March / April 2004

# VECTOR

Pointing to Safer Aviation

## Warbirds Over Wanaka 2004

Flying High

Inverted at Night

Wilderness Areas and Aircraft

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND

# VECTOR CAA NEWS

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**Cover Photo:** Polikarpov 1–153s over Lake Wanaka. Developed in the Soviet Union, this aircraft type was one of the fastest bi-planes ever produced. The prototype first flew in 1938. Photo courtesy of Ian Brodie, Curator, New Zealand Fighter Pilots Museum.

# Warbirds Over Wanaka 2004


Photo courtesy of Ian Brodie, Curator, New Zealand Fighter Pilots Museum

**It's that time again. Warbirds Over Wanaka 2004 will be one of the biggest aviation events of the year, and a significant number of aircraft will be converging on the Wanaka area for the Easter airshow. Extra traffic this year will include participants in the Around New Zealand Air Race that finishes near Wanaka. The following article discusses some of the considerations you need to think about in order to fly to and from Wanaka for the airshow.**

Following the tragic Lindis Pass crash after the 2000 event, CAA, Airways Corporation and the Warbirds organisers put a lot of effort into ensuring that the 2002 event did not suffer in the same way. The March/April 2002 issue of Vector had an extremely comprehensive article about cross-country flying in general, and flying to Wanaka in particular. If you haven't been to Wanaka before, or have limited recent cross-country experience, it would be a good idea to read that article to refresh yourself on best practice. This article will not rehash all of the issues raised back then but will instead concentrate on some of the key lessons. Note that some pilots may choose not to fly to Wanaka aerodrome, but instead park at one of the other local airfields, Queenstown, Cromwell, Alexandra and Omarama being common alternatives. In this article, the generic term "Wanaka" may be used to indicate flight to any of these airfields as well as Wanaka itself.

## Weather

The biggest factor likely to affect any cross-country flight is the weather, particularly in the mountainous terrain around Wanaka. On a fine day it can be an exhilarating, scenic and fun trip through the hills. On a bad day you may wish you had never left home. Low cloud, poor visibility, rain, updraughts and downdraughts and turbulence are not much fun anywhere, but even worse in the mountains. We can't control the weather, so your planning, flying and contingency thinking must take into account the very real possibility that you will not be able to fly your chosen route on any given day. Make sure you obtain up-to-date weather forecasts for any cross-country flight.

## Terrain

You can't get to Wanaka (or any of the other airfields mentioned above) without flying over or through the mountains. If you are not familiar with the area, or have limited mountain flying experience, you need to be extra careful about the weather. You should also brush up on your general mountain flying technique. Talk to your instructor, get some dual mountain flying experience if required, and make sure you read the CAA GAP booklet, *Mountain Flying*.

## Time Pressure

To avoid the insidious danger of time pressure, it is a good idea to build in a weather contingency. Make sure that your boss and the owners of the aircraft you are flying are happy that you might not be back on Monday or Tuesday, but could be delayed by a few days if the weather turns bad. They will be happier to see you back safely a bit late, than to see you splattered on a hillside trying to get home at a fixed time. Have some back-up accommodation planned as well.

Weather is not the only source of time pressure. On departure from Wanaka there is likely to be a long queue of aircraft, particularly on the Sunday. Don't put yourself in the situation where a delay getting airborne will compromise a safe arrival at your destination. ECT at Wanaka is at 1840 NZST on 11 April, and slightly earlier in most other South Island destinations.

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A number of en-route aero clubs reported significant congestion on the ground in 2002, particularly around fuel pumps. Don't rely on being able to land and gas up without delay en route – you may find yourself number 10 at the pump, with an unplanned extra hour on the ground.

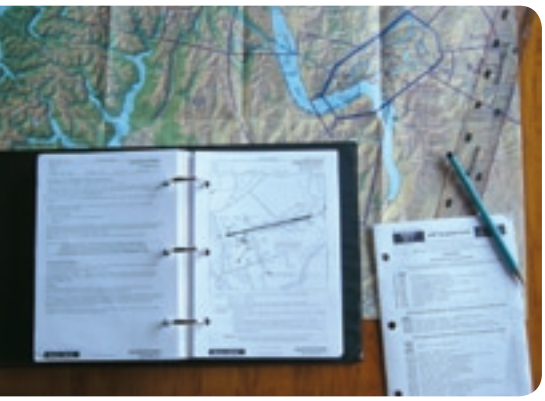
Another problem that may test your patience will be the likely congestion on the Christchurch Information radio frequencies. Airways will balance the load by using up to three operators during peak traffic flows, but that still means that each may be dealing with upwards of 50 or 60 aircraft. Keep your radio calls to a minimum, be concise and clear. Note that it may take some time to get a quiet patch to get in your call, so don't leave essential calls (such as SARTIME amendment or flight plan termination) too late.

## Pre-Flight Preparation and Publications

There are a number of documents you will need to be able to plan a safe flight to and from Wanaka. These include:

- An up-to-date *AIP New Zealand Vol 4*.
- Visual Navigation Charts covering your proposed route.
- AIP *Supplements* 37/04, 38/04 and 39/04.

You will need landing plates for all the airfields you may land at en route. Also, be aware that there are different VNCs for the east coast and west coast of the South Island. Pilots coming from the north may well fly down on one coast, and then choose (or be forced by weather) to fly back on the other. Make sure you have charts to cover all possible routes home.



## AIP Supplements

The importance of having read and understood the AIP *Supplements* about Wanaka cannot be overstressed.

Every year, ATC reports instances of pilots arriving at Wanaka who have either not read the AIP *Supplement* or, for some reason, seem incapable of following the instructions it contains. This causes significant and unnecessary problems for ATC and other pilots. To be blunt, such pilots are a menace to themselves and others. **Read and make sure you fully understand the procedures in use.** Ideally you should be able to follow them from memory, but have them available for quick reference in the cockpit anyway. Use your passengers to help out. Brief them to point out all the aircraft they spot (several hundred aircraft converge on Wanaka within a short space of time), as this may be the busiest traffic environment you will ever encounter in the air. Keep your head on a swivel, keep radio calls brief and to the point, and follow all ATC instructions.

The paragraph above is a direct quote from the 2002 *Vector* article. Unfortunately, the message did not get through to all pilots that year, as ATC once again reported that a significant number of pilots arrived who obviously did not know what was expected. Let us work towards a better result in 2004. The AIP *Supplement* is available on-line at www.aip.net.nz, or as a link from the IFIS website www.ifis.airways.co.nz . **Read it.** Note that other information relevant to the Wanaka event will also be posted on the IFIS website, so we recommend you check it out before flying down.

**AIP *Supplement* 37/04** is basically a warning to all pilots that the airspace around Wanaka will be busy with display practices and early arrivals in the week leading up to Easter.

**AIP *Supplement* 38/04** gives details of the Flow Control Procedures for aircraft intending to land at Queenstown, or fly through Queenstown airspace, between 08 and 11 April. If you are not intending to land at Queenstown, it may be a good idea to plan your flight to avoid flying through the Queenstown airspace. The key point to note is that all VFR aircraft intending to operate in Queenstown's airspace **are required to TELEPHONE** Queenstown Tower at least one hour before ETA to be allocated an arrival slot. You must do this by phone, **NOT RADIO**, nor does a Flight Plan count as sufficient notification. Given that you may not be given the slot you want – first in, first served – it would be a good idea to plan to land at an appropriate aerodrome (Omarama, Alexandra, or Cromwell for example) and make a phone call from there. You should then arrange your departure from that aerodrome to arrive at Queenstown at the allocated time.

Queenstown ATC has also requested that any pilots flying to Queenstown should be familiar with the VFR arrival procedures, particularly the Bungy Bridge arrival. It is also suggested that any pilots unfamiliar with the Queenstown area should read, *In, Out and Around Queenstown*. A revised edition of this GAP booklet has just been published. (See the information on obtaining GAP booklets elsewhere in this issue.)

**AIP *Supplement* 39/04** covers procedures for operating in and out of Wanaka aerodrome. There is a lot of information in this *Supplement*. Take the time to sit down and work your way through the procedures. Have a copy of the VNC to hand, with your planned route drawn on it. The key points are:

- **You must** plan your arrival for the periods that the airspace is open. Given likely traffic delays, it would be a good idea to arrive at the start of the open slots, not towards the end, or you may miss the slot and be turned away.
- **You must** have an additional 30 minutes of holding fuel above normal reserves.
- **You must** terminate your plan with Christchurch Information. Wanaka Tower will not accept plan terminations. Terrain effects can make contact with Information difficult at lower altitudes, so take this into account when deciding when to terminate, and what SARTIME to nominate. Check your cellphone for messages on arrival. If you have missed your SARTIME the National Briefing Office or Search and Rescue Centre may have left a message.
- **You must** plan to fly one of the published arrival procedures.

**Note** that there are different arrival procedures for higher performance and multi-engine aircraft. To avoid undue traffic conflict, it is imperative that you accurately fly the published procedure at the right altitude.

**Note** that for the Runway 11 arrivals, all aircraft will funnel through the top of downwind. Beware of the converging flightpaths of the Dunstan and Tarras arrivals at that point. For the Runway 29 arrivals, high-performance aircraft will be joining straight in for the runway, while other aircraft will be joining on a right base, having flown a full circuit.

**Note** that outside the hours of watch of Wanaka Tower, the aerodrome reverts to normal unattended procedures **AND**

**FREQUENCIES (119.1 MHz).**

**Note** that Restricted Airspace, NZR990 and ATC with associated controlled airspace will now be active until Monday 12 April 2004. ATC hours of service on Monday will be 0800 to 1300, local time.

