March / April 2002

VECTOR

Pointing to Safer Aviation

Going to Wanaka?
– Don't Push It –

Bad Weather Ahead? – Turn Back

Further Ways to Hurt Your Aircraft

Rotor Blade Care

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND

VECTOR

Managing Editor, Cliff Jenks

Vector Editors, Pam Collings, Barnaby Hill, Jim Rankin.

CAA News Editors, Peter Singleton, Phillip Barclay.

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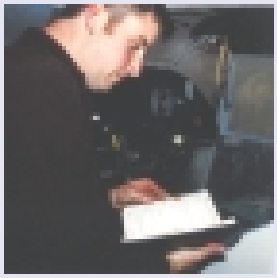

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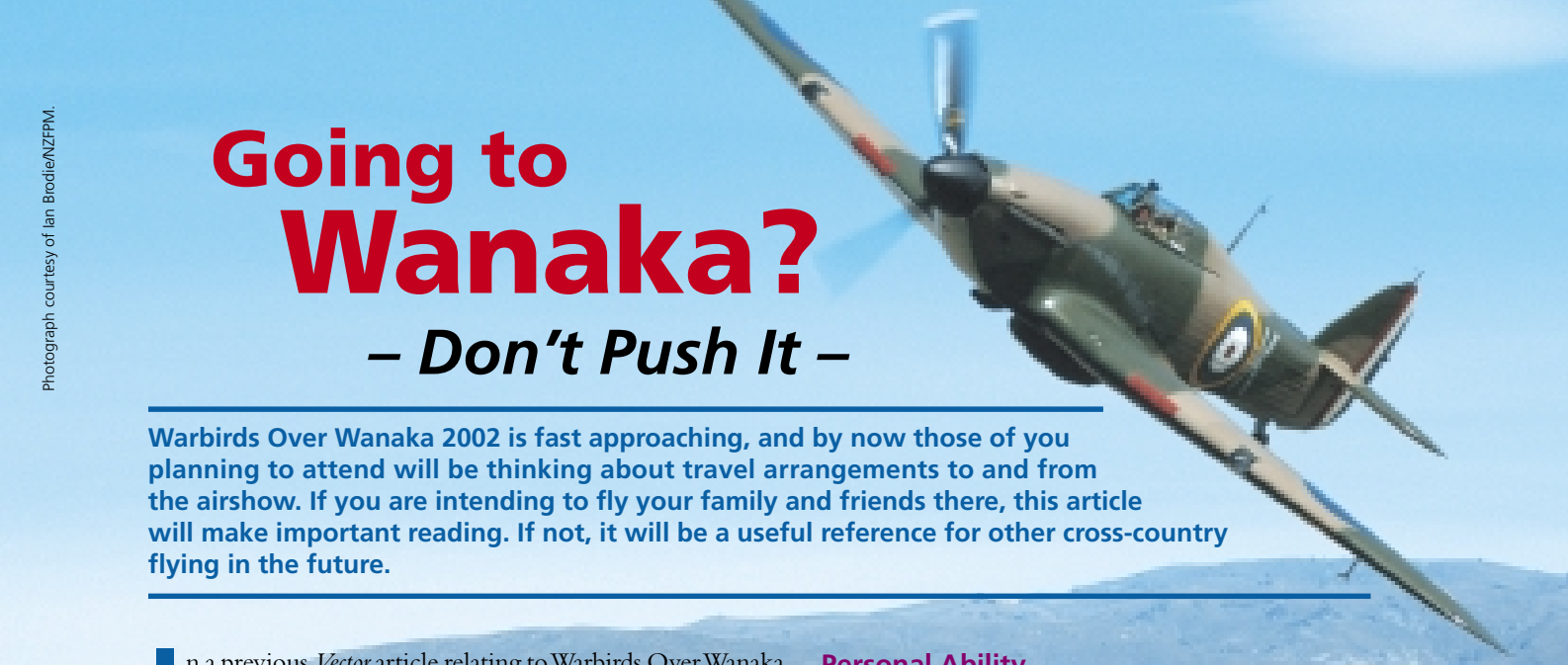
Cover photo:

A Hawker Hurricane Mk IIA, Supermarine Mk XVI Spitfire and a North American P-51D Mustang formate over the hills to the north of Wanaka Aerodrome. Photograph courtesy of Ian Brodie/NZFPM.



Photograph courtesy of Ian Brodie/NZFPM.

Going to Wanaka?

– Don't Push It –

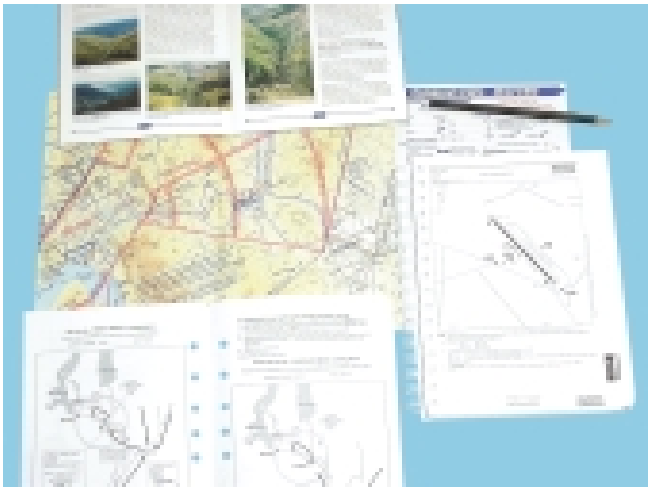
Warbirds Over Wanaka 2002 is fast approaching, and by now those of you planning to attend will be thinking about travel arrangements to and from the airshow. If you are intending to fly your family and friends there, this article will make important reading. If not, it will be a useful reference for other cross-country flying in the future.

In a previous *Vector* article relating to Warbirds Over Wanaka 2000, we reminded pilots intending to fly to the airshow of the need to be familiar with its associated AIP Supplement, have a full set of up-to-date charts, obtain a full NOTAM briefing, file a flight plan, etc. While all of these are important aspects of the flight planning process, they do not specifically address the areas where some pilots seem to be getting themselves into trouble – those of the pre-flight and in-flight decision making associated with making such a cross-country flight.

The Lindis Pass accident was tragic – but there were numerous other reported scud-running incidents, some of which could have easily resulted in serious accidents, highlighting the fact that sometimes pre-flight planning is not done properly and that crucial in-flight decisions are not being made at the appropriate times, if at all. There is certainly room for improvement among some pilots as far as this is concerned. We hope that this article makes you think about such key planning decisions before you head off to Wanaka this year, and that you apply the same advice to all the cross-country flying you do.

Initial Planning

Failing to thoroughly plan your flight well beforehand may mean you inadvertently set yourself up to fail in your goal of reaching your destination safely. Rather than leave too much to chance on the day, it makes more sense to remove as many of the external pressures as you possibly can well before the flight. These pressures include a perceived need to get there and back by specific times, or a fear of letting your passengers down. This section deals with removing some of those pressures.



Personal Ability

Before you even think about undertaking a flight to a destination like Wanaka, you need to decide whether or not such a trip is within your capabilities as a pilot. If you have limited mountain-flying experience, heading off into in an alpine environment like that surrounding Wanaka (complete with its own changeable weather system) is not always a good idea. It is essential to be completely honest with yourself about your level of experience and personal ability when making such a decision; don't let others talk you into undertaking a trip you don't feel comfortable with.

In making this decision, you need to set yourself some personal minimums that you will stick to. Doing so is not only important in these early stages of the pre-flight planning process, but also applies equally to making enroute decisions (covered later in the article). We suggest that you read the article "Personal Minimums" in the November/December 2000 issue of *Vector* to refresh your memory on how to develop a personal minimums checklist. Copies of the checklist can be obtained from your local flight-training organisation or a CAA Field Safety Adviser.

Contingencies

Before planning your route(s), it is vital that you put in place some contingency plans (eg, alternative travel arrangements, extra time off work, extra night's accommodation, etc) well before your intended departure. In this sense, it is important that you set a realistic time frame for the trip. This means adding a day or two either side of the airshow as contingency days – particularly to allow for the eventuality of inclement weather. It is also a good idea at this point to explain the limitations of travelling by light aircraft (particularly when VFR) to your passengers, and suggest that they too arrange a couple of extra days off. This will significantly reduce the pressure to get back home should the weather not cooperate, and therefore the chances of making a foolish decision to set off in marginal weather. While you may feel some pressure to get the aircraft back to the aero club by a certain date, or to be back at work on time, we will absolutely guarantee that the club would prefer to get the plane back one day late than not at all. The same should apply to your boss.

Similarly, arranging a couple of extra night's accommodation in the eventuality that you can't get back from Wanaka as planned is also advisable. If you are going to be staying with family or friends this should be easy, if not, things are a little

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more complex. At least know what options are available to you so that you can fall back on them if the weather deteriorates.

It is also a good idea to arrange an alternative means of getting to Wanaka in the event that the weather is poor but you still want to attend the airshow. Having a plan B, such as taking the car, does take the pressure off.

"Keep a close eye on what the weather is doing behind you, and always be sure that you have an out."

Note that, when it comes to planning your primary route to Wanaka, it is worthwhile making provision for at least one alternative route each way. The same level of consideration for terrain, weather patterns, fuel and airspace should be applied when planning these alternatives. This might involve talking to other pilots with experience of the area, or contacting a local operator to gather more information. There are a number of alternative routes that you should be aware of, which relate to the prevailing weather system affecting the area at the time (these are discussed next).

Picking a Route

If you are not totally familiar with flying in the south of the South Island, it is advisable to talk to another pilot before deciding what your primary route to and from Wanaka will be. There are a number of different options to choose from when coming south, depending on the prevailing weather system at the time. Essentially these are: down the centre of the Island via Burke Pass and Lindis Pass; down the West Coast and over the Haast Pass; and down the east coast to just south of Oamaru, inland to Alexandra, and up the Clutha River to Wanaka. The same routes are applicable when flying home again.

