provide an ETD to assist in traffic sequencing. During quiet periods, expect a clearance direct out of the CTR/D, usually at 1500 feet and below, reporting clear. Otherwise follow one of the assigned departure procedures. (Note: If you are cleared a Ponds Departure at 1500 feet, this altitude instruction overrides the 1000 feet altitude restriction on the departure procedure.)

After obtaining a clearance, make standard unattended radio calls to "Omaka Traffic" on the same frequency (122.8 MHz) detailing your intentions.

Aircraft wishing to operate in the Omaka circuit must first call Woodbourne Tower and state their intentions (ie, the runway they wish to use and the duration of the flight). While circuit movements are uncontrolled, pilots should be prepared to comply with instructions from Woodbourne Tower so that adequate separation is maintained from the aircraft arriving or departing the Woodbourne circuit. Pilots should also notify the Tower if they wish to change the runway in use at Omaka or conduct crosswind circuits – this is important.

Other Considerations

The following are additional points to consider when flying inside the Woodbourne CTR/D:

- Most arrivals and departures (except for the Taylor Pass) have an altitude restriction of 1500 feet and below. Don't be afraid to ask Woodbourne Tower for a higher altitude (eg, 2500 feet) if you are concerned about turbulence and terrain.
- The Woodbourne CTR/D is transponder mandatory (TM), and it is important to have "ALT" selected on your transponder.
- Watch out for gliding activity in the Taylor and Maxwell Sectors, to the south of Omaka.
- Exercise caution when arriving from the east through the Ponds VFR transit lane, as NORDO aircraft may be transiting along the coast.
- Keep a good lookout for aircraft training in the Low Flying Zone near the Domes reporting point.
- It can be difficult to contact Woodbourne Tower at lower altitudes, particularly north of the Tuamarina Bridge and Kaituna Bridge, and south of the Taylor Pass.

- If you are intending to enter the CTR/D from the west from Nelson, be aware of the Wellington Control Area immediately west of the CTR/D.
- Remember that when Woodbourne Tower is off watch (typically before 7 am and after 8 pm – check the latest *AIP Supplement)* the airspace becomes Class G and unattended procedures apply at both Omaka and Woodbourne.
- Refer to the latest *AIP Supplement* 108/05 for information on a temporary restricted area (NZR 692) inside the CTR/D. This restricted area is prescribed to facilitate the safety of air navigation during helicopter frost protection activity.

Climate

Woodbourne and Omaka are situated in a unique microclimate. The surrounding hills and ranges on either side of the Wairau Valley provide orographic protection from the weather and channel the surface wind as westerlies and easterlies. The prevailing wind direction is west or northwest. The surface wind, however, can be completely different at the two aerodromes; for example, a westerly wind can be reported at Woodbourne but an easterly can be occurring at Omaka from the sea breeze.

In the valley system there can be considerable differences between upper-level winds and surface winds. For example, southerly airflows in Cook Strait tend to become light to moderate easterly conditions at Woodbourne and Omaka. During strong southerly flows, there is often a strong shear zone in Cloudy Bay at the edge of the strong southerly wind in the Strait.

Very low cloud is uncommon at Omaka and Woodbourne. The situation is most likely to occur when a broad northeast to east airflow originating from the subtropics, advects warm moist air into the area. In these conditions low stratus with a base of 300 to 600 feet with drizzle can occur.

During moist south to southeasterly winds through Cook Strait, low stratus in the Strait will be advected to the north and northwest of the approach areas and occasionally over Woodbourne and Omaka. At times this stratus remains as a cloud bank along the coast.

During moist airflows from the north, ahead of advancing cold fronts from the Tasman Sea, a low layer of stratus can develop. In these situations precipitation is normally present, with a lower cloud base about the hills to the north and higher to the south over Omaka. At times, low cloud and rain that develops in the upper Wairau Valley and the Richmond Range will stay confined to the ranges, while Woodbourne and Omaka remain clear.

In general, the weather at Woodbourne and Omaka is better than in Cook Strait or the surrounding mountains. If you are able to fly VFR from your destination to Omaka, then a landing should not be a problem. Conversely be aware that when you depart Omaka, the weather conditions may deteriorate as you leave the CTR/D.

IFR into Woodbourne

There is good primary and secondary radar coverage for IFR aircraft flying into Woodbourne. If you are an itinerant IFR pilot, be aware that you may not necessarily fly published routes into Woodbourne, as radar vectoring is common for traffic sequencing. During busy times (early morning and late afternoon) delays may occur in departing from Woodbourne because of arrivals into Wellington.

If you are planning to conduct IFR flight training in the Wellington Control Area, it is recommended that you book the airspace (in advance) with the National Briefing Office. Refer to the *AIP New Zealand* ENR 1.9 para 5.1.2 (f) for further information on instrument training requirements.

Arrivals

Arrivals into Woodbourne are normally handled through Wellington Control (122.3 MHz, or 121.1 MHz outside Woodbourne ATS hours – check the *AIP Supplement*). Alternatively, try Christchurch Control (129.4 MHz).