Indications are that this may be one of the biggest airshows yet at Wanaka. The extra traffic generated by the Air Race may lead to the aircraft park at Wanaka reaching capacity. The deal is 'first in, first served', so later arrivals may well be instructed to land at an alternative airfield. Note that other airfields, particularly Queenstown and Cromwell (where the Air Race terminates), may also get congested. You should take that possibility into account when planning your travel and accommodation requirements. And before leaving the subject of accommodation requirements, all pilots intending to visit Wanaka are reminded that camping in, around, or under their aircraft at the Wanaka airfield light aircraft park is strictly prohibited.

## Summary

A flying trip to the Wanaka airshow can be one of the highlights of your flying career. The air display, the spectacular location, and the atmosphere that surrounds the Wanaka airshow all combine to make it a memorable event. A little bit of thought and preparation on your part can only enhance the experience, not to mention making it far safer and easier for you, your passengers and other pilots. See you there. ■

Have you seen these titles in our GAP series, which contain information relevant to operating in the Wanaka area? If not, we suggest that you read them before heading off to Wanaka. Copies can be obtained from your local flight-training organisation, CAA Field Safety Adviser, or by contacting the Safety Education and Publishing Unit, Tel: 0–4–560 9400.


**Don't forget to terminate your flight plan!**

# Agricultural Industry Education Package

## Clarification

In the last *Vector* an article outlining the Agricultural Industry Education Package included a paragraph containing errors. We apologise for the misleading information to readers and to the industry groups working with us to improve safety.

There is no new CAA or HSE legislation planned regarding agricultural aviation. Most of the issues involving airstrips, transport and storage of fertiliser, etc, are administered by the Occupational Safety and Health (OSH) service of the Department of Labour under the Health and Safety in Employment (HSE) Act 1992.

Agricultural aviation includes many industry sectors that have an effect on the overall safety of operations. The CAA HSE Unit is working with these groups, and OSH, to reach agreement on a Best Practice Topdressing Guide, to give airstrip owners, and others involved, information to improve safety in their operations. Aviation operators, airstrip owners, fertiliser manufacturers, and transport operators will be expected to use the Best Practice Topdressing Guide to comply with the HSE Act.

A draft of this Guide can be viewed on the CAA web site, www.caa.govt.nz, under "HSE Unit" on the home page. Your feedback is still invited on this. When all the groups involved are in agreement with the content, the Guide will be published by OSH under the auspices of the Agricultural Health and Safety Council. Members of the Council who are participating in this project include the New Zealand Agricultural Aviation Association, Federating Farmers of New Zealand, and OSH.

For further information about the CAA's HSE designation, see the "CAA Operational Health and Safety in Employment Policy", also on the CAA web site. This explains that the CAA HSE policy is to work with operators to improve safety through education and voluntary compliance with the HSE Act. If a situation cannot be remedied through advice, there will be a graduated response, with enforcement action under the HSE Act being the last resort.

# Planning an Aviation Event?

**Do you have a significant event or airshow coming up soon? If so, you need to have the details published in an AIP *Supplement* rather than relying on a NOTAM. (Refer to AC 91–1 *Aviation Events* for operational requirements.) The information must be promulgated in a timely manner, and should be submitted to the CAA with adequate notice. Please send the relevant details to the CAA (ATS Approvals Officer or AIS Coordinator) at least one week before the appropriate cut-off date indicated below.**

| *Supplement* Cycle | *Supplement* Cut-off Date (with graphic) | *Supplement* Cut-off Date (text only) | *Supplement* Effective Date |
|---|---|---|---|
| 06/2004 | 1 Apr 2004 | 8 Apr 2004 | 10 Jun 2004 |
| 07/2004 | 29 Apr 2004 | 6 May 2004 | 8 Jul 2004 |
| 08/2004 | 27 May 2004 | 3 Jun 2004 | 5 Aug 2004 |

# Wilderness Areas and Aircraft

***New Zealand has some spectacular scenery, some of which has recently received massive exposure world-wide through The Lord of the Rings movie trilogy. There are some special areas of the country with particular attributes that have been designated as wilderness areas.***

***From the air, pilots and their passengers can view the full grandeur of our country, but we should be mindful that others on the ground may be appreciating it in a different way. Do overflying aircraft take something away from these wilderness areas?***

***Marie Long and Martin Rodd of the Southland Conservancy, Department of Conservation, outline some of the factors to consider.***

## What is True 'Wilderness'?

Flying over many places in New Zealand offers opportunities to view incredible scenery that you will not see anywhere else in the world. When you fly from Queenstown to Milford Sound, for example, you traverse incredible mountain ranges, with amazing tarns, forests, and peaks. From the air these areas look like wilderness, but are they defined as such in the New Zealand legal context?

*Wilderness* is a term commonly used in New Zealand, but what is it, and why is it important for pilots and aircraft operators to know where these areas are?

There are many views on what the term *wilderness* means. For some, wilderness can be a place like Milford Sound, which receives close to half a million visitors a year, while to others the inner depths of Fiordland offer a wilderness experience. Neither of these perceptions is wrong, but the latter example is now enshrined in New Zealand's law.

## Wilderness Values

The concept of wilderness is not a recent phenomenon. It was first formally discussed in New Zealand as early as the 1930s, with the first gazetted wilderness area created in 1962 within the Tongariro National Park. The recognition of wilderness values and the need to protect them has been around much longer. In 1900 the early explorer Charlie Douglas wrote:

*"Let us keep a few spots in Westland uncontaminated by the ordinary tourist, the picnicker and the photographic fiend, some almost impassable place where what is inside can be left to the imagination … keep them for those who care to risk their necks and enjoy scenery in a state of nature."* (J D Pascoe (ed) 1957, Mr Explorer Douglas. A H & A W Reed, Wellington).

Today we can summarise the following as the key attributes for a true wilderness:

- The area is generally a large remote natural area.
- It provides solitude, peace and natural quiet.
- It has no man-made structures or influence.
- The users are self-reliant and highly experienced.
- Access is by the users' own means (they are self-propelled).

Wilderness areas provide a recreation experience where there is an extremely high probability of experiencing complete isolation from the sights, sounds and activities of humans, and having no interaction with other user groups, let alone individuals. They offer opportunities for reflection, for observation and for exploration of ideas and experiences – all of which can contribute significantly to human well-being.

Wilderness as a concept has become an integral part of the New Zealand identity. The National Parks Act 1980, the Reserves Act 1977 and the Conservation Act 1987 have enshrined these values in legislation. They identify what can **not** happen in these areas. For example, subject to some exceptions, the Conservation Act 1987, section 20, includes requirements that:

- No building or machinery shall be erected on it.
- No livestock, vehicles or motorised vessels (including hovercraft and jet boats) shall be allowed to be taken into or used in it, and no helicopter or other motorised aircraft shall land or take off or hover for the purpose of embarking or disembarking passengers or goods in it.
- No roads, tracks, or trails shall be constructed on it.

It is this legislative direction that makes them different from all other areas which may appear to offer wilderness values.

They truly are places that are *"wild lands designated for their protection and managed to perpetuate their natural condition and which appear to have been affected only by the forces of nature, with any imprint of human interference substantially unnoticeable"*, as defined in the Wilderness Policy of 1985.

## Ongoing Management

The need for ongoing management seems an irony, as wilderness areas are essentially places which are 'unmanaged' for recreation purposes. There are no tracks, huts and bridges for example. There are, however, two key pressures which could affect the continued viability of these wilderness areas if not managed adequately.

The first relates to ensuring the ecological integrity of these places. Without a healthy indigenous ecosystem, the value of the wilderness would be compromised. This is an ongoing challenge that the Department of Conservation faces in wilderness areas.

The second issue is one of changing visitor use, particularly on the boundaries of wilderness areas. An increasing number of

visitors to New Zealand want to experience the true wilderness, though in reality they may not actually meet the criteria of a true wilderness seeker. This may result in increased requests for aircraft access into places adjoining wilderness areas – the protective buffers to these wilderness areas – so as to provide access for people who can not walk into these places. Some of you may have noticed that the Department of Conservation may have imposed conditions on where you can land or take off if it adjoins wilderness areas, as an attempt to manage this pressure. This is to ensure that the integrity of the wilderness remains intact.

## How Can Aircraft Use Affect Wilderness Values?

The law generally does not permit aircraft to land within wilderness areas. However, the same legislation does not impose restrictions on flying over wilderness areas.

Essential components of wilderness such as solitude, being self-propelled, natural quiet and encountering nature on nature's terms are all values which may be affected by the presence of aircraft – whether they are landing or flying above. Aircraft noise, for example can diminish this experience.

There are many operators who understand these values and fly high and wide when over wilderness areas. They have specifically approached the Department of Conservation to obtain copies of maps showing where these wilderness areas are, and they ensure that their pilots are well briefed. The Department applauds this approach. There are aircraft, however, that continue to fly low over wilderness areas, and these are unfortunately the ones who spoil these values for everybody else. Chances are these are itinerant pilots who may be unaware of the values which the land beneath them holds. Educating these pilots can only be a win/win for the aviation industry and the Department of Conservation.

## What Can Aircraft Operators Do To Protect Wilderness Values?

Working together and obtaining a better understanding of wilderness area values and aircraft operator needs is a great start. How can we do this? Pilots need to:

- be informed of the location of wilderness areas;
- make contact with the local DOC office for information and advice;
- be considerate of wilderness areas when planning flight routes, and avoid overflying these areas, particularly at low altitude, wherever possible.

### *Further information*

Check the Department of Conservation website, www.doc.govt.nz, for further information such as:

*The state of wilderness in New Zealand*, Department of Conservation, 2001 – provides a good analysis of the history and the concept of wilderness in New Zealand.