We strongly suggest that you prepare a full flight plan (this should include drawing the routes on your charts and completing a flight log card) for at least one alternative route in addition to the primary route that you have just planned. This avoids having to plan an alternative in haste if the weather is poor on the day and, in doing so, possibly overlook something important.

It was interesting to note that after Warbirds 2000 a number of pilots chose to head home via the Lindis Pass in marginal conditions when better alternative routes were available. If you are unsure which option to take for the conditions of the day, ask a pilot with experience of the area.

All flight-planned routes should take into account the weather system that is likely to prevail en route, forced landing options, refuelling stops, and airspace constraints. Poring over the charts noting the topographical layout (in particular the key valley and mountain range systems), spot heights, place names, airspace structure and general lie of the land is always going to be time well spent.

Refuelling Options

A significant percentage of pilots flying to and from Wanaka will have large distances to cover and consequently will probably need to make a fuel stop. It is therefore important to check that the aerodrome you choose has the correct brand of fuel available for your aircraft's fuel card. The importance of meticulous fuel management on such long cross-country flights cannot be stressed enough – please don't cut it fine.

The chosen refuelling aerodrome should preferably be one that has an aero club, at which you can get help with weather interpretation and alternative routes if so required – aero club staff are always happy to help and are an excellent source of useful enroute information.

A fuel stop is also a good way to give you and your passengers a much-needed break on a long flight – it is also important that your concentration levels are at a peak towards the end of the flight, especially when it comes to following the arrival procedures at Wanaka.

Studying the AIP

Having finalised your primary and alternative routes, you now need to study the special AIP *Supplement* for Wanaka (AIRAC 02/2 effective 21 February 2002) and the Wanaka operational data pages in the VFG.

Particular attention must be given to understanding the Restricted Area, Control Zone, arrival/departure procedures, traffic flow control procedures, and flight planning requirements associated with the airshow. If for some reason you do not have access to a copy of the *Supplement*, it can be viewed on the IFIS web site (www.ifis.airways.co.nz) by clicking on **Publications/Documents Available Online.** Other information relating to the airshow can also be found in the same menu screen by clicking on **Special Events**, which contains some useful links to Warbirds-related websites.

The light aircraft park at Warbirds Over Wanaka 2000.

Photo courtesy of the Alpine Fighter Collection.

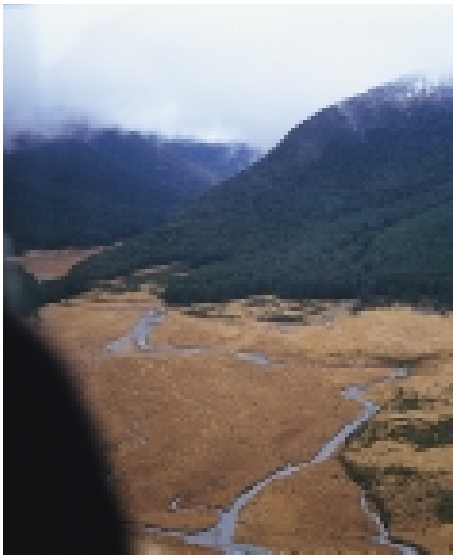
Remember to carry a copy of the *Supplement* with you in the aircraft for further reference when flying in and out of Wanaka.

Also ensure that you have a full complement of up-to-date charts (this must include the Queenstown/Milford VTC and Topographical Sheet 4) and a current VFG on board – they are now significantly (about 40 percent) cheaper, so there is no excuse for not having them. A number of pilots have turned up at previous Wanaka airshows with out-of-date charts and VFGs – in some cases with no aviation charts, VFG or AIP *Supplement* at all. This is a situation that we would not like to see repeated.

For those planning scenic flights in the local area (ie, Mt Cook, Milford and Queenstown), thoroughly study the associated traffic-flow, radio, and airspace procedures in the VFG well beforehand. Traffic densities in these areas can be considerable, and the risk of a mid-air collision very real – know the local procedures **before** taking to the air.

Survival Equipment

Being prepared with a basic survival kit, life jackets, cellphone, extra food and water, warm clothing and sturdy footwear is a must when operating in the south of the South Island – even over summer. Be sure to organise these items (and a set of pickets) well in advance of the flight, and let your passengers know what they need to bring in this regard.



Final Planning

Weather Interpretation

The most up-to-date weather must be obtained immediately prior to the flight and carefully interpreted in relation to your primary route. If the reported and forecast weather conditions along this route are borderline, and you are having difficulty forming a mental picture of how they might affect your flight, ask someone who has more experience to help you. It might also be prudent to call a local operator to gauge their assessment of the enroute weather conditions too – one call could save a lot of time, and possibly lives. If the conditions look doubtful, the pre-planned alternative routes should be considered.

A comparison between the forecast conditions and your personal minimums for whichever route looks the most promising should be made at this point. If the conditions are outside of your minimums, or you simply feel uncomfortable with proceeding, then it's time to fall back on your contingency plans – ie, try again the next day or find some alternative mode of transport. It takes discipline to do this, but you **must** for safety's sake. The decision to delay or cancel your flight is, however, made far easier by having such contingency plans in place.

NOTAMs

If you are proceeding with the flight, don't forget to obtain the latest enroute and destination NOTAMs and read them carefully. Any procedural changes relating to the airshow will be notified by NOTAM.

File a Flight Plan

Every pilot should file a flight plan prior to commencing a cross-country flight (especially when flying to and from an area like Wanaka). This will maximise their chances of being found should something go wrong. VFR flight plans can now be filed quickly and easily over Airways' Internet site at a very reasonable price (as low as $3.60). This is a great service so there is no excuse for not using it. Flight plans can still be phoned or faxed to the National Briefing Office for $6.50 if you do not have access to the Internet. Refer to the previous issue of *Vector* for details on how to file a VFR flight plan over the Internet.

In-Flight Decision Making

Even with the best of planning, you may encounter significantly different conditions en route than those forecast. Being faced with the unexpected certainly does test your judgement and self-discipline as a pilot. But, because you have made contingency plans, you are not under as much pressure to reach your destination, and the decision to divert or turn back is made much easier.

If conditions do start to become marginal en route, or you become concerned about any other factor (eg, fuel, aircraft performance, navigation, etc) **do not**, whatever you do, press on in the hope that things will improve – chances are they will not. It is important that you seek assistance from Christchurch Information or another aircraft at this point, stating your position and the nature of the problem – such a call might just turn out to be a life saver. The decision to divert or turn back must be made as early as possible here – decisive pilot-in-command action is a must.

Keep a close eye on what the weather is doing behind you, and **always** be sure that you have an out. If, despite your best efforts, the weather does start to close in around you, slow the aircraft to the bad-weather configuration and give serious consideration to making a precautionary landing. It may be the most prudent thing to do in such circumstances – a decision that could save the lives of you and your passengers. They will see you as a hero, not a failure.

Arriving at Wanaka

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.

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Summary

Flying to and from the airshow at Wanaka should never be undertaken lightly – especially if you don't have much mountain flying experience and have not flown into a large aviation event like Warbirds over Wanaka before. Remember, the weather in the area can be highly variable, and the terrain very unforgiving, with few forced landing opportunities. It is for these reasons, and the fact that detailed arrival and departure procedures will be in place at Wanaka, that you plan your flight thoroughly by following the advice outlined in this article.

Should you be unlucky enough to encounter an unexpected deterioration in the weather en route, then **please** think 'turn back, divert or precautionary landing' and **not** 'press on' – people will always admire you more for making safe decisions rather than ones involving 'pressing on'. Stick to your personal minimums, and don't let yourself become a casualty of 'get-there-itis'.

Fly safe this summer and enjoy your trip to Wanaka for what should be a fantastic airshow. ■

Photograph courtesy of Ian Brodie/NZFPM.

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.

Oshkosh and Wanaka

In the September-October 2001 issue, we drew a parallel between Warbirds Over Wanaka and the annual Experimental Aircraft Association gathering held at Oshkosh, Wisconsin, USA.

Although Oshkosh is on a larger scale, both are events that pilots make a special effort to get to, with many flying there in their own or hired aircraft. Both have special arrival and departure procedures that pilots must be aware of and comply with. It is equally important that pilots apply a high degree of airmanship and basic flying skills while en route – and particularly during their arrival and departure.

There were several accidents, some fatal, associated with the last Oshkosh event, and Rick Durden, a columnist for AVweb, lost a friend in one of them. He wrote a heartfelt plea to all pilots in an article entitled "Yes, Pogo, the Enemy is Us" in AVweb's *The Pilot's Lounge* series, No 38. Here is an extract from the summary, but we recommend that you read the whole article before heading off to Wanaka. You will find it at www.avweb.com under **Articles**, then **Columns** (direct link http://www.avweb.com/articles/lounge/tpl0038.html).

Here's the extract:

"This is Oshkosh. It is a special, almost sacred place to aviators. On top of that it is extremely visible to the public (far more people drive in than fly in). Each and every one of us has an extra duty and responsibility when we fly in to OSH to do so with our skill levels high enough to meet the demands, and having read the stuff one has to read to arrive and depart. Our errors are magnified. Our accidents at OSH are discussed endlessly. Our stupid pilot tricks are in front of everyone in aviation. At Oshkosh we are not just responsible for the safety of ourselves and our passengers, we have a duty to aviation and every single person who cares deeply for it. Right now, we are letting aviation down, and we are at risk of having to pay a serious price."

"Ben, I miss you. The sight of that funeral pyre of smoke over your airplane is going to be with me until I die. … right now, your death has caused me to finally express some of the deep anger I feel over pilots who continue to screw things up for the rest of us. If that means that just one more pilot next year reads the NOTAM, or takes some dual before coming to OSH or does an honest self-assessment and decides to drive in, and saves one life, then your death is going to make a difference to people you never knew, just as your life made a difference to a lot of people who knew you."