Most arrivals are from the Tory VOR, Wellington, or the Cape Campbell NDB. These are either via the published flight routes (typically used for IFR flight training) or via radar vectoring from Wellington Control. Radar-vectored flights are positioned for the start of VOR/DME 25 approach, at LUTKA (15 NM Woodbourne). If you have approved GPS equipment, it can be easier to request own navigation direct to LUTKA. Alternatively, request an intercept onto the Woodbourne VOR 062 radial for the VOR/DME 25 approach. If conditions are suitable for a visual approach at Woodbourne, expect to track direct to the VOR – or you can request radar vectors.

Runway 25 at Woodbourne.

Arrivals from Nelson normally join overhead the Woodbourne VOR and track outbound to join the VOR/DME 25 approach via the 15 NM arc.

Typical approach altitudes are 4000 to 6000 feet from Tory, Wellington or Cape Campbell, and 8000 feet from Nelson. If icing is an issue, contact Wellington Control for the lowest safe altitude you can descend to under radar terrain clearance.

Approaches

The most commonly used instrument approach is the Woodbourne VOR/DME 25. Be aware that during busy periods aircraft will be requested to be at or below 2000 feet by 6 DME from Woodbourne. If you are following the advisory altitudes you will be at approximately 1750 feet by 6 DME from Woodbourne.

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Remember that Omaka VFR circuit traffic can be operating in close proximity to Woodbourne; the Tower will pass this traffic information to you.

When meteorological conditions are 1500 feet and 5 km, or better, and Runway 07 is in use, the ATC preferred approach is the VOR/DME 25 circling lefthand for Runway 07. On occasions ATC may require you to join the aerodrome circuit traffic. To assist with circling at night, there is a circuit limit light (fixed red) located 2 NM north of the threshold of Runway 25, and a second light 2.5 NM northwest of the threshold of Runway 07. Circling is not permitted to the south of the aerodrome.

Pilots wishing to use the VOR/DME 07 approach for operational reasons must notify their request on first contact with Wellington Control. Be aware this approach is steeper than the VOR/DME 25, and the minimum descent altitude (MDA) is higher than the VOR/DME 25 circling MDA. (Note: Training operations that require this approach must either notify the requirement when booking the training details or advise the Christchurch ATS Supervisor before departure to Woodbourne.)

As a back-up to the VOR, there is the twin NDB/DME or the twin NDB instrument approach. Note the twin NDB has a lower MDA and visibility minima than the twin NDB/DME for category A and B aircraft.

If the weather conditions result in a missed approach, then the most likely alternate is Nelson, which is generally clear during easterly conditions.

Departures

During certain times of the day, there can be departure delays for IFR aircraft. For example, in the early and late afternoon, Wellington Control is busy sequencing arrivals into Wellington in addition to Woodbourne. If you have arrived at Woodbourne and you are only intending to be on the ground for a short period, pass on your ETD and requested altitude for your next sector to Woodbourne Tower as you taxi to the apron. This may speed up your IFR departure clearance.

Summary

Flying safely and successfully into Woodbourne and Omaka comes down to correct preparation.

Disorientation and confusion can be avoided by studying the topography, airspace, and reporting points on a current VNC.

Potential conflicts with Woodbourne traffic can be kept to a minimum when joining, vacating, or operating in the Omaka circuit by being familiar with the local procedures in *AIP New Zealand*.

Good situational awareness and a good lookout should be maintained at all times.

Finally, if you are ever unsure how to comply with an ATC instruction or clearance, ask the controller for confirmation – they will usually be more than happy to help. Remember that if the clearance you are given makes you question your ability to operate safely, or you are unable to conform to a clearance or instruction – then ask ATC for an alternative. ■

TCAS II Traffic Display

The article "More on TCAS II" (March/April 2005 issue of *Vector*) examined how TCAS II works as a traffic alert and collision avoidance system. In a situation where there is a threat of collision, TCAS II will trigger a resolution advisory (RA) 15 to 35 seconds before the closest point of approach, which provides pilots with an indication of appropriate vertical manoeuvres, or vertical manoeuvre restrictions, to ensure the safe separation of the aircraft.

We emphasised that it is crucial that the pilot follows the correct reaction to the RA, and should follow the RA even if it conflicts with an ATC instruction.

In this article, we look at the dangers of flight crew using the TCAS II traffic display for separation and sequencing with other aircraft. The TCAS II traffic display is provided for the purpose of assisting the flight crew in the visual acquisition of aircraft in the vicinity. It is **not** provided for flight crew to make their traffic assessment based on the traffic display information, as it can be misinterpreted.

The TCAS II traffic display only provides partial information, has limited accuracy, and is based on a moving reference. It is not designed for the purposes of self-separation or sequencing. This is inappropriate, and could also be hazardous.

Case Study

A B767 heading 100 degrees magnetic and an MD80 heading 217 degrees magnetic, are maintaining FL290 on crossing tracks. The B767 will pass approximately 15 NM behind the MD80 (dotted line in Figure 1). For radar separation, when they are still

80 NM apart, the controller instructs both aircraft to maintain their present heading.

One minute before the tracks cross, the controller provides traffic information to the B767, "eleven o'clock, from left to right, same level, aircraft type MD80, present time 25 NM converging". The B767 pilot starts monitoring a target that is on the lefthand side of the TCAS traffic display. The pilot assesses the other traffic is converging head-on and asks the controller, "Where is this twelve o'clock traffic going?" The controller responds with updated traffic information.