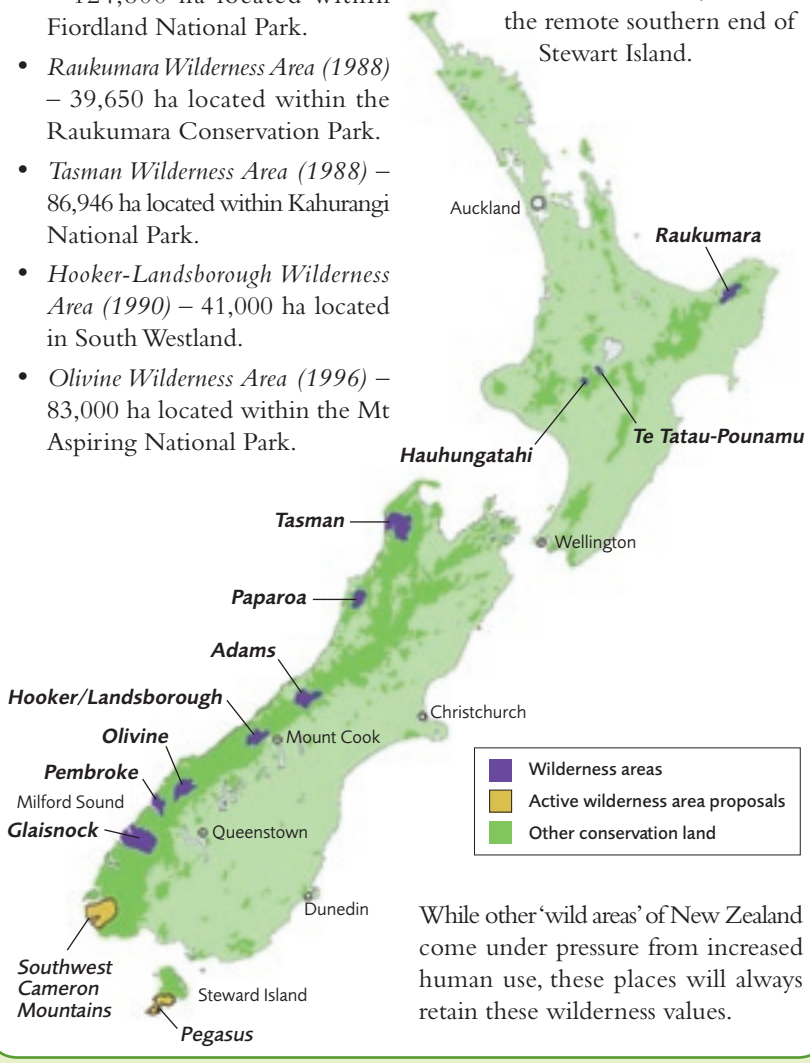
Department of Conservation management strategies and management plans – these outline specific management regimes for different wilderness areas.

*Wilderness Policy 1985* – defines the attributes of wilderness areas. ■

## Gazetted Wilderness Areas

There are 10 gazetted wilderness areas in New Zealand, with proposals for a further two. These are:

- *Te Tatau-Pounamu Wilderness Area (1962)* – 6,475 ha located within Tongariro National Park.
- *Hauhungatahi Wilderness Area (1966)* – 8,498 ha located within Tongariro National Park.
- *Pembroke Wilderness Area (1974)* – 18,000 ha located within Fiordland National Park.
- *Glaisnock Wilderness Area (1974)* – 124,800 ha located within Fiordland National Park.
- *Raukumara Wilderness Area (1988)* – 39,650 ha located within the Raukumara Conservation Park.
- *Tasman Wilderness Area (1988)* – 86,946 ha located within Kahurangi National Park.
- *Hooker-Landsborough Wilderness Area (1990)* – 41,000 ha located in South Westland.
- *Olivine Wilderness Area (1996)* – 83,000 ha located within the Mt Aspiring National Park.
- *Adams Wilderness Area* – covers approximately 56,000 ha located in the heart of Westland.
- *Paparoa Wilderness Area* – covers an area of approximately 32,000 hectares east of the main Paparoa Range in the Buller District.
- *Proposed Southern Fiordland Wilderness Area* – a general area based around the catchment of the Cameron Mountains down to the southern fiord boundaries.
- *Proposed Pegasus Wilderness Area* – an area of more than 40,000ha at the remote southern end of Stewart Island.




While other 'wild areas' of New Zealand come under pressure from increased human use, these places will always retain these wilderness values.

# Flying High

**A look at some of the hazards inherent in high-altitude takeoffs and landings**

*This article was adapted and reproduced from* ***Flight Safety Australia*** *who in turn adapted it from "Fickle Winds and High Altitude Operations" and "Helicopter Mountain Flying", both published in the Australian DFS-ADF* ***Flying Safety Special: Operations in Tropical Mountainous Areas*** *(Fourth Edition, 2000).*

## Introduction

It is one of life's unfortunate facts that aircraft performance diminishes with density altitude. For helicopter pilots who work in mountainous areas, it's just another consideration that must be added to a long list of other factors, which can include severe turbulence, unpredictable weather, unfriendly landing sites and hostile terrain. While it's a combination of hazards that many operators learn to manage, some don't – and occasionally the consequences can be fatal.

What are some of the mistakes that have been made in the past, and how can we learn from them?

The following Australian accident, which occurred several years ago, is typical of the type of accident that can occur if proper consideration is not given to the hazards of mountain flying.

## Landing Short

The pilot had a total of 2000 hours flying time, of which 150 had been logged in helicopters. His first mission in a mountainous area as pilot-in-command required him to locate some supplies that had fallen into an inaccessible area.

The pilot spotted the supplies and requested further instructions from his superiors. He was asked to land, if possible, and send two men to recover the cargo. The closest accessible landing site seemed to be a clearing near an alpine shelter at 6000 feet amsl. The pilot radioed headquarters that he was initiating landing procedures.

He made two passes over the chosen area, verifying the wind speed and nature of the terrain. He then opted for a flat approach pattern toward a point where he could hover with sufficient power. His speed decreased to 30 knots, 50 to 100 feet above the ground just before the landing site.

As the helicopter transitioned to the hover, the pilot increased power and the machine began to settle, with the rotor rpm beginning to decay. The pilot informed his passengers of the imminent landing and raised the collective pitch to its maximum.

The helicopter touched down rather violently almost 200 feet before the chosen site and came to rest on a 15-degree incline.

### *Basic Rules for Mountain Approaches*

While at first glance it appears that the pilot did not commit any glaring errors, it's worth reviewing his actions according to some basic rules of mountain approaches:

- Maintain constant awareness of the direction and estimated speed of the wind.
- Take into account the temperature, keeping in mind that it may increase as you approach ground level.
- Plan the approach in such a way that you retain the option of discontinuing it at your convenience – the approach should be along a slope and preferably into the wind, so as not to gain altitude.
- If the wind is light, choose a summit or an elevation as your landing site in order to be able to anticipate and counteract every possible wind activity.
- If you are not familiar with a landing site, execute a minimum of two passes over the area.
- Identify any obstacles near the landing site.
- Do not select a landing site solely on the basis of its suitability for unloading cargo.
- Carry out power checks to determine that you have the power required for the desired landing.
- Where possible, the approach to a mountainous summit should be made along the ridge – not from the perpendicular – to provide an escape route. On the final approach use a soft touch on the controls – over-controlling can lead to a loss of rotor rpm.

## Power and Density Altitude

Circling above the area, the pilot had estimated the wind conditions to be calm but had not taken the temperature into consideration, noting merely that it was rather warm. Subsequent calculations revealed that the density altitude was in fact 8000 feet. Nor did the pilot check the power. Had he done so he would have realised that the conditions during the approach pattern required all the power that was available.

The approach flight path was too flat to permit an overshoot if any unexpected difficulties arose. These are all small but important details which, when disregarded, turned a potentially safe approach and landing into a manoeuvre that taxed the capability of the machine beyond its limits.

The pilot involved, confirmed that conclusion. "In my opinion the accident could have been avoided had I refused to land. Once the supplies had been spotted and localised, the urgency of the operation was reduced. Unfortunately this was not communicated to me. I thought I had carried out all the necessary operations, without in effect knowing that I was operating at the limits of the helicopter's operating capabilities. Had I made a simulated approach at a higher altitude, I would have realised how much power I really lacked for an eventual approach and landing."

## Wind Speed and Direction

Another trap, which can complicate matters for pilots new to mountain operations, is the discrepancy between indicated airspeed and true airspeed at altitude.