Importance of trip:

The more important the trip, the more tendency there is to compromise your personal minimums, and the more important it becomes to have alternative plans.

Don't forget to terminate your flight plan!

Rotor Blade Care

What sort of condition are your helicopter's rotor blades in? When was the last time that you thoroughly inspected them for corrosion and general damage?

The reason we ask is that the CAA has recently received several defect reports indicating that rotor blade corrosion continues to be a problem. Such corrosion is being caused by water and other contaminates (eg, salt, chemical sprays, and dirt) being driven through minute holes in the rotor blade's leading edge abrasion strip, and then progressing outboard due to centrifugal force as the rotor is turning. The trapped moisture then causes the blade's super-thin skin (less than 0.025 inch in many cases) to corrode and de-bond from its core structure.

A number of blades, mostly off Schweizer 300 and Hughes 500 helicopters, have had to be scrapped due to severe corrosion caused in this manner. Had these blades been inspected more regularly and, at the first sign of corrosion, referred to a rotor blade repair facility, a repair probably would have prevented them from being scrapped so early in their useful life. In fact, around 80 percent of blades are scrapped due to corrosion before the end of their useful life. (A set of Hughes 500D and Schweizer 300 blades cost around $117,500 and $105,000 each respectively.)

On-going rotor blade care and regular pre-flight inspections between each 100-hour inspection will not only significantly reduce the likelihood of corrosion developing in the first place, but also will mean that the problem can be referred for repair **before** it becomes too serious. Regularly waxing or rubbing the blades down with a CRC or WD40 soaked rag after every day's flying will help prevent water and other contaminants from getting under the leading edge abrasion strips and causing corrosion.

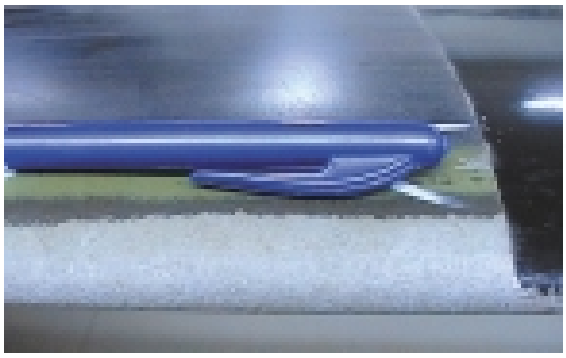
Because it can sometimes be a considerable number of months between 100-hour inspections, a thorough daily pre-flight inspection of the rotor blades by the pilot for signs of corrosion or other damage (eg, nicks, dents, cracks, and leading edge erosion) is essential preventive maintenance. A stepladder should always be to hand to permit such a close inspection – an inspection while standing on the ground is **not** sufficient.

The first signs of corrosion, however, can be difficult to spot, because they are often hidden behind the leading edge abrasion strip. Corrosion will usually be denoted by a slight blistering of the paint adjacent to the abrasion strip, which is an indication that there is moisture trapped behind it. This sort of blistering, or any other suspect-looking nicks or cracks, should be referred to an appropriately qualified LAME **before** the helicopter is flown again.

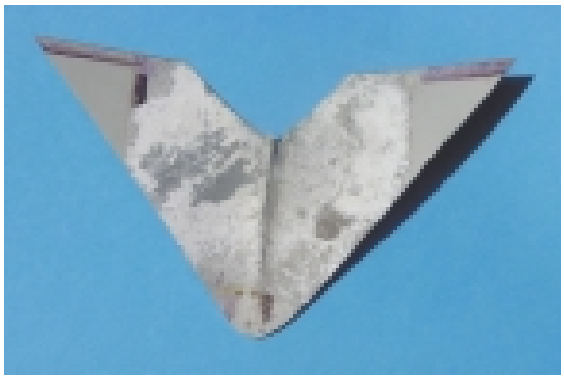
If your LAME is not readily to hand, an easy way to do this is to email them a digital photograph of the suspect area, which includes a suitably sized reference scale (eg, a coin or a pen). (If you don't have access to a digital camera, an alternative method is to take a conventional photograph and get a colour bureau to scan the print and download it to a disk, the files of which can then be emailed.) Your LAME should then be able to quickly give you an indication as to whether further action is required – you would be surprised what can be determined in this way – and it ensures peace of mind.

If the damage is determined by the LAME to be serviceable, mark it with indelible pen or paint dots for future reference – that way any changes can easily be detected over time.

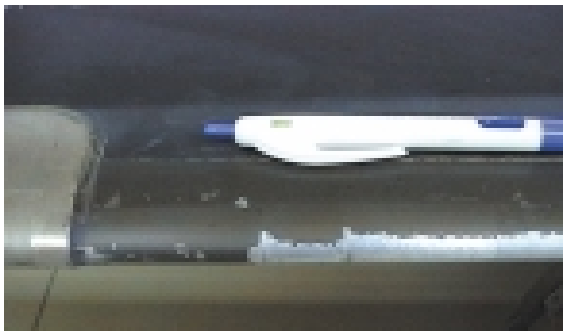
Protecting your helicopter's rotor blades from contaminants, regularly inspecting them, and referring any suspect areas to an appropriately qualified LAME, not only make good economic sense, but also could mean that an entirely preventable accident is averted. ■



An example of excessive corrosion of a blade that has done many hours of work. This blade will require refinishing with a good quality primer and top coat system and the application of a leading-edge abrasion strip.



Severe internal rotor blade corrosion.



An example of the 'notch effect' caused at the inboard end of a stainless steel leading-edge abrasion strip. Each time the abrasion strip is replaced, it should be started at a different place on the blade to preclude the leading edge eroding through.

An example of a rotor blade with little leading edge wear for comparative purposes.

Photographs courtesy of Jeremy Davies, Wing and Rotor Aviation Ltd.

Bad Weather Ahead? – Turn Back

— Pressures, Good Intentions, and Mind-sets... —

This article was contributed by John Nicolson, a well-known microlight and glider pilot with a keen interest in safety issues. His thoughts illustrate how a study of accident scenarios (via safety seminars or reading) can help to extend our knowledge and understanding and hopefully assist us in making better weather-related decisions.

Bad-weather flying or scud-running in conditions below VFR minima is as bad and as risky as it can get. Bad weather and restricted visibility is an unsafe condition. To attempt passage in these circumstances is an unsafe act. Personal pressures, the downstream effect of obligations and/or self-imposed commitments, abandoned good intentions, and mind-sets together are potentially deadly components when associated with bad-weather flying. The existence of pressure gives rise to distractions, and who needs distractions when everything in our favour as pilots is already against us!

Much has been written about the woes of penetrating bad weather, though despite excellent on-going advice, controlled flight into terrain (CFIT) continues to claim the lives of many unsuspecting VFR aviators. A poignant article, "Pushing the Limits" (*Vector* 1999, Issue 2), reminds us of the need to be wary of bad weather and 'go, no-go' pressures. "The pressure to get to a destination can be great – as can the pressures exerted by passengers. It is essential that these pressures are resisted and that the decision on whether or not to continue is based solely on safety..."

"It is too simplistic to consider the cause of these and other accidents to be just a case of random pilot error."

Back in 1997, I attended a thought-provoking AeroKiwi Flight Safety Seminar conducted by the CAA, which focused on pilot pressures and the inherent tendency to form a 'must-go' mind-set. The given case study involved an actual air crash in which the pilot of a Cessna 185 was attempting to navigate his aircraft through a narrow mountain pass in seemingly appalling weather and limited visibility. The big Cessna collided with the ground at the top of the pass while flying straight and level, and all on board were tragically killed. Background information included the fact that the pilot had discussed the marginal on-track weather with another pilot during his pre-flight preparation. It was decided that he would return to the airfield if the situation aloft further deteriorated. Our study group also noted that the aircraft was to be back at its base by a certain time, and that a passenger was required to be home by a certain time.

A more recent accident, with reasonably similar causal factors, occurred in April 2000. In this case, the pilot of a Cessna 206 and his five passengers set off on a late-morning flight from Central Otago to the lower North Island. The proposed time of their departure had been delayed by about three hours because of poor weather conditions en route. Although local weather conditions had improved with time, the weather over a section of the pilot's planned outbound route – the area of the accident site – remained in question, and accordingly the pilot made it known that he would reassess the situation once airborne. The Cessna, configured for bad weather, was seen by witnesses to be transiting low-level overhead a main highway via a mountain pass in drizzle and low misty cloud. The aircraft's progress was eventually impeded by an impassable situation of valley cloud, whereupon the pilot initiated a reversal turn. The aircraft crashed into the ground during the turn and, sadly, there were no survivors among those on board.

In June of 1999, a microlight pilot – flying a Kolb Mk2 – set out on a 127-mile cross-country flight down the middle of the North Island. The on-track weather with regards to visibility was not a problem, but it was very windy. At about 25 miles from his destination, the pilot made a fuel stop. The local microlight club president approached the pilot and told him of his serious concerns about continuing the flight due to the very gusty northwesterly winds.

The possibility of extreme mechanical turbulence in the lee of the hills on track was also discussed by the two men. The pilot

commented in reply that he had already been "thrown about" and indicated that he "would give it go and turn around if it got too bad." On takeoff, the club president noticed that the pilot was having trouble controlling the engine revs due to the turbulence. A witness soon after saw the aircraft in flight and reported that it was being "tossed around" in the high winds, said to be gusting upwards of 30 to 40 knots. When nearing its destination, the microlight's left wing rear pivoting attachment failed, and consequently the wing became completely detached from the aircraft in flight. The pilot was killed in the ensuing ground impact.

It is appropriate to note in this instance, that while strong winds were most certainly a large contributing factor, accident investigators found that the left wing's rear pivoting attachment had failed "through overload or low cycle fatigue in tension." In particular, the weld site at the point of failure was closely examined and was reported to be of "exceptionally poor quality, and that the load required to cause failure would have been significantly less than one third of that required for a good weld."