The B767 pilot, however, says, "We are going to turn right on to 120" and begins a right turn. Due to this turn, which is the wrong direction, the horizontal separation reduces quickly and a TA is triggered on both aircraft. The B767 pilot says, "We would like to go to FL270". This turn reduced the separation to only 2 NM.

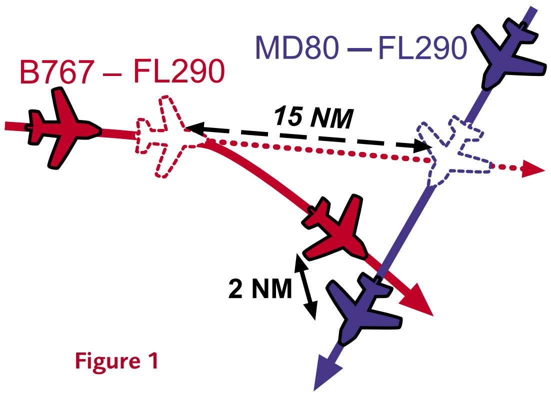

Figure 1

So why did the B767 pilot decide to turn, contrary to the ATC instruction? And why did he turn to the right?

Figures 2, 3, 4 and 5 illustrate how the situation was represented on the controller's radar display and the B767 TCAS traffic display during the 90 seconds of this event.

In Figure 2, the controller's display, the 3-minute speed vector (magnetic track and speed) clearly shows that the B767 was going to pass behind the MD80 (which was faster, 520 knots vs 470 knots ground speed for the B767). This is not obvious on the TCAS II traffic display. Due to the relative motion of the symbol and the lack of speed vector, it is extremely difficult to anticipate the evolution of the situation based solely on the TCAS traffic display.

The B767 pilot, however, related a target on the TCAS II traffic display to the initial traffic information. The pilot saw a target moving apparently on opposite track, slightly on the left (Figure 3). Consequently, he started to question the controller.

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"TCAS II is designed for collision avoidance, not for traffic separation"