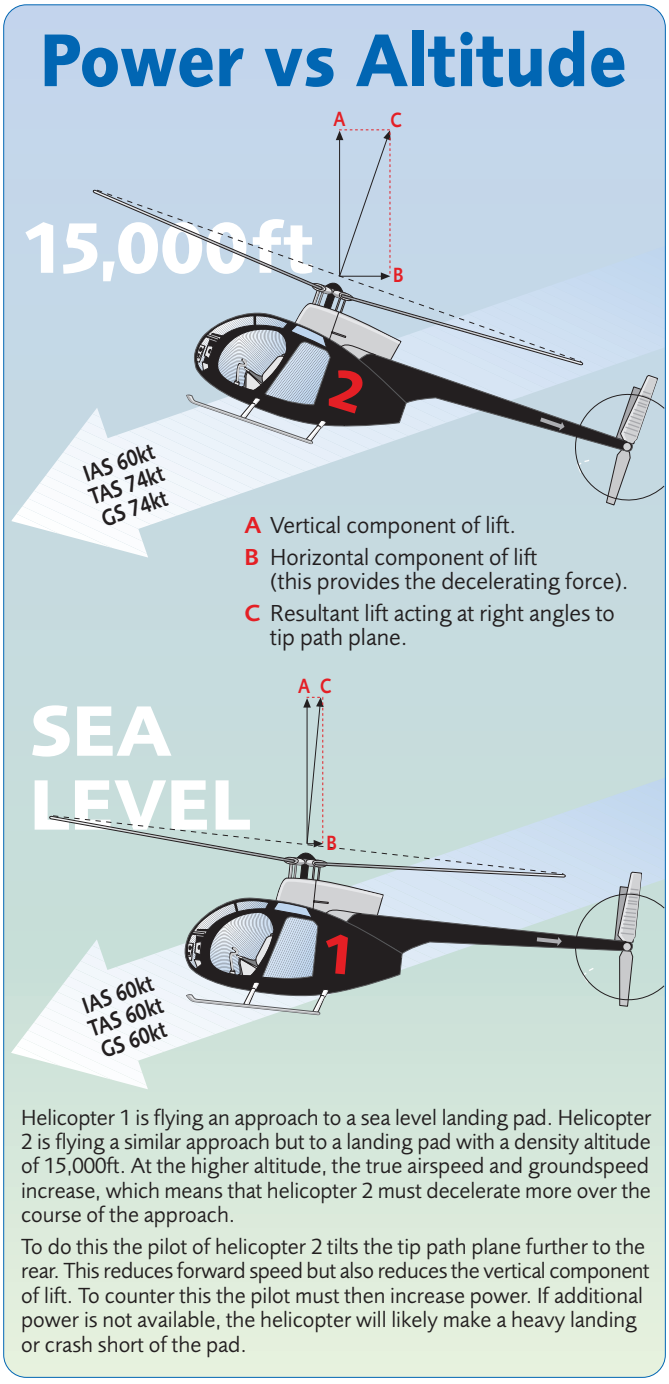
Consider a helicopter on an approach to a pad at sea level at an indicated airspeed of 60 knots. If the calibrated airspeed is also 60 knots and the wind speed is zero, then the groundspeed will be 60 knots. Now consider the same approach but to a landing site with a density altitude of 15,000 feet. At the higher altitude, true airspeed and groundspeed increase to the extent that 60 knots indicated airspeed now equates to a groundspeed of 74 knots. If the pilot notices the higher groundspeed on the approach they may conclude that they are landing with a significant tailwind (a logical conclusion for operators at sea level). They abort the approach and set up a landing from the opposite direction.

This does not present a problem if there is in fact no wind. But what if the pilot was flying into a 5-knot headwind on the original pass – the groundspeed would still be higher than they would be used to at sea level. If they make the decision to approach from the opposite direction they are unwittingly choosing to land with 5 knots tailwind.

If the same pilot has a gross weight which only allows them to hover in ground-effect (IGE), they are going to pass below effective translational lift short of the touchdown area, over-pitch, and land heavily on whatever happens to be below – unless they have sufficient height to lower the nose and collective to pick up airspeed and rotor rpm. (This could be a couple of hundred feet depending on the rotor rpm decay and aircraft altitude.)

## Approach Profile

The type of approach flown is also critical to the safety of operations at altitude. Because the groundspeed is significantly higher at altitude, a greater deceleration is required to bring the helicopter's speed to zero at touchdown than if the approach was flown at sea level.




Helicopter 1 is flying an approach to a sea level landing pad. Helicopter 2 is flying a similar approach but to a landing pad with a density altitude of 15,000ft. At the higher altitude, the true airspeed and groundspeed increase, which means that helicopter 2 must decelerate more over the course of the approach.

To do this the pilot of helicopter 2 tilts the tip path plane further to the rear. This reduces forward speed but also reduces the vertical component of lift. To counter this the pilot must then increase power. If additional power is not available, the helicopter will likely make a heavy landing or crash short of the pad.

At the point in the approach when maximum decelerating attitude is reached (about 30 to 50 feet above ground level), and the pilot starts easing forward cyclic and bringing in power, it is going to take more power to keep the rate of closure constant with the greater deceleration.

The pitch angle will also have to be increased to provide the lift required to support the weight of the aircraft, because the tip path plane is tilted further to the rear, and the vertical component of lift, which governs our rate of descent, is less (see accompanying diagram). This additional power may not be available, and it usually results in over-pitching and one of the following:

- Arrival on the pad with the seats set lower in the aircraft and the skids level with the floor;
- A new helicopter-shaped terrain feature short of the pad; or
- An aborted landing – if the pilot is lucky and recognises the problem soon enough to allow sufficient altitude for recovery.

*Continued over ...*

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So, how should we fly the approach in these conditions? A long shallow approach to the forward (upwind) edge of the usable area has several advantages. It minimises the rate of descent, ensuring that valuable power is not expended while reducing vertical momentum. It also minimises the required change in fuselage attitude and the rotor disc plane, so that excessive power is not used to reduce forward momentum. However, shallow approaches can be used only in light (or zero) wind conditions. The approach profile should be steepened with wind strength to avoid turbulence.

***Points to Note***

- For pinnacle and ridgeline landings, never approach straight in or at right angles – fly at an angle that allows an escape route to a lower altitude in case of an abort.
- When landing in a new area for the first time, plan your load so that the helicopter can be hovered OGE, with some reserve power.
- Before takeoff, determine the density altitude at your intended landing point, the maximum weight for hover IGE and OGE, and the maximum torque or manifold pressure. Work out the maximum weight you can carry to hover OGE (for first landing) and IGE. Also work out the maximum torque or manifold pressure you will get.
- Make sure the aircraft is loaded to the minimum possible weight to complete the mission, but include a survival kit.
- On arrival in the area of intended landing, perform a full-power check at or above the level of the pad. And note the torque setting or manifold pressure. Check this against the performance data.
- Assess wind direction carefully allowing for higher true airspeeds at altitude.
- Execute a practice approach, maintaining approximately 40 knots, and overfly the intended touchdown point as low as is safely possible to check for slope, size, shape, and firmness of the intended touchdown point.
- Carry out the final approach all the way to the ground, paying particular attention to the rate of closure and descent.
- If an approach is not going to plan, abort as early as possible. Do not try to salvage a poor approach. Consider returning when conditions improve or you have reduced your payload.

## The Trouble with Takeoffs

Takeoffs at altitude can also be problematic. The following accounts illustrate some of the hazards.

"Because of the loads we were lifting, we could just get a three-foot hover at full throttle, and anything over this caused over-pitching. Our takeoffs were made with a very gradual acceleration, and, after passing through translational lift, a reduction of power was normally made to give a reserve of power if needed. This was also intended to leave the aircraft at an altitude where it was IGE if the wind gusts dropped the airspeed back below effective translational lift before the aircraft could accelerate to a reasonable climb speed."

"The pilot took off to the east, picked up a gust that put him above effective translational lift, and caused the helicopter to climb 15 to 20 feet; then, the wind dropped momentarily, and he was back below translational lift and starting to sink back towards earth. He was already at full power, and when he pulled pitch to stop the sink, over-pitching occurred and the aircraft struck the ground."

On another occasion, a pilot confronted with deteriorating weather was faced with the option of overloading the aircraft against his better judgement, or leaving one man to spend a wet bleak night on a mountain top without adequate protection. As he had a slight down-slope run over low scrub for takeoff, he decided to load the extra man. As a result, the whole party, plus a bent aircraft, spent a miserable night without adequate protection.

What factors should be considered when making a departure from a mountain pad? An adequate power margin at the hover is essential. As long as altitude can be traded for airspeed, takeoffs from pinnacles, ridgelines or other sites with clear areas below, offer the fewest problems.

Takeoffs from sites that have some obstacles either slightly below, level with, or higher than the takeoff point, require thorough ground reconnaissance and planning. The helicopter must be backed up into the far corner of the usable area and an abort point worked out. If effective translational lift, or an adequate climb angle, is not reached by the abort point, the pilot then knows that the takeoff can be discontinued with sufficient clear ground left for deceleration.

Takeoffs from gullies or ravines, where higher obstacles exist behind those immediately ahead of the takeoff run, also require ground reconnaissance so that turns can be anticipated. (The high reconnaissance before landing should have just about determined the takeoff run with some degree of certainty.)

If over-pitching or rotor rpm bleed off occurs at full power before reaching effective translational lift, or if any limits are exceeded,

the takeoff should be aborted. Remember, translational lift will occur at a higher groundspeed than at sea level, and acceleration will be slower.

If you ever require full power and rpm right at the point of bleed off or over-pitching to barely clear the obstacles on climbout – you're cutting it way too fine.

## Summary

- Plan the flight carefully.
- Know what power is available and what power is required before commencing an approach or takeoff.
- Understand the environment in which you are operating.
- Avoid excessive control inputs.
- Be prepared to go around if the approach is not working.
- Use every available aid to determine wind speed and direction.
- Leave yourself an escape route on the approach.
- Finally, consider developing standard load charts which show payload capabilities at various fuel loads and pressure altitudes as an aid to planning (up to ISA + 20 conditions). ■

*For further reference, see Good Aviation Practice booklet,* ***Helicopter Performance****. These booklets are available from your local flight training organisation or CAA Field Safety Adviser.*

# *How-to… fill the* gap

GOOD AVIATION PRACTICE

The CAA publishes two series of information booklets.