"A plane passes beneath the light-quenching cloud
So low and so fast
Insistent as it flies
But what of the pilot, his interesting past
I will never know –
Least not he crashes and tragically dies."

by John Nicholson 2001

It is too simplistic to consider the cause of these and other accidents to be just a case of random pilot error. We must also look at the surrounding circumstances in each of these tragic accidents. There was a lot going on in the events leading up to the point of impact – the least of which being the human factors and succession of demanding complexities that might well have been beyond the individual pilot's ability to both recognise and respond to. The possibility of personal pressures, the development of a mind-set and a failure to remain within the proposed good intentions, were very much apparent as part of the accident's causal chain in my opinion.

So what is the headstrong driving force that urges us on in an attempt to penetrate poor weather conditions when the odds are knowingly against us? A short answer discloses perhaps a hint of desperation, not detected by the usually very dependable pilot, as it quietly erodes the approving values of common sense.

The requirement for sound weather-related judgment, stemming from the need to make intelligent aeronautical decisions, is unfortunately letting some pilots down. Why? Tony Wilson, ATPL and Human Factors consultant, maintains that pilot experience with regards to the decision-making processes is not reliable in itself. "It might be expected that novices would be involved in more accidents than more experienced pilots", he writes. "When handling errors are involved, this is true, but when it is a matter of judgment and decision-making, the figures show that the higher-time pilot does little better than the less experienced fellow."

Mr Wilson's comment in general makes a whole lot of sense to me – anyone is capable of making a bad judgment call, and more so perchance when the chips are down. But there are other authoritative findings on this very subject that are not entirely in harmony with Tony Wilson's views. In 1996, a report was released by Dr David O'Hare of the Otago University and his colleague, Dr Mark Wiggins (University of Newcastle) on an experiment in which a cross-section of NZGA pilots were put through a decision-making test in a controlled VFR cross-country environment. They found that when confronted by a weather-related decision, "Experienced pilots (+1000 hours) were much quicker at making decisions on all of the model's variables. They accessed the information screens less, made fewer information recursions, and spent less time examining the information screens than the inexperienced pilots."

Dr O'Hare went on to report that, "Inexperienced pilots (Novice, 2 to 100 hours and Intermediate, 101 to 1000 hours) also responded much slower when selecting from a forced choice whether to continue to the destination or return to the point of takeoff." Furthermore, it was established in the study that "Inexperienced pilots have greater difficulty formulating an appropriate decision strategy during limited time frames..."

Whatever your camp, pilots have to think smarter. Recognising that dubious weather ahead is a problem (a big problem!) is a good place to start. Knowing the difference between right and wrong, safe and unsafe is also a giant step in the right direction, and it's not a big ask. Having achievable options or alternatives and the ability and knowledge to anticipate bad outcomes are equally tried and true safeguards, as is taking into special consideration the consequences of your actions. As an aside, it's worth noting that, in order to anticipate a potential, likely or probable state of affairs, you have to have knowledge – without the appropriate knowledge you cannot anticipate! The greater the knowledge, therefore, the greater will be the accuracy (and safety) of an anticipated outcome.

In summary then. Good intentions can be directly affected in one way or the other by pressures and the sequential progression of mind-sets. It has to be remembered that, for the most part, good pre-flight intentions are (or should be) created without duress, in the relative calm of the moment and are therefore pretty reliable. Good intentions ordinarily form the basis of our flight safety management contingencies. But good intentions are like plasticine – they can be easily moulded into any shape or profile to fit any situation at any given time, especially when in flight!

By the way. Have you ever heard this line? "With a little bit of luck, I'll be able to get through now." Dodgy! The only pilots who think success is a result of luck are the unsuccessful ones. Trust me on this!

Vector Comment

Pilots do not deliberately set out to have accidents. This article has provided one explanation of how otherwise cautious and qualified pilots have found themselves in situations beyond their control or ability. Some rules to bear in mind are:

- Make your key flight-planning decisions and set your limits when on the ground before the flight, where there is plenty of time to think about all the issues.
- Set and adhere to your personal minimums. If conditions unexpectedly deteriorate en route, turn back well before your minimums are breached.
- Never allow external factors, such as time pressures or passengers, to affect your decision to continue a flight or not – it's better to wait for another day and be late than it is to 'press on' and be dead on time. ■

To Fly or Not to Fly?

The CAA is concerned that too many aircraft operators are not aware of their responsibilities when it comes to ensuring their aircraft's airworthiness.

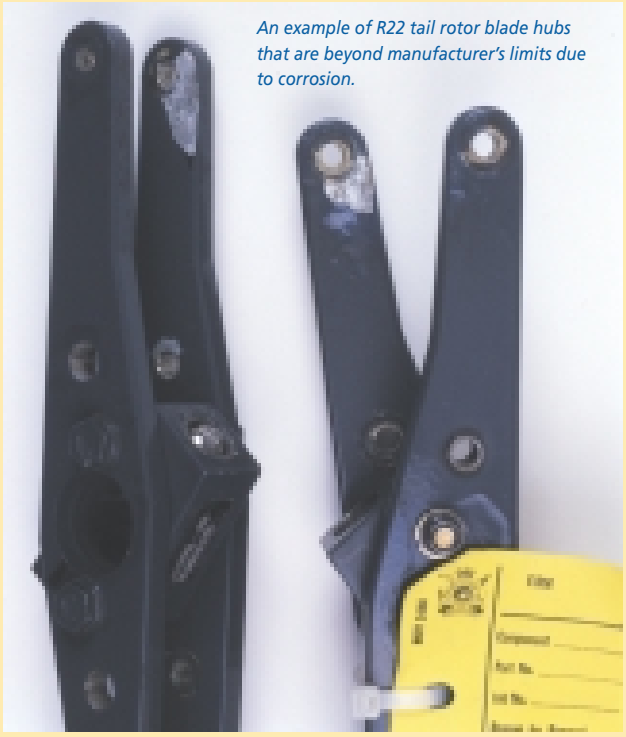
Civil Aviation rule 91.603 *General maintenance requirements* states, among other things, that: "The operator of an aircraft shall ensure that … the aircraft is maintained in an airworthy condition …"

A number of operators are under the misconception that their LAME is responsible for the airworthiness of their aircraft – wrong! It is, in fact, the operator. The operator must ensure that all necessary maintenance to keep the aircraft in an airworthy condition under CAR Part 91 *General Operating and Flight Rules* is carried out. The LAME is responsible only for performing the maintenance under Part 43 *General Maintenance Rules*.

An airworthy condition is defined as "…the condition of an aircraft, including its components, fuel, and other materials and substances essential to manufacture and operation of the aircraft, that complies with all the requirements prescribed by the Civil Aviation Rules relating to design, manufacture, maintenance, modification, repair and safety."

So what happens when a defect or discrepancy occurs? The operator, being the responsible party, needs to be familiar with rule 91.603(5), which requires them to ensure that: "…discrepancies are repaired between inspections required by the Maintenance Programme under which the aircraft is maintained." There are no ifs and buts here. If a defect or discrepancy occurs you **must** get it fixed before the aircraft is flown again.

There are, however, some exceptions to this rule. Rules 91.603(6) and 91.537 allow an aircraft to continue operating with inoperative instruments and equipment, provided that they are specifically covered by the Minimum Equipment List (if so approved) and are repaired or replaced within the specified time limits.



An example of R22 tail rotor blade hubs that are beyond manufacturer's limits due to corrosion.

If the aircraft does not have an approved Minimum Equipment List (MEL), and it does not exceed 5700 kgs MCTOW, you may operate with inoperative instruments and equipment provided that they are not:

- part of the VFR day certificated instruments and equipment prescribed in the applicable airworthiness requirements under which the aircraft was type certificated; or
- required by CAR Part 91 Subpart F Instrument and Equipment Requirements for specific operations; or
- required by an Airworthiness Directive to be in operable condition.

It is important to remember that this rule also requires any inoperative instruments and equipment to be placarded "Inoperative" and recorded as a "Maintenance Action" in the aircraft Technical Log or Maintenance Logbook.

What about defects or discrepancies other than instruments or equipment? Again, the operator is required to ensure the aircraft is maintained in an "Airworthy Condition". More specifically, rule 43.53(a)(10) *Performance of maintenance* requires the LAME performing the maintenance to:

"…on the completion of maintenance, ensure that the condition of the aircraft or component is satisfactory for 'Release to Service' and is at least equal to its original or properly modified condition with regard to:

(i) aerodynamic function; and

(ii) structural strength; and

(iii) resistance to vibration and deterioration; and

(iv) other qualities affecting airworthiness."

In other words, before a LAME can release an aircraft to service after maintenance, he or she must assess any defects or discrepancies against the above rule. The LAME has several tools available to make such an assessment, the most common being the Manufacturer's Maintenance Manual, the Structural Repair Manual, and FAA Advisory Circular 43.13-1B. Defects or discrepancies should then be reassessed at each scheduled inspection until such time as they have been repaired or replaced.

When releasing an aircraft to service, the LAME needs to state in its Technical Log or Maintenance Logbook that the defects or discrepancies have been assessed in accordance with an "Acceptable Standard" and that the aircraft is "Released to Service".

Another area that often causes operators confusion is when an Annual Review of Airworthiness (ARA) turns up one or more defects or discrepancies. If this is the case, all of the criteria outlined above apply. In other words, the aircraft cannot be considered airworthy and should **not** be flown until such time as the defects or discrepancies have been repaired or appropriately deferred. ■

West Melton Danger Area

Danger Area NZD827 (army firing range) lies just to the west of West Melton aerodrome. It is designated permanently active.