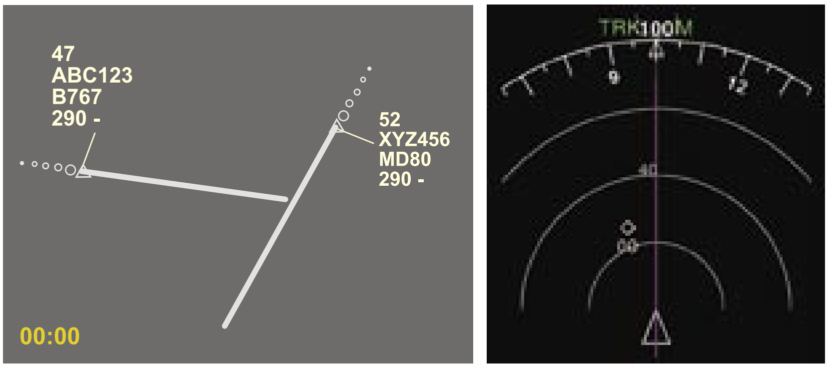

Figure 2 Controller's radar display B767 TCAS traffic display

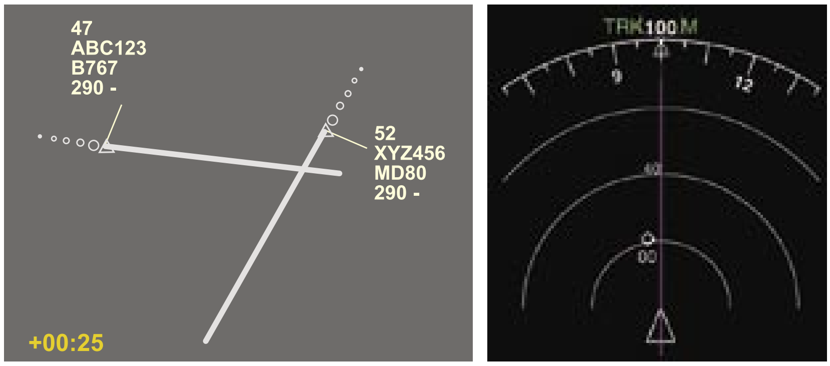

Figure 3 *"Where is this 12 o'clock traffic going?"*

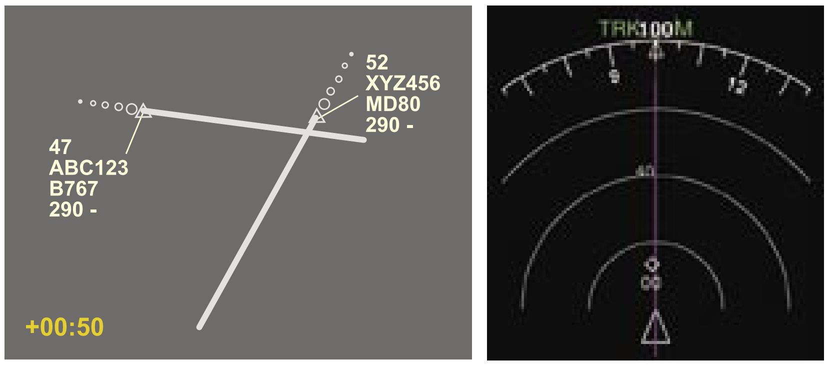

Figure 4 *"We are going to turn right on to 120"*

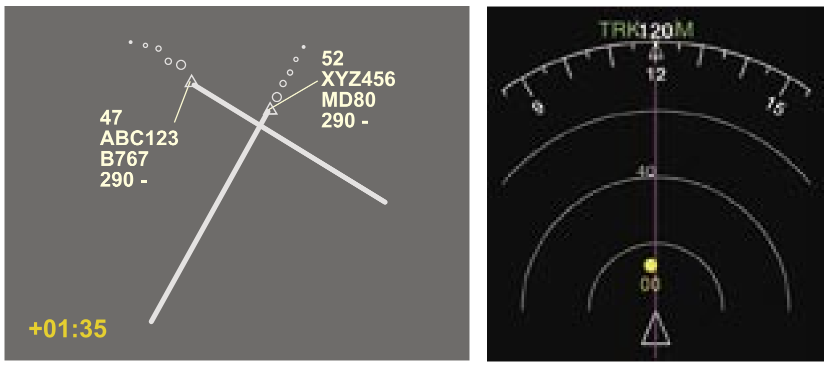

Figure 5 *"We would like to go to FL270"*

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When the target was at a 12 o'clock position and less than 20 NM, the B767 pilot decided to turn right to avoid the target on the TCAS display. The pilot could not relate the direction of the traffic contained in the controller's information to the information provided by the TCAS traffic display, so he did not take it into account. To the controller, however, it was obvious that this turn to the right would create a loss of separation.

Due to the right turn, the target remained on the lefthand side on the TCAS II traffic display, apparently still on opposite track, and a traffic advisory (TA) was then triggered. The pilot decided to descend. A loss of separation then occurred.

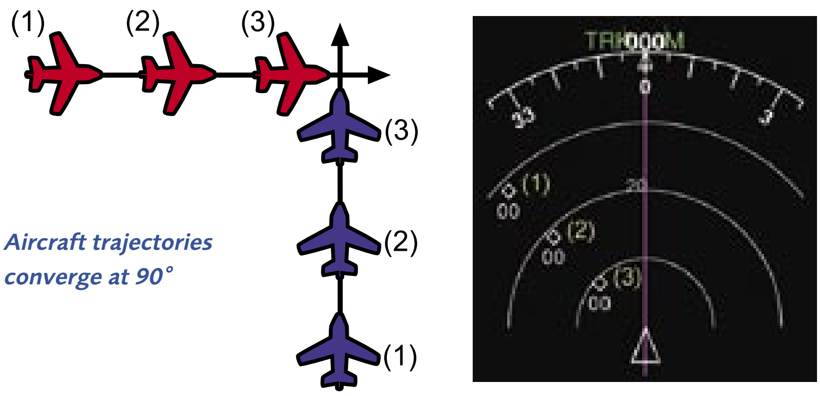
Limitations of the TCAS II Traffic Display

The TCAS II traffic display is not designed to support separation manoeuvres. It gives only a snapshot of the relative horizontal and vertical position of other aircraft in the vicinity. Flight crews, therefore, should not be over-reliant on this display. It supports visual acquisition of other traffic – it is not a replacement for the out-of-window scan.

Moving Reference Display

The reference for the TCAS II traffic display is the aircraft's own position, which is constantly moving (unlike the controller radar display, which has a fixed reference). This gives a display where the targets are shown in relative motion, which is a cause of TCAS II traffic display misinterpretation.

The most significant illustration of this is when two aircraft are converging at 90 degrees. Figure 6 shows that the symbol of an aircraft on a 90-degree crossing track actually appears to be converging at a 45-degree angle on the TCAS II traffic display. The interpretation of the flight path of another aircraft on the TCAS traffic display is even more difficult when your aircraft is manoeuvring, since the bearing of the aircraft on the display will vary significantly even if its heading is steady.



Aircraft trajectories converge at 90°

Figure 6 *Closure appears to be at 45°*

Partial Traffic Picture

TCAS II only detects aircraft with active transponders. There may be aircraft in the vicinity even if there is no target on the TCAS display. It is recommended that **all** pilots have their aircraft transponder set on ALT (Mode C) at all times to ensure maximum benefit from the TCAS technology (refer to the November/December 2004 issue of *Vector*, "TCAS II and the VFR Pilot").

TCAS II surveillance range may be reduced to 5 NM in high-density airspace. Pilots, therefore, could observe aircraft in the vicinity, which might not be shown on the TCAS II traffic display.