The **How-to…** series aims to help interested people navigate their way through the aviation system. The following titles have been published so far:

| *Title* | *Latest Version* |
|---|---|
| How to Be a Pilot | 2000 |
| How to Charter an Aircraft | 1999 |
| How to Deal With an Aircraft Accident Scene | 2001 |
| How to Establish a Small Aerodrome (web only) | 2002 |
| How to Get Your Licence Recognised in New Zealand (web only) | 2000 |
| How to Navigate the CAA Web Site | 2000 |
| How to Report Your Accidents and Incidents | 2002 |

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

| *Title* | *Latest Version* |
|---|---|
| Aircraft Icing Handbook | 2000 |
| Bird Hazards | 2003 |
| Chief Pilot | 2000 |
| Flight Instructor's Guide | 2003 |
| Fuel Management | 2002 |
| Helicopter Performance | 2002 |
| In, Out and Around Milford | 2002 |
| In, Out and Around Queenstown | 2004 |
| Mountain Flying | 1999 |
| Takeoff and Landing Performance | 2002 |
| Wake Turbulence | 2003 |
| Weight and Balance | 1999 |
| Winter Flying | 2001 |

**How-to…** and **GAP** booklets (except *Flight Instructor's Guide* or *Aircraft Icing Handbook*) are available free from most aero clubs, training schools or from Field Safety Advisers (FSA contact details are usually printed in each issue of *Vector*). Note that *How to be a Pilot* is also available from your local high school.

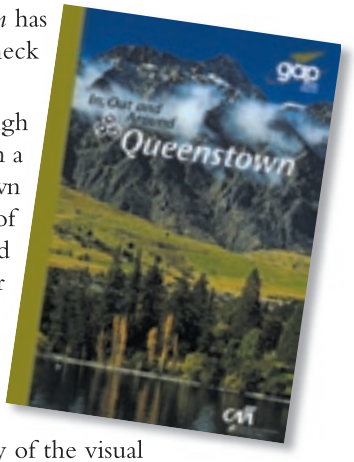
Bulk orders (except *Flight Instructor's Guide* or *Aircraft Icing Handbook*) can be obtained from:

**Communications and Safety Education**
Civil Aviation Authority
P O Box 31-441, Lower Hutt
Tel: 0–4–560 9400

*The ***Flight Instructor's Guide*** and ***Aircraft Icing Handbook*** can be purchased from either:

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

## In, Out and Around Queenstown




A revised edition of *In, Out and Around Queenstown* has been published. To identify the revised version, check the back cover for "revised in January 2004".

Mountainous terrain, changeable weather, and high density and variety of traffic can make Queenstown a challenging destination. Before flying into the Queenstown area, a pilot should have a thorough understanding of the airspace and local procedures, and have a sound knowledge of basic mountain flying techniques (refer to the *Mountain Flying* GAP).

*In, Out and Around Queenstown* gives an overview of the airspace and associated activities around Queenstown and details the arrival/departure procedures, which are well illustrated with aerial photographs of many of the visual reporting points. Aerodrome circuit procedures, aircraft performance considerations, and general RTF procedures are also discussed. This booklet will be a useful reference, whether you are a first-time pilot to the area or a regular visitor.

The recent revisions reflect changes in airspace terminology, charts (new VNCs) and publications (new AIP). A few photos are updated. Changes to procedures and other information are only minor. ■

# Safety Videos

The following safety videos are available. The New Zealand titles have been produced for the CAA by Dove Video Productions. **Note:** The instructions on how to borrow or purchase are detailed at the end of this item.

## Civil Aviation Authority of New Zealand

### *Safety Video Series*

**Airframe Icing** – 26 min, 2003
This video looks at the fundamentals of airframe icing, including the conditions that cause it, types of icing, its effect on aerodynamic performance, and what to do if icing is encountered. IFR pilots of single-engine, through to commuter turboprop aircraft will find this topic relevant to their operation, regardless of their experience level.

**Airspace and the VFR Pilot** – 47 min, 1992
A light aircraft flight from North Shore to Ashburton exposes two VFR pilots to the world of controlled airspace.

**Apron Safety** – 19 min, 2003
Aerodrome aprons present a number of potential hazards. This revised and updated video highlights the dangers on the tarmac, in particular the problems associated with inadequate passenger supervision between terminal and aircraft, for both airline and GA. Hazards to employees are covered as well. The examples and advice in this video are relevant for anyone involved in working on an aerodrome, including pilots.

**Collision Avoidance** – 20 min, 1993
What causes aircraft to collide? How is it best to avoid a collision? This video examines the problem including collision-risk levels, traffic awareness, use of radio, scanning techniques etc. (The limitations of the human eye aspect is covered in *Mark 1 Eyeball*.)

**Decisions, Decisions** – 30 min, 1996
When flying we make one decision after another, but are they always right and on what basis are they made? While in the past pilots made decisions, good or bad, based largely on their experience, research has now shown that pilots can be trained to make better decisions, whatever their experience level. This video will help you analyse your own responses and work towards improving your decision-making.

**Drugs and Flying** – 21 min, 1995
Drugs and flying are incompatible. This programme looks at the adverse affects that drugs (both recreational and medicinal) can have on your performance as a pilot. It details the types of medication that pilots must avoid prior to flying an aircraft.

**ELBA** – 14 min, 1987
This video looks at the function, uses, and limitations of the emergency locator beacon. It also outlines what you can do to help reduce the number of false ELBA activations from a Search and Rescue point of view.

**Fatal Impressions** – 6 min, 1995
This short video carries a vital message, namely, "Low Flying Can Kill". Ideally, it is the sort of video that makes good viewing before a group discussion on the topic of low flying.

**Fit To Fly?** – 21 min, 1995
Pilots must apply self-discipline when assessing their everyday fitness to fly. This video examines how to conduct this self-assessment of your physical and mental well-being, and explains what steps you are required to take if you detect a medical problem that may affect your performance in the cockpit.

**Fuel Management** – 38 min, 2002
This video is in two parts; the first looks at flight planning and in-flight fuel management, and the second covers basics such as refuelling, de-fuelling, and what to do if something goes wrong. The video is designed to complement the *Fuel Management* GAP booklet, also produced by CAA.

**It's Alright if You Know What You Are doing – Mountain Flying** – 32 min, 1997
This programme views the topic through the eyes and comments of several pilots with a wealth of experience in the particular skills and knowledge required for flying in areas of mountainous terrain. Both fixed-wing aircraft and helicopters are catered for. The comments cover weather, planning, illusions, awareness, techniques, and more – with the key message being to stay within both your limits and those of the aircraft. The comments are recorded against a background of some magnificent footage of a variety of aircraft operating in the high country of southern New Zealand.

**Light Twins** – 23 min, 2001
Flying a light twin-engine aircraft, particularly on a commercial operation, is very demanding of a pilot's skill and experience – the accident statistics confirm this. This video, which is aimed at pilots who are about to complete a light-twin rating or those that are converting to a more sophisticated machine, covers basic twin-engine aerodynamic principles, engine failures, single-engine performance, weight and balance considerations, airframe icing, and organisational safety culture. It stresses the importance of receiving a thorough type rating and being totally familiar with your aircraft's systems, its performance limitations, and the engine failure drills.

**Marine Survival** – 42 min, 2003
New Zealand is an island nation with considerable expanses of inland water as well, and the possibility of having to ditch in the event of an engine failure is not necessarily a remote one. Prior consideration and planning may be vital to successful survival. This video covers points from planning and equipment, through the various phases and appropriate actions of a ditching situation and then addresses subsequent survival in cold water. With proper preparation, proper execution and the right survival equipment, ditching can be a relatively safe procedure

**Mark I Eyeball** – 24 min, 1993
Seeing is believing. Or is it? This video describes and illustrates some of the limitations of the human eye. (The associated topic of seeing and avoiding other aircraft is covered in *Collision Avoidance*.)

**Mind That Prop/Rotor!** – 10 min, 1994
The human body offers little resistance to the motion of an aircraft propeller or a helicopter blade. This video shows how accidents involving people being struck by propellers and rotor blades can occur, sometimes with fatal results. It also emphasises the pilot's responsibility regarding the safety of passengers and others around aircraft.

**Momentum and Drag** – 22 min, 1998
This video looks at the two important values, momentum and drag, and how these differ in different classes of aircraft. Understanding the differences is crucial when transitioning from one class of aircraft to another. The topic is relevant for all pilots, whether they fly a microlight or a wide-body jet. It is particularly important if a pilot plans to convert from one end of the scale to the other, but even moving from a Cherokee to a microlight, for example, can be hazardous.

**Mountain Survival** – 24 min, 2000
This video, based on a THL alpine survival training course for their pilots, covers the basic principles of survival, suggested survival kit contents, how to maximise the insulative values of different clothing types, ways to utilise the aircraft fuselage as a primary means of shelter, using a Zdarsky sack, building a snow mound, using a cooking stove, and finally the importance of positive leadership. Although intended primarily for pilots involved in commercial high-country operations, the information covered in this training video is also relevant to the recreational flyer who might occasionally operate in and around mountainous terrain.

**On The Ground** – 21 min, 1994
A wide-ranging guide to operating safely on aerodromes, particularly the larger airports. Runway and taxiway markings, standard marshalling signals, taxiing tips, and windsock indications – it's all there.

**Passenger Briefing** – 20 min, 1992
This video opens with a dramatic courtroom scene, which demonstrates the importance of always briefing passengers before a flight. The video will be of interest to all pilots and operators, no matter how small or large your aircraft or operation.

**Radar and the Pilot** – 22 min, 1990
An introduction to the uses and limitations of air traffic control radar for pilots. The video covers primary radar and secondary surveillance radar, radar coverage, shows the SSR radar screen display and outlines the radar flight information service.