There have been a number of incidents of aircraft flying through the area when live firing exercises were taking place. The upper limit of the danger area is 1350 feet amsl, so aircraft joining overhead the airfield (at 1500 ft amsl) are above it, but aircraft in the circuit (at 1100 amsl) can easily be in danger. (The circuit and joining heights for West Melton are non-standard because of controlled airspace above 1500 feet.)

You are permitted to enter a danger area, but only after assessing that the nature of the activity within it will not affect the safety of your aircraft. In the case of military operations, such as firing, very few of us have the knowledge to make such a judgement – the safe option is to avoid the area, rather than risk finding out the hard way that your assessment was faulty.

"There have been a number of incidents of aircraft flying through the area when live firing exercises were taking place."

The West Melton Range can have a number of activities including grenade firing, demolitions practice and rifle firing. A few years ago a new rifle firing range comprising a 300-metre and a 600-metre range was established in the southeast corner of the danger area. This is now the most frequently used part of the range, and it is the portion closest to the aerodrome. It is this area and activity that is of most concern.

When the rifle firing range is in use, a modified circuit is necessary to remain clear of the area when using Runway 04. If a normal circuit is flown when this range is active, aircraft on base leg are directly in the line of fire. Care must also be taken when taking off from Runway 22 – it may be necessary to turn early to avoid entering the danger area and flying directly over the rifle range. The circuits for Runways 35 and 29 remain clear of the danger area if a reasonably tight circuit is flown.

The aerodrome operator (Canterbury Aero Club) and the NZ Army have been working together to implement measures to reduce the number of incursions into the danger area.

The Aero Club is taking action to raise pilots' awareness of the close proximity of the danger area to the airfield by adding a "caution" note and illustration to the West Melton aerodrome chart (in VFG Change Notice effective 21 March 2002).

In the past it has been difficult to identify whether the area is in use or not. Red flags have been flown when the rifle range at the southern end of the danger area is active, but these are not easily seen from an aircraft until you are close enough to be in the danger area. The NZ Army now display large orange markers when firing is in progress. A large (2 m x 2 m) fluorescent orange board is displayed on the top of the bullet catcher at the end of each of the 300-metre and 600-metre ranges. An orange flag is flown beside each board. There may be one or both sets of markers displayed, depending on the degree of activity. The orange marker(s) can be seen from some distance away, particularly if you are alerted to look for it.

The separate ranges stand out reasonably well in this photograph, but may not be so distinct at other times of the year. The active range is the one on the left in this view (the 600-metre range, which is closest to the aerodrome). Note the marker and orange flag at the bottom right of this range.

In these somewhat uncertain times, there is likely to be increased activity in army training exercises. The Canterbury Aero Club is taking the stance of assuming continuous activity, and their pilots are trained to fly modified circuits to avoid the area.

The aerodrome is available to other light aircraft as approved by the Canterbury Aero Club. If you have been approved to use the aerodrome, please refresh your knowledge of the aerodrome chart and the adjacent danger area, and ensure that you remain clear of the danger area when it is active.

It is important to always carry out an overhead rejoin (this is at 1500 feet amsl for West Melton due to the TMA above). At 1500 feet you are above the upper limit of the danger area and can have a good look around to ascertain whether the area is active before descending to join the circuit.

There is another danger area further west, NZD829, active daylight hours, which is used by the Canterbury Model Aero Club. The Club has expressed concern that aircraft have flown through this area at low level when model aircraft have been flying. Their area has an upper limit of 1350 feet also. Although model aircraft may not appear to be as lethal as army ammunition, a collision with a modern-generation larger model aircraft could be equally as damaging.

Take note of both these danger areas when flying in the vicinity of West Melton aerodrome, and avoid them as appropriate. ■

The West Melton Aerodrome cautionary note. Diagram courtesy of Aviation Publishing.

Further Ways To Hurt Your Aircraft

Previous *Vector* articles have looked at ways in which the airframe and engine of an aircraft can be damaged. This article continues that theme by considering ancillary aircraft systems. Most of the points discussed are common sense and have automotive analogies, but some may not have been brought to your attention.

Electrical Systems

These would be the most ubiquitous of ancillary systems. Few aircraft don't have one – even those without engines. Most electrical systems have one (or more) generators, a battery, some form of regulating system, and a number of services or equipment, sometimes fed from a common source or 'bus'.

The component that requires the most care and attention is the same as the one that causes the most problems in your car – the battery. These have a finite life, normally measured in years. Modern gell-cell or sealed batteries need little by way of direct care, but their lifespan can be significantly extended by appropriate use. Batteries should be regularly exercised, that is charged and discharged. The worst thing you can do is let a battery sit for a long time. As well as causing potential problems within the battery, if you let it sit for a while, it will start to lose its charge. When you do finally get around to starting the engine, the lower charge may make it harder to get the engine started. Prolonged cranking will lead to a higher discharge rate, and then when the engine finally bursts into life, there will be a high charge rate. All of this may cause excessive current and strain on the battery, generator and regulating system. Regular cycles of start and charge are the best way of avoiding this. If you recall the article on engines, you will remember that they also need regular running to keep the oil circulating and corrosion at bay, so the message is clear. Start and run your aircraft regularly!

On the subject of starting, most aircraft have a time limit or duty cycle that limits the amount of time that you can crank a recalcitrant engine. The current that flows, and the resulting heat that is generated during a start, is the heaviest load that the electrical system will normally bear. Damage can occur if these time limits are exceeded. The aircraft Flight Manual will specify any particular limits for your aircraft. A properly maintained and primed engine should start easily, so if you do find it necessary to crank for an excessive period of time before the engine fires, have the engine checked or get an instructor to look at your starting technique.

Similar time or duty limits may apply to other high-demand electrical loads, such as electrically driven landing gear or flap extension and retraction mechanisms. These are commonly found on more sophisticated aircraft. Again, the Flight Manual will specify any particular limits.

The electrical component next most likely to cause you problems is lighting. Like batteries, light bulbs have a finite life, and their occasional replacement can be expected. In particular, landing lights have a nasty habit of breaking their very hot filaments if they get jolted excessively while running. Prolonged taxiing over rough ground with the landing light on is one way to do this, and should be avoided where it is safe and prudent to do so. Excessive cycling of these lights (ON– OFF – ON) is another way to reduce their life.

Modern avionics are remarkably robust and trouble free – maybe that explains their price tag! There are, however, a few things they don't like though. These include excessive temperatures

and sitting at one setting for too long. Excessive cockpit temperatures are not uncommon in aircraft left outside in the summer sun with no suitable cover and shade. Prolonged high cockpit temperatures can damage avionics, as well as causing general deterioration of the aircraft interior and upholstery. They can also be a flight safety hazard for the pilot who then gets in and flies, due to possible heat stress and dehydration, but that is a different issue. If you can't hangar your aircraft, cover it. If you can't cover or shade it, consider parking it in such an orientation that direct sunlight on canopies and windscreens is minimised. Where possible ventilate the aircraft to keep temperatures down.

Avionics don't like having switches left in the same position all the time, particularly volume and squelch rheostats. It is a good idea to periodically change frequencies and volume settings, just to make sure that the switches don't bed in (modern avionics often use synthetic devices to change frequencies and are not a problem).

Avionics can also be damaged by voltage spikes. These can be caused as generators or inverters are switched on, or come on line after start. It is therefore a good idea to have avionics off during start and only turn them on once the electrical system is up and running.

Hydraulic and Pneumatic Systems

Discussion with engineers indicates that there is not too much that pilots can do to damage these systems if they are operated normally. Avoid excessive cycling of systems, and as a rule, don't reverse a cycle once started, except in emergency. It is best to let the system move to the selected position (say gear down) before reversing the cycle, otherwise damage to jacks caused by pressure spikes may occur. In some aircraft with retractable landing gear it is recommended that brakes should not be checked unless the gear is locked down, due to possible problems with brake lines being bent into unusual positions. Pilots should be vigilant for leaks, and if checking fluid levels be very cautious about allowing contamination to enter working fluids. Contamination is almost certain to cause system damage of some sort.

Airsickness

This might sound like a funny way of hurting your aircraft, but one of the possible consequences of airsickness is an involuntary up-chuck. Bad enough if caught in a bag, but even worse if it gets on the upholstery, instruments or into the electrics. The digestive juices that can get sprayed around are highly acidic and can do real damage, or even cause an electrical short circuit, not to mention creating that smell we know so well. Clean them off as soon as possible, or better yet make sure they don't get out in the first place!

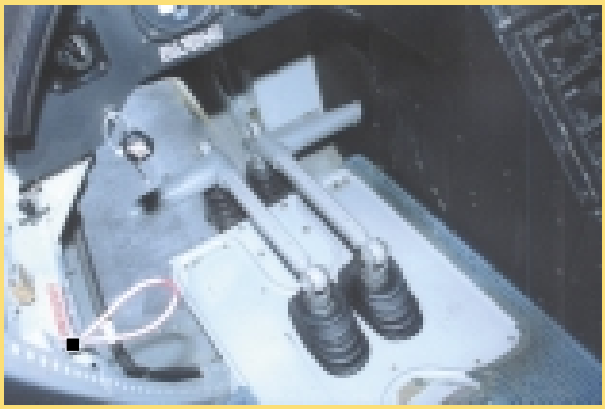
Summary

If you wouldn't do it to your car, you shouldn't do it to your aircraft. Like cars, aircraft need regular running, regular cleaning and maintenance, and should always be operated well within their limits. This means knowing your aircraft and its limits (reading the Flight Manual is a good place to start). It also means spending enough time flying, cleaning and generally looking after your aircraft so that any change (eg, fluid consumption, excessive leakage, and higher-than-normal charge rates) can be more readily spotted before they cause serious damage. ■

Safety Placards

Two BK117 operators recently found that the installation of a dual-pedal cover (designed to protect the yaw pedals from inadvertent interference by a passenger's feet) can limit pedal travel if they are not installed in a particular way. Fortunately, the problem was discovered without any adverse consequences.