Even if aircraft are detected by TCAS II, they may not be displayed. Some installations limit the number of displayed targets to a maximum of eight. In addition, the TCAS II traffic display options provide altitude filtering, so not all aircraft within the vicinity will be shown.

TCAS II does not provide traffic identity information; therefore, aircraft may be misidentified as the aircraft type will not be shown on the display.

Limited Accuracy of TCAS Bearing Information

TCAS II bearing measurement is not very accurate. Usually the error is no more than 5 degrees but it could be greater than 30. In the worst case, therefore, bearing error could cause a target on one side of the aircraft to be displayed on the other. This emphasises the danger of undertaking a horizontal manoeuvre solely on the TCAS II traffic display. Note that TCAS II does not need the bearing information for collision avoidance RAs. Bearing is used for the TCAS II traffic display.

ICAO

ICAO procedures for the use of the TCAS II traffic display, *ICAO PANS-OPS Doc 8168* state that: "Pilots shall not manoeuvre their aircraft in response to traffic advisories (TAs) only". This point is emphasised in the ICAO ACAS II training guideline for pilots: "No manoeuvres are made based solely on the information shown on the ACAS display in response to TAs". ICAO standards only include phraseology to report resolution advisories (RA). Pilots, therefore, should not report "TCAS contact" or "we have it on TCAS" after traffic information from ATC.

Conclusion

The TCAS traffic display is designed to assist the visual acquisition of surrounding aircraft. It does not provide the information necessary for the provision of separation and sequencing. Manoeuvring solely on the information shown on TCAS traffic display may degrade flight safety. Pilots, therefore, should not attempt to self-separate, or challenge an ATC instruction based on the information derived solely from the TCAS traffic display.

TCAS II is designed for collision avoidance, not for traffic separation. If there is a risk of collision, TCAS II will trigger an RA. In this situation, respond immediately by following the RA as indicated, unless doing so would jeopardise the safety of the aircraft. Follow the RA even if there is a conflict between the RA and an ATC instruction to manoeuvre.

To maximise the benefits of TCAS, **all** pilots are strongly encouraged to select ALT (Mode C) on their transponder when flying in all classes of airspace. ■

Reference: Eurocontrol ACAS *II Bulletin*

Enroute Frequencies in Uncontrolled Airspace

If you are flying VFR enroute in uncontrolled airspace, what frequency do you monitor?

In the past, VFR pilots flying cross-country would listen out on the Flight Information Service frequency and make regular position reports (normally every 30 minutes). Many still do, but it appears that an increasing number of pilots may be listening out on 119.1 or some other frequency.

When all aircraft remained on the flight information frequency and made regular position reports, a pilot was able to maintain situational awareness regarding other likely traffic. With flight plans and position reports now being optional (in most situations) a less-complete picture is available today.

Naturally, when in the vicinity of an unattended aerodrome, or when operating in a Special Procedures Area or Mandatory Broadcast Zone, you will change to the relevant frequency. It is when operating outside these areas that the varying practices occur.

The more variation there is, with pilots of aircraft operating in the same area (and at a similar altitude) being on differing frequencies, the more potential there is for a near miss, or worse. It is for this reason that the MBZ and SPA frequencies have been established in busy areas. Operating under visual flight rules requires a constant lookout but the appropriate use of radio can enhance situational awareness.

Benefits of Flight Plan and FISCOM Frequency

Although regulatory requirements may have changed, it is still good aviation practice to always file a flight plan and to make regular position reports to Flight Information Service. If you are **not** on a flight plan, you may still make reports and the Flight Information Officer will record your position, which could prove vitally important in determining your whereabouts should something go wrong and you do not arrive at your next landing, or your final destination. Your position report call could also alert other aircraft in the vicinity to your presence (assuming they are also listening out on the information frequency).

Monitoring the Information frequency means that you can readily access help if you have a problem – a MAYDAY or PAN PAN call should be heard (within the limits of VHF range/coverage). In addition, selecting the appropriate emergency code on the transponder is sure to get ATC's attention within radar coverage. Any new NOTAMs, SPARs or SIGMETs are broadcast on the FISCOM or automatic broadcast system frequency with a recap of all current ones on the hour. Again, even if you are not on a flight plan, you can still listen out for information and can request information. This provides an excellent way of updating the weather conditions and other relevant information enroute.

Continued over ...

GEN 3.4 - 18 AIP New Zealand

Figure GEN 3.4-3
South Island FIS COM Chart

SHOWS EXPECTED COVERAGE AT 4000FT AMSL. IF NO RESPONSE ON SELECTED FREQUENCY TRY ADJACENT LRG FREQUENCIES

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Christchurch Information staff monitor a large number of frequencies and they will not be able to hear every RTF exchange between pilots and Christchurch Information staff. If there is a delay in the Flight Information Officer replying it is often because they are communicating with another aircraft on a different frequency.

Filing a flight plan is the best practice – we have had another accident example recently when the aircraft was not reported as overdue until the next day.

If you are on a flight plan, the first action taken by Airways when a VFR flight goes overdue is to call the aircraft on the appropriate frequency. If the pilot has forgotten to update their SARTIME and they are not listening out on the frequency when this call is made, it isn't only embarrassing for the pilot – it also results in unnecessary work for Airways and the Rescue Coordination Centre which is alerted within a short time after the SARTIME.