**Rotary Tales** – 10 min, 1999
Over a recent five-year period there were 133 accidents in New Zealand involving helicopters. Thirteen pilots died along with 19 passengers. There were, during this same period, many more incidents involving helicopters that came very close to being accidents. This video consists of two short sketches that carry safety messages for all helicopter pilots.

**Situational Awareness** – 15 min, 2002
This video gives pilots a practical insight into situational awareness (SA), what it is, how to get and maintain SA on a given flight, and the signs or symptoms that indicate you may be losing situational awareness. This is a video for pilots of all experience levels.

**Survival** ≠– 19 min, 2000
Set at a crash site in the bush, this video deals with the actions that you must take as pilot in command immediately following a crash landing and gives advice on how to survive in the open. A Westpac Rescue helicopter paramedic talks about the type of information that rescue services will need from you (assuming that you have cellphone or are in radio contact) to effect a quick and successful rescue. A suggested list of contents for an aircraft survival kit is also included.

**Survival – First Aid** – 26 min, 2001
*Survival – First Aid* highlights the importance of pilots being competent in first aid, to be able to assist their passengers if injuries are suffered as a result of a forced landing. It deals with essential first aid techniques but does not purport to be a complete first aid course. This video complements two other survival videos in our series: *Survival*, and *Mountain Survival*.

**The Final Filter** – 16 min, 1998
At least 75 percent of accidents can be regarded as 'human factor' accidents. This programme looks at the role that the human factor plays in the everyday decisions that we make as pilots in the general aviation environment. It not only looks at how we can better understand and evaluate our performance as safe pilots, but also presents a number of scenarios that

help illustrate how that performance can be influenced. We are ultimately 'the final filter' in the decision-making process. Understanding how to evaluate our performance in different situations can allow us to break the chain of events that can lead to an accident.

**To The Rescue** – 24 min, 1996
This video covers all aspects of transporting passengers in need of medical attention, whether from an accident site, or during inter-hospital transfers. The emphasis is on the view that these passengers should be able to expect at least the same level of safety as that offered any fit and well passenger. Pilots must avoid being captured by any sense of drama.

**Weight and Balance, Getting it Right** – 28 min, 2000
This video covers a wide range of weight and balance considerations for single and twin-engine fixed-wing aircraft. Helicopter weight and balance considerations are also dealt with.

**We're Only Human** – 21 min, 1999
This video looks at the compromise between our physiology, the environmental demands of flight, and the design limitations of our aircraft – and how these can affect our performance as pilots. It takes a close look at the effects of flight on our physiological and sensory systems and investigates the influence of cockpit ergonomics. *We're Only Human* complements our previous release, *The Final Filter*, which deals with decision-making aspects of the 'human factor'. Other titles relevant to our minds and bodies are *Mark I Eyeball*, *Fit To Fly?*, *Drugs and Flying*, and *Decisions, Decisions*.

**Wirestrike** – 16 min, 1987
Every year there are incidents involving light aircraft and wires. This video attempts to show the nature of the problem and how best to avoid a wirestrike.

**You're On Your Own** – 15 min, 1999
Flying single-pilot IFR, particularly in light twins, is the most demanding of tasks and yet, so often, it is undertaken by the least experienced. This video is designed to assist you to better understand IFR cockpit management and flight planning issues. It emphasises the need for careful pre-flight planning, thinking ahead, and being aware of both the aircraft limitations and your own limitations as pilot. Pilots who regularly fly in this environment also offer some practical advice.

### *Other CAA Titles*

**All of Us** – 22 min, 2003
This video aims to raise the security awareness of people working in the aviation industry. It promotes the concept that everyone can enhance security by following some basic rules and by developing a security-awareness culture. The importance of individual responsibility as well as collective responsibility, in order to minimise the risk of a security event occurring, is stressed. Ideal for staff induction and refresher training courses,

**Working With Helicopters** – 8 min, 1996 (re-release date)
A brief look at the practical aspects of working around helicopters.

*(Note that the above programmes have been produced over a number of years using three formats, Low-band, SVHS and Betacam. Programmes are being progressively replaced, and it is the intention to eventually offer all programmes in Betacam.)*

### Civil Aviation Authority, Australia

**The Gentle Touch** – 27 min, (Making a safe approach and landing)

**Keep it Going** – 24 min, (Airworthiness and maintenance)

**Going Too Far** – 26 min, (VFR weather decisions)

**Going Ag-Grow** – 19 min, (Agricultural operations)

**Going Down** – 30 min, (Handling emergencies)
Outside Productions
These may be borrowed, but not purchased, from CAA.

### Outside Productions

**Mountain Flying** – 66 min, 2000
(Produced by High Country Productions, C/o John Richards, R D 2, Darfield Tel: 0–3–318 6838)
This video covers the importance of pilot proficiency and knowing your aircraft, details a precautionary landing exercise, and discusses valley-flying and ridge-crossing techniques. A great deal of practical advice and experience is included. The latter half of the video takes the viewer on a scenic flight through the Southern Alps. Mountain Flying is intended to encourage interest and stimulate discussion on safe mountain-flying techniques rather than to be used as a formal training video.

**NZ 60 – 'A Free Lesson'** – 32 min, 2002
(Produced by Air New Zealand)
This CRM training video deals with how to recognise and react to erroneous ILS indications. It is relevant to all pilots who conduct ILS approaches.

**To Borrow:** The tapes may be borrowed, free of charge. Contact CAA Librarian by fax (0–4–569 2024), phone (0–4–560 9400) or letter (Civil Aviation Authority, PO Box 31–441, Lower Hutt, Attention Librarian). **There is a high demand for the videos, so please return a borrowed video no later than one week after receiving it.**

**To Purchase (except Outside Productions):** Obtain direct from Dove Video, PO Box 7413, Sydenham, Christchurch. Email dovevideo@yahoo.com. Enclose: **$10 for each title** ordered; plus **$10 for each tape** and box (maximum of 4 hours per tape); plus a **$5 handling fee** for each order. All prices include GST, packaging and domestic postage. Make cheques payable to "Dove Video".

# Safety Seminars
## – Aircraft Accidents –

The theme of this year's series of Av-Kiwi seminars focuses on recent aircraft accidents in New Zealand.

The impetus for these seminars has been a spate of unfortunate accidents, many of them fatal, particularly in the sport aviation segment of the aviation community. You will have noted the new "From the Accident Files" series of articles in *Vector*. The Av-Kiwi accident presentation is designed to complement this series. We can all learn from the accidents of others – it is easier, cheaper and less hazardous than having the accident ourselves.

The first seminar for the year was held at Nelson on 12 March. Venues for seminars in the next couple of months are:

**Christchurch – Sunday 28 March, 19:00**
Canterbury Aero Club

**Auckland – date and time to be confirmed**
Pikes Point Airpark

**Hamilton – date and time to be confirmed**
Waikato Aero Club

This Av-Kiwi presentation will also be part of forthcoming ACE days in 2004.

***We look forward to seeing you at a venue near you soon!***


Readers are encouraged to share their aviation experiences in order to alert others to the potential pitfalls. Please send your experiences to Peter Singleton, Editor, *Vector/CAA News*, Civil Aviation Authority, P O Box 31–441, Lower Hutt, or email publications@caa.govt.nz.

Thanks for the excellent response to this new series. Please keep sending in your contributions.

# Inverted at Night

It had been a fantastic weather day in mid March 1995 and I was preparing for my Swiss night VFR cross-country with an off-base landing at Zürich International Airport. There was talk of a storm coming in from the west, but that didn't really bother me, watching the stars appearing in the clear skies above Altenrhein Airport as I pulled the AS202 Bravo aerobatic trainer out from the hangar. I was more worried about the complete lack of wind and the silent swirls of mist appearing over the airfield.

The briefing with the CFI was short – he had a bad head cold and didn't want to be there. However, I had persuaded him that the weather was not in doubt (we'd be back long before any storm front had arrived), the procedures were well rehearsed (I'd flown to Zürich a few times before, albeit in the daylight), and that I needed just this one landing before being signed off for my night VFR rating.

After fuelling the aircraft, I noticed the CFI taking a few drops of decongestant up his nasal passages, head back, gargle, gasp, sniffle, and smile. On the radio, weather still no problem, Zürich knew we were coming (ETD 5 minutes), and that we would arrive in about another 40 minutes for our landing slot. The flight to Zürich was uneventful, landing straight-in on Runway 28.

Disembarking, the CFI was at his nose drops again.