The covers are normally supplied with a placard in either English or Japanese, which reads "Caution: Make sure both pedals are fixed in the forward most position before the cover is installed". These particular helicopters had previously been registered and operated in Japan, and thus were fitted with the Japanese placard. There is unfortunately no reference in the helicopter Flight Manual to the installation of the pedal cover, meaning that more far-reaching enquiries had to be made in order to determine what the placard meant.



The passenger-side yaw pedals of the BK117 involved in one of the incidents.

The CAA was alerted to the problem, and a letter was sent to all BK117 operators advising them to ensure that all pedal covers carry the appropriate placard and that their pilots be made aware of the problem.

These incidents could have easily resulted in a serious accident. They highlight the need to be careful with the use of aircraft placards – they are there for a reason and should never be ignored. We strongly advise that if any doubt exists as to the intent of a placard, then its purpose be verified as soon as possible, no matter what the aircraft type.

The same yaw pedals with the dual-pedal cover installed.

Joining Standards

The longer days and summer weather encourage more pilots to get into the air. Many of you will be based at an unattended aerodrome or will operate into one at some stage in the coming months.

Take a little time to ponder on the correct joining procedures. Some of you (particularly if your base aerodrome is unattended) will be saying – "I know all that, I'm quite familiar with the procedures, and I can get in and out of my aerodrome pretty quickly and efficiently."

In that case, you have even more responsibility to 'do it right'. Experienced pilots need to be role models. You may be tempted to make that quick non-standard approach that you judge to be quite safe – but pause and think about the less experienced pilot on the ground watching (and wondering), or in the air being startled and confused by your lapse in procedure.

Experienced pilots tend to forget the low level of experience that may be operating around them (and how it felt back at that stage). A surprise or non-standard arrival of traffic to an inexperienced pilot, and in particular a student pilot, is a potentially dangerous situation.

Bad practice can also become a bad habit, and complacency can set in. If joining shortcuts become a habit, the odds are one day something will go wrong and you won't have the margins you wish you had.

Helicopter pilots have a special responsibility – your machines are highly manoeuvrable and don't require a runway, but they can be difficult to see. The practice, by some, of approaching and departing at any old angle can be confusing for other traffic and could set up a dangerous situation.

There are other traffic mixes that require extra care. Microlights normally fly a lower circuit. They can be hard to see and may be NORDO, so a careful visual lookout is the only way to detect them. You can't rely on hearing radio calls for all of the potential traffic. Microlight pilots, particularly if NORDO, must take care to conform to accepted procedures.

For pilots with radio-equipped aircraft, make calls at the appropriate points when joining, and when in the circuit. Keep a good listening watch, and if you hear an aircraft joining or taxiing, who may not have heard your previous position (having just come on to the frequency), make an extra position report of your current position and intentions to help them build their situational awareness of traffic in the area.

Joining aircraft shouldn't need to ask if there is any other traffic about. This increasingly common practice is not normally appropriate anyway – joining aircraft should listen out and hopefully will receive information from other relevant traffic. Remember though, that you won't get a response from a NORDO aircraft, so a silent radio does not necessarily mean no one else is about.

Extra care should be taken in light or nil wind conditions. Join overhead and have a good look around – in all directions. These are the days when different pilots may choose different (possibly opposing) runways. Look (and listen) for traffic already established in a circuit (you have to conform with or avoid that pattern) – but again remember, not all will be talking.

Many unattended aerodromes are a hive of activity over the summer, particularly at weekends, with a diverse range of aircraft types and an equally diverse range of pilot experience. Whatever your level of experience, aim to apply a high degree of airmanship and professionalism in your flying – and for those more experienced pilots please 'do it by the book' to set a good example (and make life easier) for the less experienced. Let's have a safe, enjoyable, and stress-free summer of flying. ■

2002 Australasian Regional Air Safety Seminar

— Investigation and Safety Topics in the 21st Century —

The New Zealand and Australian Societies of Air Safety Investigators hereby gives notice of this seminar, and invites papers for presentation on contemporary issues relevant to aircraft accident investigation and prevention, with particular reference to the Australasian region. Seminar details are as follows:

Where: Crowne Plaza Hotel, Auckland

When: Saturday and Sunday, 8–9 June 2002 (arrival reception Friday night)

Cost: Registration for ISASI members is NZ$325, non-members NZ$375 (registration covers Friday night reception, all seminar sessions, meals, and a CD copy of papers). The 'partner' fee is NZ$120, which covers reception, breakfasts, and Saturday banquet only.

For further information about this seminar and how to register, please contact the NZSASI secretary:

Peter Williams
Ph: 0–9–256 3915 (wk), 0–3–355 6620 (hm)
Email: prwilly@xtra.co.nz or peter.williams@airnz.co.nz

If you wish to give a presentation at the seminar, please provide an abstract (approximately 100 words) plus personal details to John Goddard as soon as possible before the end of March:

John Goddard
C/o Transport Accident Investigation Commission
PO Box 14025, Christchurch Airport
Christchurch
NEW ZEALAND
Ph: +64–3–358 9801 Fax: +64–3– 358 9194
Email: j.goddard@taic.org.nz

Temporary Runway Change Auckland

Runway 05R/23L at Auckland Airport will be closed for approximately one month from 6 April 2002, to facilitate runway reconstruction work. Temporary runway 05L/23R (designated as such since early 2001) will be activated 24 hours per day for the duration of the reconstruction work.

While pilots should refer to the Auckland Airport green pages* of their IFG/VFG for specific operational details associated with the temporary runway change, we would like to highlight the following key points:

- The airport will be closed to itinerant general aviation traffic during this period to ease traffic flow congestion and minimise the pressure on the limited aircraft parking space.
- An aircraft movement priority system will be in place. There is likely to be a reduction in the number of daily aircraft movements (especially at peak times) due to the configuration of the available taxiways.
- The existing runway (05R/23L) will be closed to takeoffs and landings for the duration of the reconstruction period, although portions will be used as a taxiway.
- Runway hold points and taxi procedures will be significantly changed.
- Precision approaches (ILS) will **not** be available for runway 05L/23R.
- A runway advisory alerting system will be monitored from the Auckland Tower to ensure that aircraft do not approach the wrong runway.
- The activation (and deactivation) of the temporary runway, and its associated special procedures for taxiway and hold points, will be advised by NOTAM. Subsequent NOTAMs relating to the reconstruction project may be issued – pilots are reminded to check for these prior to departing for Auckland.

Further detailed information on the temporary runway change is contained in a brochure published by Auckland International

Airport Limited, Airways New Zealand and BARNZ. This brochure can be obtained by contacting Kevin Carr on 0–9–256 8909 or carr.k@akl-airport.co.nz.

***Note:** The Auckland Airport green pages contained in the 6 September 2001 issue of the VFG are not complete and need to be updated prior to 6 April 2002. Update packs can be obtained free of charge by contacting Aviation Publishing on Tel: 0800 500 045. ■

AIP Supplement Cut-off Dates

Do you have a significant event or airshow coming up soon? If so, you should have the details published in an *AIP Supplement* – relying on a NOTAM is not as effective, and the information may not reach all affected users. In order that such information can be promulgated in a timely manner, you need to submit it to the CAA with adequate notice (at least 90 days before the event). Please send the relevant details to the CAA (ATS Approvals Officer or AIS Coordinator) at least one week before the cut-off date(s) indicated below.

Supplement Cycle	*Supplement* Cut-off Date	*Supplement* Effective Date
02/5	21 March 02	16 May 02
02/6	18 April 02	13 June 02

Field Safety Advisers

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

Owen Walker
(Maintenance, North Island)
Ph: 0–7–866 0236
Fax: 0–7–866 0235
Mobile: 025–244 1425
walkero@caa.govt.nz

Ross St George
(North Island, south of line, New Plymouth-Taupo-East Cape)
Ph: 0–6–353 7443
Fax: 0–6–353 3374
Mobile: 025–852 097
stgeorger@caa.govt.nz

Murray Fowler
(South Island)
Ph: 0–3–349 8687
Fax: 0–3–349 5851
Mobile: 025–852 098
fowlerm@caa.govt.nz

Bob Jelley
(Maintenance, South Island)
Ph: 0–3–322 6388
Fax: 0–3–322 6379
Mobile: 025–285 2022
jelleyb@caa.govt.nz

Safety Videos

Here is a list of safety videos made available by CAA. See our web site (www.caa.govt.nz) for a synopsis of each title by clicking on **Safety Information** then **Videos**. Note the instructions on how to borrow or purchase (ie, don't ring the editors.)

Civil Aviation Authority of New Zealand

Title	Length	Year released
Airspace and the VFR Pilot	45 min	1992
Apron Safety	15 min	1992
Collision Avoidance	21 min	1993
Decisions, Decisions	30 min	1996
Drugs and Flying	14 min	1995
ELBA	15 min	1987
Fatal Impressions	5 min	1995
Fit to Fly?	23 min	1995
Fuel in Focus	35 min	1991
Fuel Management	35 min	1991
It's Alright if You Know What You Are Doing – Mountain Flying	32 min	1997
Light Twins	23 min	2001
Mark 1 Eyeball	24 min	1993
Mind that Prop/Rotor!	11 min	1994
Momentum and Drag	21 min	1998
Mountain Survival	24 min	2000
On the Ground	21 min	1994
Passenger Briefing	20 min	1992
Radar and the Pilot	20 min	1990
Rotary Tales	10 min	1999
Situational Awareness	15 min	2002
Survival	19 min	2000
Survival – First Aid	26 min	2001
The Final Filter	16 min	1998
To the Rescue	24 min	1996
We're Only Human	21 min	1998
Weight and Balance – Getting it Right	28 min	2000
Wirestrike	15 min	1987
You're On Your Own	15 min	1999

Miscellaneous individual titles

Working With Helicopters	8 min	1996*

*re-release date

Civil Aviation Safety Authority, Australia

The Gentle Touch (Making a safe approach and landing)	27 min
Keep it Going (Airworthiness and maintenance)	24 min
Going Too Far (VFR weather decisions)	26 min
Going Ag – Grow (Agricultural operations)	19 min
Going Down (Handling emergencies)	30 min

Outside Productions

(may be borrowed, but not purchased, from CAA)

Mountain Flying (produced by High Country Productions, R D 2, Darfield)	66 min	2000

The CAANZ programmes have been produced over a period 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. While the technical quality of some of the earlier videos may not be up to the standard of commercial programmes, the value lies in the safety messages.