The establishment of a number of different frequencies in uncontrolled airspace has meant more frequent radio changes and, for aircraft with only one radio, it is not possible to monitor the FISCOM frequency all the time. Aircraft with two radios can continue to monitor the FISCOM frequency after changing to a local area frequency.

It appears that some pilots maintain that 119.1 is an 'open' frequency and remain on that frequency, changing to the FISCOM frequency only when necessary. Certainly, 119.1 MHz is used for many unattended aerodromes (including unpublished strips and helipads) and aircraft in the vicinity of these will change to 119.1 MHz, but when away from these aerodromes and outside any specific frequency area, it makes sense for all aircraft be on the FISCOM frequency (these are included on visual aeronautical charts). Aircraft operating at an unpublished aerodrome or heliport need to keep an extra vigilant lookout as there could well be other aircraft transiting the area (blissfully unaware of the strip or helipad) who will be on the enroute information frequency.

When cruising cross-country it is recommended that both aeroplanes and helicopters monitor the Information frequency. If there is a need to chat to another aircraft, you can both change to the recently promulgated aircraft-to-aircraft domestic 'chat' frequency, 128.95 MHz (but don't stay there too long and lose situational awareness on what is going on around you). Calls on MBZ, SPA or unattended aerodrome frequencies should use correct phraseology and be limited to concise position reports for collision avoidance purposes. Refer to the *Radiotelephony Manual* (Advisory Circular AC 91-9 and 172-1) for advice. ■

REVISED BOOKLET –

How to Deal With An Aircraft Accident Scene

The *How to Deal With An Aircraft Accident Scene* booklet has been revised and updated. It provides guidance and information on the actions to be taken should you be a witness to (ie, first on the scene), or be required to attend, an aircraft accident.

To obtain copies, contact either your local Field Safety Adviser (see the advertisement in *Vector* for their contact details) or the Communications and Safety Education Unit, Tel: 0–4–560 9400, Email: info@caa.govt.nz

Field Safety Advisers

Don Waters
(North Island, north of line, and including, New Plymouth-Taupo-East Cape)
Tel: 0–7–823 7471
Fax: 0–7–823 7481
Mobile: 027–485 2096
Email: watersd@caa.govt.nz

Ross St George
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Bob Jelley
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Fax: 0–3–322 6379
Mobile: 027–285 2022
Email: jelleyb@caa.govt.nz

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

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

Aviation Safety Concerns

A monitored toll-free telephone system during normal office hours.
A voicemail message service outside office hours.

0508 4 SAFETY
(0508 472 338)

For all aviation-related safety concerns

OCCURRENCE BRIEFS

Lessons for Safer Aviation

The content of *Occurrence Briefs* comprises notified aircraft accidents, GA defect incidents, and sometimes selected foreign occurrences, which we believe will most benefit operators and engineers. Individual Accident Briefs, and GA Defect Incidents are now available on CAA's web site, www.caa.govt.nz. Accident briefs on the web comprise those for accidents that have been investigated since 1 January 1996 and have been published in *Occurrence Briefs*, plus any that have been recently released on the web but not yet published. Defects on the web comprise most of those that have been investigated since 1 January 2002, including all that have been published in *Occurrence Briefs*.

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 CA005 to the CAA Safety Investigation Unit.

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 that follow are the results of either CAA or TAIC investigations. Full TAIC accident reports are available on the TAIC web site, www.taic.org.nz.

ZK-LTF, NZ Aerospace FU24-950, 4 Apr 03 at 18:30, 10 NE Stratford. 2 POB, injuries 2 fatal, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 29 yrs, flying hours 1438 total, 340 on type, 230 in last 90 days.

The aircraft was engaged in its last sortie of the day before returning to Stratford. It was reported overdue, and the wreckage was found in the early hours of the morning. A full report is available on the CAA web site.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/976

ZK-JML, Kolb Twinstar Mark-II, 10 May 03 at 15:40, Foxpine Ad. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, private other. Pilot CAA licence nil, age 63 yrs, flying hours 1763 total, 638 on type, 83 in last 90 days.

The microlight aircraft was observed during takeoff and then was lost to view behind a line of pine trees. Shortly after, a 'thump' was heard, and subsequently the aircraft was found upside down in a small clearing. The pilot and sole occupant of the aircraft died from injuries received in the accident. A full report is available on the CAA web site.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/1355

ZK-FRO, Beech A23-24, 15 Jan 04 at 18:30, Rukuhia Ad. 1 POB, injuries 1 minor, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 48 yrs, flying hours 251 total, 32 on type, 3 in last 90 days.

The aircraft force-landed near Hamilton Airport after the engine ran roughly and lost power after takeoff. Substantial damage was sustained by the wings, front fuselage and undercarriage. The pilot sustained minor injuries and was taken to hospital.