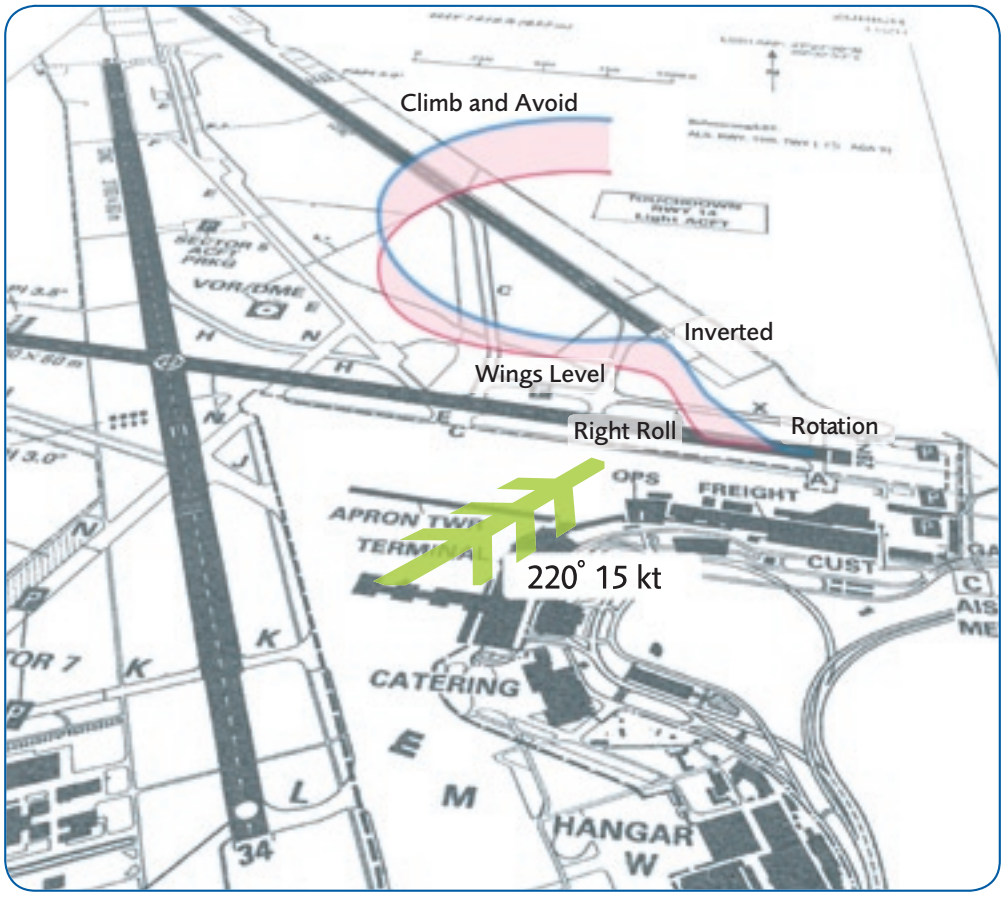
Pay the landing fee, confirm the slot for departure, ground check, nose drops, AFIS (still no appreciable weather), obtain clearance from 'Zurich Delivery', start up, taxi to holding point, and wait… and wait…

The slot time came and went, but still we were waiting. Apparently, those big jets were not going to let us small fry out, what with separation distances to respect and timetables to keep to. We also had a timetable to keep – two actually – we wanted to go before the weather caught up with us, and we needed to get back to base before night curfew came into effect.

Then it started to rain heavily and the wind was picking up. At first we thought it was jet blast, but then reasoned the jets were holding facing our position before they taxied out and lined up on Runway 28. On the radio again. At last, a revised clearance – five minutes more. Check ATIS again, but still no cause for concern.

So, there goes the B737, the Airbus, the Dash, and BAe146. Five minutes were up. Another two or three B737s and, 10 minutes later Zurich Tower informed us we were fourth in sequence.

Line up Runway 28, wind 220 degrees 15 knots gusting 25, windshear alert in force, visibility 2500 metres, ceiling 3000 feet. Minimums were met. At least the AS202 was IFR-equipped and I had the CFI sat next to me! It was then that I realised he hadn't said much whilst we were waiting and, turning to face him, I found out why – he had fallen asleep apparently under the influence of the alcohol in the nose drops and the rhythm of the idling engine. I gave him a gentle prod, which woke him from his slumbers then, tentatively, I waited for the last of the 737's jet blast to subside before making my way out to the exposed Runway 28.



I had never experienced such a ride. It was as if we were doing our engine checks. The plane was bucking around. Surely jet blast! But it didn't subside. (Apparently, in the lee of the cargo and ops building, and especially the multi-story car park, eddies are not uncommon for this wind direction and strength. See the accompanying diagram for details.) Takeoff clearance came. I looked at the CFI – he was wide-eyed, now. He nodded. Read back clearance. Advance power and release brakes.

We lurched forward, perhaps 50 metres, and were airborne. This was not right – too quick. Airspeed OK though, at 60 knots and accelerating. We had been cleared to turn right after takeoff. Normal procedure was to turn to the left, but doing so would mean closing Runway 16 briefly, and with a B747 on finals, and a queue behind us, the controller wanted us out of there fast. *(Runway 28 is normally the departure runway due to the prevailing westerly winds, with runways 14 and 16 being the predominant landing runways.)*

So, standard angle-of-bank turn to the right. Wham, buffet, thrown to the left, strange floating feeling! *(This upset was probably caused by the eddies/gusts off the buildings to the southwest of us, although the reported windshear could have also been a factor.)* Instrument scan – airspeed 80 knots, height 250 feet agl and falling, attitude rolling inverted to the right! Push up! Push up! Strange shapes appearing in the bubble canopy above (below) us – Learjet, Citation, the business jet park! Tree! Keep the roll going, roll out, come on, wings levelling.

CFI on the radio declaring an emergency, and other words that I dare not translate from Swiss German! Attitude now righted and climbing (just). Sound of B747 on short finals spooling up to go around. Lots of landing lights in front of us, then to the side, and gone with loud engine noise. Climb to the right to avoid the B747 wake turbulence (piece of cake after what we had just encountered).

We vacated to the east sitting in silence, landing back at Altenrhein Airport 15 minutes later in relatively still air and mist.

The debriefing was even more hurried than the briefing. Pale-faced, the CFI just shook my hand then walked out of the hangar into the evening mist.

The next morning a notice appeared on the Flight Briefing room notice board: "If required by Zurich ATC to perform the alternative, righthand turn out off Runway 28, do not comply. Insist on a normal lefthand departure".

So what did I learn from that experience?

- Know the limits of your aircraft and yourself.
- Don't fly only when the weather is CAVOK.
- Refresh yourself with inclement-weather training with an instructor on board.
- The weather is how it is now and not always what is forecast.
- Unexpected attitude-recovery training pays off.
- As pilot in command, you have the final say over ATC when it comes to performance and weather condition limitations.
- If in doubt, fly the aircraft, declare an emergency and take your time (if possible) to sort out the problem – ATC will cope with clearing airspace around you.
- Don't try and persuade a reluctant pilot (or instructor) to fly with you.
- If under medication, don't fly! ■

***Vector Comment***

We thank Julian Idle for sending us his account of this dramatic incident.

There are many valuable lessons that can be taken from such an incident, and we think you have covered them well in your bullet-point summary. It nicely illustrates how accidents/incidents are usually the result of a series of events or circumstances that compound to cause a negative outcome. The key is to have safety procedures in place to correct or eliminate them early enough to break the accident chain.

## Accident Notification

*24-hour 7-day toll-free telephone*

**0508 ACCIDENT**
**(0508 222 433)**

*CA Act requires notification "as soon as practicable".*

## Aviation Safety Concerns

*A monitored toll-free telephone system during normal office hours. A voice mail message service outside office hours.*

**0508 4 SAFETY**
**(0508 472 338)**

*For all aviation-related safety concerns*

## Field Safety Advisers

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# Letters to the Editor

**Readers are invited to write to the Editor, commenting on articles appearing in *Vector*, recommending topics of interest for discussion, or drawing attention to any matters in general relating to air safety.**

## "Brake Out!"

Thank you for a great magazine which I always read with interest. I would like to comment on the article "Brake Out!" in the November/December issue.

In 48 years of aircraft engineering, I have never heard of the basic laws of physics failing, one of which has it that a liquid is incompressible. This includes hydraulic fluid to MIL-H-5606 or DTD 585. No matter how old, what colour or smell, it still works. Even contaminants like metal, water, or rubber would not affect that. Only air, another gas, or water turning to steam under boiling temperature, would give a spongy feel. I was disappointed to see two CAA engineering names linked by the story to the statement about losing incompressibility. The reference to Toyota recommending changing oil regularly is common to **all** cars having vegetable-based hydraulic oil, which absorbs moisture during its life. This causes corrosion and boils in hot braking, causing brake fade. Mineral oil does not naturally absorb moisture, and in an aircraft system it is not subject to much contamination.

In the case of the Warrior, it was ambiguous whether the aircraft had problems with the right brake, or the right set of brake pedal cylinders. Bleeding the dual brake system takes extra steps, which are not well explained in the manual.

All kudos though to the pilot-in-command for rejecting the proposed flight in favour of having the brakes fixed. A lesser person would have decided to have them seen to later and carried on regardless. Keep up the good reporting.

John Pheasant
Papakura
December 2003

### *Vector Comment*

Thank you for your letter, and the complimentary remarks. We referred your letter to Ross St. George and Bob Jelley, and their comments were as follows:

John Pheasant's letter gives us the opportunity to clarify a couple of points that, in retrospect, were conveyed too loosely in telling the story.

The remark about the old fluid losing 'incompressibility' was a simple but not entirely accurate way of saying what appeared to have happened.

The problem faced was that the brake pedals and hand brake would not function.

There was no clear leak in the system, and the reservoir was full.

While by-pass leakage was not ruled out, only one seal in the system was replaced, and this one was not considered to be in bad or poor condition.

However, this step did not rectify the problem. The next step taken was to completely bleed the whole system. During the flushing and bleeding process, entrapped air did not appear to be the problem – there was no air bubbling or interruptions to flow. It just took a lot of time and effort to pump out the surprisingly large volume of atypical fluid before we could note the change to the new replacement fluid being put into the system.

The fluid recovered from bleeding was not formally analysed. The colour and consistency ('feel' when run between thumb and forefinger) was attributed to both fluid contamination and ageing. The fluid was not typical of the darker red colour of aged aviation hydraulic fluid.

One should not get moisture absorption into aviation hydraulic fluid by hygroscopic means, but it could not be ruled out that moisture or some other fluid contaminant had entered the system by other means. The aircraft is, after all, 30 years old.

Similarly, it could not be ruled out that the seal and O-ring operation was in some way inhibited by deterioration of the fluid, as alluded to in the "All is Revealed" paragraph of the original article.