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".

New Video – Situational Awareness

What does the term Situational Awareness (SA) mean to you? Do you know about mental models and the part they play in SA and your decision-making? Do you know about the eight symptoms of SA breakdown?

If you are not sure about the answers to these questions, then perhaps you should view our latest video – *Situational Awareness*. This video gives pilots a practical insight into SA, what it is, how to get and maintain it 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.

It is available now from the CAA Library or Dove Video.

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

24-hour 7-day toll-free telephone

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 (submitted by the aviation industry to the CAA), and selected foreign occurrences that we believe will most benefit engineers and operators. Statistical analyses of occurrences will normally be published in *CAA News*.

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

This issue contains a number of accidents that have been withheld from publication until now due to insufficient information. Efforts have been made to source the missing information, but some data fields and synopses remain incomplete.

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.

ZK-HYF, Bell 206B, 7 Oct 99 at 08:45, 10 NM NE Stratford. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Helicopter), age 39 yrs, flying hours 625 total, 209 on type, 150 in last 90 days.

During the course of agricultural spray operations, the helicopter collided with 11-kV power lines. A full report is available on the CAA web site.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 99/2856

N650DC, Sikorsky S-61R, 9 Feb 00 at 11:30, nr Wakefield. 2 POB, injuries nil, damage substantial. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 32 yrs, flying hours 5103 total, 301 on type, 200 in last 90 days.

The helicopter was slinging logs from an inaccessible forestry block to a nearby road head. On the thirteenth lift of the third cycle, the helicopter had just picked up a log and had just achieved translational lift, when a "bang" was felt through the airframe. The captain likened it to the jolt felt when a "choker" slips during a log lift. The helicopter developed a severe vertical oscillation, during which neither pilot was able to read the instruments. The crew immediately jettisoned the log and commenced descent into the adjacent riverbed. During touchdown, the main rotor struck a small tree, causing the helicopter to roll on to its left side. Both pilots vacated the aircraft without injury, although both later discovered that they had sustained bruising from the front edge of their seats during the vertical oscillation. The cause of the oscillation was not discovered.

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

CAA Occurrence Ref 00/299

ZK-HJD, Hughes 369HS, 18 Feb 00 at 16:15, Taupo Ad. 3 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Helicopter), age 41 yrs, flying hours 231 total, 171 on type, 15 in last 90 days.

The helicopter was taking off from a fuelling area to the north of the terminal at Taupo Airport. The initial departure was towards the northwest but, at about 25 feet agl, the rotor rpm decreased, and the helicopter descended into a gully where it landed heavily. The engine was still running after impact. The fuel control unit, power turbine governor, and fuel pump were all tested, but no abnormalities were found. After discussing the accident sequence with a CAA helicopter specialist, the pilot accepts that he may have momentarily over-pitched the rotors during the downwind departure at a high MAUW and density altitude. The helicopter had a 250-C18 engine, but the pilot was accustomed to having more power at his disposal, having flown a BK117 and a Hughes 369 with the C20 engine.

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

CAA Occurrence Ref 00/389

ZK-HZA, Hughes 269C, 17 Mar 00 at 08:22, Dargaville. 2 POB, injuries 2 minor, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Helicopter), age 52 yrs, flying hours 11700 total, 6400 on type, 50 in last 90 days.

The helicopter was being ferried to commence an agricultural job. While in the cruise, it suffered an engine failure, and on carrying out an emergency landing into a paddock, tipped over. Investigation revealed that one of the connecting rods had suffered a fretting fatigue failure as the result of movement between it and the bearing shell. This fretting was possibly

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exacerbated by a part number being stamped on the back of the bearing shell, which is adjacent to the high-stress area on the connecting rod. The engine had done 618 hours since its last overhaul.

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

CAA Occurrence Ref 00/630

ZK-HZY, Robinson R22 Beta, 1 Dec 00 at 11:40, Lees Valley. 1 POB, injuries 1 minor, damage substantial. Nature of flight, hunting. Pilot CAA licence CPL (Helicopter), age 32 yrs, flying hours 492 total, 472 on type, 109 in last 90 days.

The helicopter was observed carrying deer on a strop towards a hill. When it went out of sight, a loud engine revving noise was heard followed by a large puff of blue smoke. The pilot had been lifting an under-slung load when it became caught. He tried to release it without success. The aircraft then nose dived into the terrain. The pilot believes that the aluminium carabiner was not released adequately by the steel hook. This was possibly due to the adverse effects caused by two different types of metals being in contact with one another.

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

CAA Occurrence Ref 00/3730

ZK-BNY, Piper PA-18A-150, 1 Dec 00 at 20:56, Timaru. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 21 yrs, flying hours 134 total, 23 on type, 18 in last 90 days.

The pilot was on a local scenic flight with a friend, following the Tengawai River at approximately 200 feet agl. During a medium turn the aircraft stalled. The pilot applied full power and checked forward but clipped the top of some willow trees, which dragged the aircraft down.

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

CAA Occurrence Ref 00/3755

ZK-HUO, Hiller UH-12E, 6 Dec 00 at 16:45, nr Greymouth. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 24 yrs, flying hours 414 total, 231 on type, 48 in last 90 days.

While performing a sling-load operation, the pilot noticed a hot rubber burning smell emanating from the clutch area. He shut the machine down and checked the clutch, which seemed to be okay. The pilot decided to fly the aircraft to the maintenance base to have it checked. During the flight, the aircraft suffered a power transmission failure and a hard landing ensued. It appears that the torsion coupling failed.

CAA Comment *A safer more appropriate action would have been to ask an engineer to inspect the machine in the field.*

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

CAA Occurrence Ref 00/3841

ZK-BOG, Fletcher FU24-950M, 11 Dec 00 at 06:30, Five Rivers. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 29 yrs, flying hours 1349 total, 276 on type, 85 in last 90 days.

The topdressing pilot underestimated the amount of down slope on the landing area prior to commencing a landing approach. There was also a reduced headwind component present at the time due to the sheltering effect of trees at the side of the landing area. Braking action was also degraded as light rain was falling. The aircraft failed to stop before the end of the area and skidded sideways into an embankment, which caused the port landing gear to collapse and the propeller to contact the ground.

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

CAA Occurrence Ref 00/4421

ZK-BHL, Fletcher FU24-950M, 15 Dec 00 at 06:40, Raglan. 1 POB, injuries 1 serious, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 38 yrs, flying hours 6700 total, 5820 on type, 150 in last 90 days.

The pilot was on the first sortie of the day, when he noted that the windsock was indicating calm conditions and so requested a lighter load from the loader driver. Acceleration was slower than expected during the takeoff, so he checked the position of his brakes and park brake as possible reasons for this. On leaving the airstrip, the aircraft sank at an alarming rate. The pilot initiated a jettison and applied more flap, but the aircraft collided with a ridge to the left of the airstrip.

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

CAA Occurrence Ref 00/4078

ZK-HGU, Robinson R22 Beta, 17 Dec 00 at 10:00, Mt Griffin. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 31 yrs, flying hours 160 total, 149 on type, 8 in last 90 days.

On the second approach onto a mountaintop pad the pilot experienced a sudden loss of altitude, which he was unable to arrest using all available power. The rotor rpm decayed as he was attempting to avoid terrain, and attempts to recover were unsuccessful. The helicopter contacted the ground and rolled on its side. The pilot had previously calculated that he had OGE (Out of Ground Effect) hover performance available up to 6300 feet, and found that on his first landing (which was at a higher weight than the second), he had a power margin of 1.5 inches MAP available over that used for landing. The wind had increased slightly between the flights, but was still light. No cause was established for the loss of altitude, but a downdraught is a strong possibility.

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

CAA Occurrence Ref 00/4115

ZK-CIK, Piper PA-28-140, 19 Dec 00 at 19:00, nr Hanmer Springs. 3 POB, injuries 3 fatal, aircraft destroyed. Nature of flight, private other. Pilot CAA licence CPL (Aeroplane), age 31 yrs, flying hours 450 total, 25 on type, 0 in last 90 days.

On Tuesday 19 December 2000 at about 1700 hours, ZK-CIK, a PA-28-140, departed from Forest Field aerodrome near Christchurch on a return scenic flight. On board were the pilot and two passengers. After circling several properties near Waiau in North Canterbury, the aeroplane was last seen at about 1745 hours heading in the direction of Hanmer Springs. At about 2100 hours, the aeroplane was reported overdue to

the Police. About the same time a local farming couple and their son, concerned about smoke up a valley at the back of their property, located the wreckage of ZK-CIK in an area of burning scrub. The three occupants had died on impact. After attempting to cross a ridgeline, the pilot probably lost control of the aircraft while trying to turn back down the valley. The aircraft then impacted the ground in a near-vertical attitude.

Main sources of information: Abstract from TAIC Accident Report 00-015.

CAA Occurrence Ref 00/4122

ZK-BQS, Piper PA-18, 23 Dec 00 at 00:14, Turangi. 2 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 32 yrs, flying hours 317 total, 301 on type, 23 in last 90 days.