This aircraft had been involved in a priority landing incident at Ardmore Airfield in late 2003, due to a rough-running engine and subsequent loss of power. An engineering investigation revealed the problem was caused by water in the fuel system. The main components were sent away for repair and refitted, the engine-driven mechanical pump was replaced, and the fuel tanks and lines were cleaned and flushed out. The engine was ground run and found satisfactory.

On the accident flight, the pilot carried out all preflight checks and a ground run, the engine meeting all the requirements as per the Flight Manual. An independent bystander (a flight instructor), however, reported that the engine was running roughly during the ground run, taxi, and takeoff. The pilot reported the takeoff run as normal until about 150 to 300 feet over the boundary fence, when the engine began to run roughly and lose power.

An engineering investigation revealed the probable cause of the rough running was that the number 1 and 2 cylinders' fuel injector nozzles were partially blocked by rust particles. It was noted that this aircraft was not hangared and spent extended periods exposed to the weather. It had previously experienced water-in-the-fuel problems due to the design of the fuel filler cap in the wing.

CAA recommends that, whenever a water-in-the-fuel problem is encountered, all fuel and injector lines are removed and inspected, and all steel fittings should be re-plated or replaced.

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

CAA Occurrence Ref 04/106

ZK-JMO, First Strike Supercat, 24 Jan 04 at 16:00, Whitford. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 65 yrs, flying hours unknown.

The aircraft developed severe vibrations in flight. At 1000 feet the propeller came off, damaging the cowling. The pilot made

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an emergency landing in soft ground, causing further damage.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 04/220

ZK-EYF, Piper PA-38-112, 5 Feb 04 at 18:00, West Melton. 1 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence nil, age 25 yrs, flying hours 50 total, 50 on type, 38 in last 90 days.

The pilot decided to abort the takeoff, during a touch-and-go. When the brakes were applied, the aircraft bounced over the intersection between Runway 04 and 17. The aircraft then impacted the ground, nose first, causing substantial damage to the aircraft.

Main sources of information: Accident details submitted by operator.

CAA Occurrence Ref 04/2825

ZK-EMW, NZ Aerospace FU24-954, 12 Mar 04 at 16:00, Kinohaku. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 37 yrs, flying hours 9970 total, 600 on type, 230 in last 90 days.

It was reported that on roll-out after landing, the starboard wheel dropped into a hole in the airstrip, resulting in the main undercarriage leg breaking. The aircraft slid for 30 metres before coming to rest.

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

CAA Occurrence Ref 04/1117

ZK-KYT, Cessna U206G, 27 Jan 05 at 17:45, Moerangi Station. 4 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 50 yrs, flying hours 981 total, 900 on type, 30 in last 90 days.

The pilot was landing his own aircraft on to a steep topdressing strip which faced to the west; there was a quartering tailwind at the time.

The initial ground contact resulted in a bounce followed by another, the pilot initiated a go-around but in avoiding a concrete fertiliser bin clipped a fence with the righthand main wheel and the righthand elevator horn. The aircraft came to rest some 150 metres after hitting the fence with the righthand wing striking a tree stump.

Main sources of information: Accident details submitted by Rescue Coordination Centre.

CAA Occurrence Ref 05/170

GA Defect Incidents

The reports and recommendations that follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rules, Part 12 *Accidents, Incidents, and Statistics*. They relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less. These and more reports are available on the CAA web site, www.caa.govt.nz. Details of defects should normally be submitted on Form CA005 to the CAA Safety Investigation Unit.

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

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
Bearing boot

It was reported that the drive shaft overheated after only three hours time in service after an overhaul. It appears that the bearing boot had failed, allowing a loss of the grease and subsequent overheating. The drive shaft was replaced with a later type. TSO 3 hours.

ATA 6300 CAA Occurrence Ref 04/891

Cessna 172P
Throttle

It was reported that the aircraft was carrying out max-rate turns when the throttle could not be reduced to idle, and the throttle became stiff. The lowest rpm setting gained was 1400 rpm. The defect was not confirmed, but it possibly resulted from dirt causing scoring of the carburettor throttle shaft, or a poorly contacting earth strap causing arcing through the throttle linkage. TSI 30 hours, TSO 44 hours, TTIS 44 hours.

ATA 7320 CAA Occurrence Ref 04/3350

Cessna 207A
Cylinder attach bolt

It was reported that, during inspection, the pilot's left brake master cylinder was found to have excessive movement at the lower attach point. The bracket was inspected, and the outer bracket section was found broken away from the bolt attach point. The bracket was renewed with one made from steel. TTIS 9207 hours.

ATA 3240 CAA Occurrence Ref 04/1466

Cessna A152
Flap micro-switch terminal

During a touch and go the student selected 10-degree flaps at about 150 feet agl. Although the lever showed 10 degrees, the position indicator showed that the flaps were still at 30 degrees. A check out the window showed that this was correct. Several attempts were made to recycle the flaps. The student did a low-level circuit and made a safe landing. Investigation revealed a defective earth terminal on the flap micro-switch.