What we do know is that once the atypical fluid was replaced – plus one seal – full, proper and consistent brake action was restored. Possibly the successful rectification was the result of a combination of factors. The one thing that gained our attention, however, was the colour and nature of the hydraulic fluid recovered.

Reference to texts on aircraft hydraulics shows that many factors influence the quality of aviation hydraulic fluids and systems. Clearly the very low compressibility under the pressures encountered, the operating temperature regimes, and a list of other technical properties, are important. But these texts do indicate that all fluids are ultimately compressible and that these fluids can have their properties changed – usually for the worse – over time by many quite complex interacting factors. With good condition fluid in a properly functioning hydraulic system, these issues are not of practical significance. Our curiosity was prompted by the suspicion that the bulk of the resident hydraulic fluid in this aircraft was well beyond its 'use-by-date'.

It was the absence of a clear guideline about fully replacing aviation hydraulic fluid in light aircraft from time to time that led to the comparison with the guidance relating to modern cars.

As John rightly noted, aviation hydraulic fluids (for example, meeting MIL-H-5606) do not naturally absorb moisture, unlike the vegetable-based oils used in cars.

Interestingly, early Airtourers apparently used a car-based hydraulic system with automotive hydraulic fluid. This may be the case in other older aircraft. And vegetable-based hydraulic fluids are used in microlight aircraft. In all of these cases, it might be prudent to consider the state of the fluids periodically on the grounds of their hygroscopic properties.

Another point that came up in discussion is that, for a typical private-operations general aviation aircraft flying a lot of hours (say more than 100 a year), the brake system check should include regular bleeding of the hydraulics and fluid replacement or replenishment. A private aircraft, however, doing far fewer hours per year, may be vulnerable to its aviation 'spec' hydraulic fluid not being as good as it once was many years ago. The suggestion was to give these hydraulic systems a regular calendar or 'birthday' check – just like other systems – to be more assured of putting a stop to things when we want to. ■

# OCCURRENCE BRIEFS

## Lessons for Safer Aviation

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

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

## Accidents

The pilot-in-command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form CAA 005 to the CAA Safety Investigation 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 which 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-FYF, Micro Aviation B22 Bantam, 31 Dec 02 at 12:00, Thames. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence nil, age not known, flying hours 150 total, 150 on type, 15 in last 90 days.**

The pilot decided to practise dead-stick landing circuits and started with failures from 100 feet agl (having done this before in winter time). However, he miscalculated the ambient air temperature, which was very warm (summer), and the aircraft dropped out of the sky.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 02/3885

**ZK-HUL, Robinson R22 Beta, 17 Jan 03 at 16:30, Masterton. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, training solo. Pilot CAA licence PPL (Helicopter), age 36 yrs, flying hours 158 total, 10 on type, 6 in last 90 days.**

The pilot was on a solo consolidation flight following dual type-rating instruction on the R22. As the helicopter was climbing out after takeoff and had reached an altitude of about 400 feet, witnesses on the aerodrome heard a loud noise and saw pieces flying off the helicopter. It free-fell to the ground; the pilot was killed and the helicopter destroyed. The main rotor rpm had decayed, and one main rotor blade struck the cabin, then detached from the helicopter.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/127

**9V-SMT, Boeing 747-412, 12 Mar 03 at 16:00, Auckland. 389 POB, injuries nil, damage substantial. Nature of flight, transport passenger A to B. Pilot CAA licence n/a, age not known, flying hours 12,000 total, 120 on type, 120 in last 90 days.**

On Wednesday 12 March 2003, at 1547, flight SQ286, a Boeing 747-412 registered 9V-SMT, started its takeoff at Auckland International Airport for a direct 9-hour flight to Singapore. On board were 369 passengers, 17 cabin crew and 3 pilots.

When the captain rotated the aeroplane for lift-off, the tail struck the runway and scraped for some 490 metres until the aeroplane became airborne. The tail strike occurred because the rotation speed was 33 knots less than the 163 knots required for the aeroplane weight. The rotation speed had been mistakenly calculated for an aeroplane weighing 100 tonnes less than the actual weight of 9V-SMT. A takeoff weight transcription error, which remained undetected, led to the miscalculation of the takeoff data, which in turn resulted in a low thrust setting and excessively slow takeoff reference speeds.

The system defences did not ensure the errors were detected, and the aeroplane flight management system itself did not provide a final defence against mismatched information being programmed into it. During the takeoff the aeroplane moved close to the runway edge, and the pilots did not respond correctly to a stall warning. Had the aeroplane moved off the runway or stalled, a more serious accident could have occurred.

The aeroplane takeoff performance was degraded by the inappropriately low thrust and reference speed settings, which compromised the ability of the aeroplane to cope with an engine failure and hence compromised the safety of the aeroplane and its occupants.

Safety recommendations addressing operating procedures and training were made to the operator, and a recommendation concerning the flight management system was made to the aeroplane manufacturer.

Main sources of information: Abstract from TAIC Accident Report.

CAA Occurrence Ref 03/715

**ZK-XIE, Micro Aviation B20 Bantam, 1 Jun 03 at 12:00, Whangarei Heads. 1 POB, injuries nil, damage minor. Nature of flight, training solo. Pilot CAA licence nil, age 63 yrs, flying hours 78 total, 9 on type, 9 in last 90 days.**

The microlight pilot was practising uphill landings when he bounced twice. He then decided that a go-around was not an option and after the final touchdown tried to turn away from some bush at the top of the airstrip, but the aircraft slid into it, causing minor damage.

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

CAA Occurrence Ref 03/2011

**ZK-CSR, Rand KR-2, 8 Jun 03 at 16:45, Avon Valley. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 32 yrs, flying hours 195 total, 59 on type, 8 in last 90 days.**

The aircraft was on a private flight to over-fly a military bush camp. It was seen to fly up the valley over the camp at approximately 500 feet agl. At the end of the run the aircraft banked to the left to return over the camp. During the turn, the bank angle reached approximately 90 degrees, and the aircraft entered a spin to the left from which it did not recover. The carbon monoxide in the pilot's blood was found to be 23 percent. The cabin heater exhaust shroud had recently been relocated on the exhaust pipe. The new position, however, was over a slip joint, which leaked carbon monoxide into the cabin air. The pilot in all probability suffered in-flight incapacitation and lost control of the aircraft during the turn.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/1675

**ZK-EYD, Piper PA-38-112, 20 Jul 03 at 09:00, West Melton Ad. 2 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence CPL (Aeroplane), age 29 yrs, flying hours 473 total, 58 on type, 66 in last 90 days.**

The student was completing a dual circuit-training exercise with an instructor at West Melton airfield. The instructor was demonstrating an engine failure from the downwind position and the associated glide approach. At approximately 400 feet above ground the instructor believed the approach was normal and lowered 16 degrees of flap. At approximately 200 feet above the ground the instructor assessed that the aircraft would land well into the field.

As the aircraft approached the downwind fence line the aircraft sank rapidly. The instructor applied full power, but the left wing and nosewheel contacted the airfield fence, causing the aircraft to yaw to the left. The instructor then closed the throttle and applied full right rudder, but the aircraft touched down at about 45 degrees to the runway. The aircraft stopped in the long grass to the left of the runway.

There were no injuries, but the aircraft received substantial damage.

Main sources of information: Accident details submitted by pilot and operator.

CAA Occurrence Ref 03/2434

**ZK-HWE, KHI Kawasaki-Hughes 369D, 24 Jul 03 at 17:05, Queenstown. 2 POB, injuries nil, damage substantial. Nature of flight, test flight. Pilot CAA licence CPL (Helicopter), age 25 yrs, flying hours 3500 total, 3000 on type, 120 in last 90 days.**

During unscheduled maintenance, some days prior to the accident flight, the helicopter's fuel quantity transmitter was removed for access. Either during removal, storage or installation, the transmitter arm was bent and became unserviceable. The lack of clear information on post-installation transmitter functional checks in the helicopter's maintenance manual was a contributory factor in the damage remaining undetected. The result of the damage was that the fuel transmitter stopped reading fuel quantities below 150 lb.

During the accident flight, the pilot had not spotted the sticking gauge indication and was unaware that his fuel tank quantity was very low – until the engine failed. The helicopter landed heavily, causing substantial damage.

This accident highlights how important it is to maintain an awareness of the fuel tank quantity irrespective of the fuel gauge indication, and any fuel gauge indication discrepancies.

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

CAA Occurrence Ref 03/2166

**ZK-CBY, Cessna 185A, 11 Oct 03 at 13:00, Masterton Ad. 2 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 19 yrs, flying hours 258 total, 33 on type, 9 in last 90 days.**

While on approach to Runway 06 (grass) at Hood aerodrome in nil wind conditions, the pilot missed the intended touchdown point and, due to wet grass causing loss of braking, lost directional control of the aircraft. As a result, the left wing made contact with a hangar.

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

CAA Occurrence Ref 03/2885

## Rotor Hub Corrosion

During routine maintenance on a Kawasaki-Hughes 369 helicopter, the engineer discovered that an outboard lower strap shoe (Part Number 369A 1218) of the main rotor hub assembly was corroded. The item was subsequently replaced. Total time in service for this rotor hub was 8424 hours, and the time since overhaul was 1489 hours.

It is recommended that operators and helicopter maintenance organisations inspect these shoes on all aircraft of this type.

CAA Occurrence Ref 03/2177


**RTF: Christchurch Info (or ATS Units)**

**Tel NBO: 0800 626 756**

**Web: www.ifis.airways.co.nz**

**For further information refer to the AIP or phone the NBO**

AIRWAYS NEW ZEALAND

CAA CIVIL AVIATION AUTHORITY OF NEW ZEALAND