ATA 5750 CAA Occurrence Ref 03/902

De Havilland DH 104 Dove 1B
Cylinder head

The pilot elected to return to Great Barrier when the left engine began running roughly three minutes after takeoff. The pilot made a single-engine landing, and the aircraft was towed back to the apron. The right plug on the number three cylinder (left engine) had blown out due to a defective thread, which had been salvaged by helical insert. A new cylinder head was fitted and the aircraft returned to service.

ATA 8530 CAA Occurrence Ref 04/3896

Diamond DA20-C1
Exhaust valves

The pilot noticed rough running during the engine start-up and again intermittently during the cruise. Investigation revealed that the exhaust valves were the cause. The maintenance organisation notified the engine manufacturer (Teledyne Continental Motors) and, as a result, revised exhaust valve to guide clearances were provided to address the problem. TSI 166 hours, TTIS 2166 hours.

ATA 8530 CAA Occurrence Ref 04/657

Hughes 269C
Tail rotor assembly

On completion of shimming of the tail rotor, the helicopter was ground run for tail rotor balancing. The pilot lost control of the helicopter while conducting the ground run on the trolley. The helicopter rolled on to its side, causing damage to its tail rotor and associated components.

Investigation revealed that the tail rotor assembly was installed the wrong way, resulting in the tail rotor pitching 'full left' when the rotational speed increased.

ATA 6500 CAA Occurrence Ref 04/500

Hughes 369HS
Avi-bank blade attachment pins

It was reported that two main rotor blade folding pins were found broken at the base of the tension nut shaft thread. This meant the main rotor blade was only being held on by jammed broken parts.

Engineers found the fractured surface to be grainy. Two folding pins were replaced. TSI 82 hours, TTIS 10,089 hours.

ATA 6200 CAA Occurrence Ref 04/853

KHI Kawasaki-Hughes 369D
Right rear upper leg assembly

During ground handling, the pilot observed the undercarriage right rear upper leg assembly had cracked through the brace mount/attachment. The upper leg assembly was replaced.

ATA 3270 CAA Occurrence Ref 04/1788

Pacific Aerospace 750XL
Push rod assembly

It was reported that during a routine 150-hour inspection, both righthand aileron push rod fittings were found loose. It was noted that the 1/8 inch TLP-D rivets were loose, as if they had not been pulled up correctly, and the fittings were not a tight fit in the rod ends. TSI 150 hours, TTIS 300 hours.

ATA 2700 CAA Occurrence Ref 04/2152

Pacific Aerospace Cresco 08-600
Cresco strut

During compliance with the applicable Airworthiness Directive and Service Bulletin, a crack was found in the strut at the known fracture area, which is through the weld at the interface of the engine mount attachment bolt tube and the main tube. The strut was replaced. TTIS 7947 hours.

ATA 5310 CAA Occurrence Ref 04/2145

Partenavia P 68B
Lower engine mount bracket

While changing the righthand engine and also complying with AD DCA/P68/24, the lower engine mount attachment bracket was found cracked from beside the attachment bolt hole, up to the top of the bracket, across the top, and down inside the bracket to the bolt hole. A new replacement bracket was fitted. TTIS 7242 hours.

ATA 7120 CAA Occurrence Ref 04/2658

Piper PA-28-161
Alternator

The alternator failed while the aircraft was flying in cloud. The engineer suspected that the failure resulted from excessive moisture build-up on electrical terminals while in cloud, as the problem could not be reproduced on the ground.

ATA 2420 CAA Occurrence Ref 04/2146

Piper PA-28-181
Cleveland brake disc

The aircraft landed and an unusual noise was heard, accompanied by minimum braking availability. Investigation revealed that the lefthand brake disc had separated from the hub due to the effects of corrosion and heavy braking. The operator has instructed engineers to be extra vigilant when inspecting wheel brake assemblies for corrosion. TSI 40 hours, TTIS 2021 hours.

ATA 3240 CAA Occurrence Ref 02/2285

Piper PA-31-350
Ball end

It was reported that righthand main undercarriage failed to lock down. An emergency gear extension also failed to give a green indication. A successful landing was made after emergency services were called. The down lock hook was found not engaged. The fault was caused by dirt and sediment fouling the cable ball end, causing stiffness. TSI 50 hours.

ATA 3200 CAA Occurrence Ref 04/1965

Pitts S-2A
Elevator control system

The aircraft's elevator momentarily jammed during flight. Despite an extensive inspection, no reason for the control jamming could be determined. It was possibly a loose article.

ATA 2730 CAA Occurrence Ref 05/662

Robin R2120 U
Canopy

It was reported that in flight, the aircraft canopy dislodged from its starboard railings, leaving a 30 cm gap from the fuselage. The instructor held the canopy closed, and the aircraft returned to land. The canopy had possibly not been fitted correctly after maintenance.

ATA 5200 CAA Occurrence Ref 04/1457

Schweizer 269C
Lateral trim system

During descent, the pilot was initially unable to make righthand cyclic inputs. The engineers discovered that a top hat type sleeve, normally glued in place, had come adrift from a lateral trim control tube, which had allowed the tube to jam the cyclic controls. There will be a manufacturer's SB and an FAA AD addressing the problem.

ATA 2700 CAA Occurrence Ref 05/124