The aircraft was completing circuits at Turangi Aerodrome. The pilot did not apply sufficient power to arrest the high rate of descent, which had developed while on a steep and slow approach. The aircraft stalled during the round-out at approximately 10 to 20 feet above the runway surface, resulting in a heavy landing and damage to the undercarriage.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 00/4193

ZK-SJB, Boeing 737-33R, 26 Dec 00 at 19:30, Brisbane. 122 POB, injuries 2 serious, damage nil. Nature of flight, transport passengers from A to B. Pilot CAA licence ATPL (Aeroplane), age 35 yrs, flying hours 8930 total, 2184 on type, 204 in last 90 days.

The flight from Palmerston North to Brisbane encountered some thunderstorm activity shortly before top of descent. This continued throughout the descent. The seat belt signs were illuminated, but the descent was relatively free of turbulence until reaching Coolangatta, where heavy rain and hail was encountered. This was accompanied by a couple of moderate bumps and then a severe jolt. Two cabin crew members in the rear galley were thrown off their feet and impacted the interior structure of the cabin. One hit the exit sign and roof and then landed on her hip and fractured it. The second suffered injuries to her head and neck following impact with the cabin roof. The aircraft had an uneventful landing at Brisbane, after which the cabin crew members were transported to hospital.

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

CAA Occurrence Ref 00/4194

ZK-FGY, Cessna 182P, 2 Jan 01 at 10:00, Gisborne. 3 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 56 yrs, flying hours 474 total, 261 on type, 4 in last 90 days.

On approach to grass Runway 03 at Gisborne, the pilot realised that his approach speed was higher than normal, and accepted that he would land well into the runway. The aeroplane touched just short of the intersection with sealed Runway 14/32, bounced slightly and settled back onto the runway surface right on the lip of the sealed runway. This caused a more marked bounce, and when the aeroplane touched down again, having crossed 14/32, the nose gear collapsed. The aeroplane slid to a halt on its nose.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/1

ZK-CWI, Druine Turbulent Ultra Light, 2 Jan 01 at 11:14, Waihi Beach. 1 POB, injuries 1 minor, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 72 yrs, flying hours 738 total, 21 on type, 4 in last 90 days.

The aircraft was turning onto a very short final approach when it stalled and lost altitude. The aircraft crashed onto the road edge, slid through a flax hedge and ended up just inside the airfield boundary.

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

CAA Occurrence Ref 01/10

ZK-ECV, Piper PA-32-300, 5 Jan 01 at 11:38, Taieri Ad. 1 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence CPL (Aeroplane), age 29 yrs, flying hours 931 total, 3 on type, 115 in last 90 days.

The engine failed without warning during takeoff, resulting in a forced landing into a paddock. It is believed that the fuel control unit was defective in some way, but this has not been confirmed.

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

CAA Occurrence Ref 01/12

ZK-PZL, PZL Warszawa-Okecie PZL-104 Wilga 35, 6 Jan 01 at 12:02, Devonport. 2 POB, injuries nil, damage minor. Nature of flight, other aerial work. Pilot CAA licence CPL (Aeroplane), age 38 yrs, flying hours unknown.

The aircraft was towing a banner when its engine started to run roughly, before failing completely. A forced landing was made onto the mud flats in the Bayswater area, where the aircraft flipped over on touchdown. The engine and its related accessories under went investigation to determine the reason for the failure. The likely cause appears to have been a carburettor problem.

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

CAA Occurrence Ref 01/14

ZK-HXB, Robinson R22 Beta, 7 Jan 01 at 13:01, Okaihau. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 28 yrs, flying hours 1600 total, 1000 on type, 95 in last 90 days.

The helicopter was unable to clear a fence as it lifted off with a load of spray for an agricultural operation, and clipped the fence wires with its tailrotor in the process. The pilot was unable to maintain tailrotor control as a result, and the helicopter rolled over.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/15

ZK-DLN, Piper PA-28-180, 7 Jan 01 at 13:06, Te Anga. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 63 yrs, flying hours 1795 total, 342 on type, 19 in last 90 days.

The aircraft was landing on an uphill topdressing strip, which had a dogleg to the left. An unforeseen crosswind from the left

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(there was no windsock at the strip) was encountered as the aircraft touched down on the long wet grass. After touchdown, the aircraft continued almost straight ahead at the dogleg. The pilot locked up the brakes in an attempt to stop in time, but the right wingtip clipped a fence post, swinging the aircraft to the right and through the fence. The nosewheel struck a fence post and broke off, causing the aircraft to turn over on to its back.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/13

ZK-HVC, Robinson R22 Beta, 12 Jan 01 at 16:20, Motueka. 2 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence CPL (Helicopter), age 34 yrs, flying hours 650 total, 583 on type, 79 in last 90 days.

The helicopter, with the student pilot flying, was on approach to a hilltop pad for a low approach and overshoot. The instructor directed the student to maintain his airspeed, and to fly closer to the edge where a suitable escape route existed. The airspeed decayed, and the helicopter sank towards the ground about two metres from the edge, coming to a hover with the rotor rpm bleeding off. The instructor was able to recover the rpm by applying full throttle, but at this point the wind dropped off and the rpm reduced again. Lowering the collective, the instructor attempted to fly the machine towards the escape route, but the rotor rpm had run down below the normal range for flight. One skid was placed on the ground in an attempt to recover the rotor rpm, but the skid slipped, resulting in the main rotor striking the adjacent sloping ground. The helicopter then rolled on to one side. Both occupants vacated without injury and called for assistance by cellphone. While awaiting rescue, the instructor observed that the wind was blowing steadily at 10 to 15 knots for a time, then would drop off to nothing for a period of two to three minutes. The ELT did not activate during the rollover, and the pilot was subsequently unable to access it.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/81

ZK-FMC, Gippsland GA200C, 30 Jan 01 at 10:00, Guards Bay. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 32 yrs, flying hours 2530 total, 50 on type, 61 in last 90 days.

A propeller strike occurred during takeoff due to undulations in the steep topdressing airstrip. The load was immediately jettisoned, allowing the aircraft to become airborne. An aborted takeoff was not possible due to the steepness of the strip. With such a significant loss in performance, a forced landing was attempted on the beach below the airstrip. Due to a lack of available height in hand, the proposed landing site could not be reached, which resulted in the aircraft being ditched.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/308

ZK-MBT, Piper PA-44-180, 13 Feb 01 at 15:15, Palmerston North. 3 POB, injuries nil, damage minor. Nature of flight, training dual. Pilot CAA licence CPL (Aeroplane), age 26 yrs, flying hours 948 total, 155 on type, 86 in last 90 days.

The Piper Seminole landed with its wheels up on the sealed runway. It transpired that cockpit distractions during training simulations led to the failure of both the student and instructor to check for 'three greens' while on short finals, resulting in an inadvertent wheels-up landing.

Main sources of information: Accident details submitted by operator.

CAA Occurrence Ref 01/480

ZK-HOI, Robinson R22 Alpha, 21 Feb 01 at 12:20, Riverhead Forest. 1 POB, injuries nil, aircraft destroyed. Nature of flight, training solo. Pilot CAA licence PPL (Helicopter], age 43 yrs, flying hours 657 total, 138 on type, 32 in last 90 days.

The pilot was completing solo sling-loading training in preparation for his CPL(H) flight test. The helicopter was hovering at around 20 feet agl and was preparing to lift a light sling load, when an easterly gust was encountered, causing the helicopter to abruptly yaw and impact the ground. It rolled over and was destroyed.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/544

ZK-HSM, Robinson R22 Beta, 26 Feb 01 at 06:45, Jacksons Bay. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 68 yrs, flying hours 3555 total, 330 on type, 47 in last 90 days.

On takeoff, the helicopter's left skid hooked the side of a trailer, causing the helicopter to roll over on to its left side.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 01/620

ZK-FSD, Micro Aviation B22 Bantam, 3 Mar 01 at 11:00, Te Kowhai Ad. 1 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence nil, age 67 yrs, flying hours 30 total, 30 on type, 30 in last 90 days.

The student pilot encountered some turbulence just before touchdown. The aircraft subsequently landed at an angle and ran into long grass at the side of the runway. The pilot applied takeoff power, but the aircraft became airborne in a stalled condition before rolling on to its nose.

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

CAA Occurrence Ref 01/1248

ZK-DHE, NZ Aerospace FU24-950, 8 Mar 01 at 11:00, Puketutu. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 34 yrs, flying hours 812 total, 550 on type, 147 in last 90 days.

The tailwind component increased when the aircraft was at about five feet above the strip surface during the landing. The pilot elected to continue in the belief that he would be able to stop in time. Dew and lush grass, however, caused poor braking performance, and the aircraft slid about 180 metres until the left wing hit a post, which turned the aircraft 90 degrees and sent it down a small gully.

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

CAA Occurrence Ref 01/755

GA Defect Incidents

The reports and recommendations which follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rule, Part 12 *Accidents, Incidents, and Statistics.* They relate only to aircraft of maximum certificated takeoff weight of 5700 kg or less. Details of defects should normally be submitted on Form CAA 005D 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	**TIS**	= time in service
NDT	= non-destructive testing	**TSI**	= time since installation
P/N	= part number	**TSO**	= time since overhaul
SB	= Service Bulletin	**TTIS**	= total time in service

Eurocopter AS 350 B3 – Uncommanded cargo hook release

An uncommanded release of the cargo hook during an agricultural operation resulted in the loss of the fertiliser bucket in flight.

The release was attributed to incorrect routing of rear manual release cable. There was subsequently found to be insufficient detail within the manufacturer's installation procedures to safely route the cable. When the hook was installed, the operator inadvertently, and incorrectly, routed the cable resulting in a 'hair trigger' type situation. This was compounded by the release lever on the collective extension not sitting correctly in the neutral position. When the sling moved aft with the load on, the cable became tensioned to the point where the release was activated.

The manufacturer has issued a Service Bulletin SB 25-00-69 clarifying the correct installation procedure.

This incident highlights the importance of maintaining an oversight of the integrity of such release mechanisms and adequately testing them for safe operation prior to flight.

ATA 2550 CAA Occurrence Ref 01/2992

Hiller UH-12 – Conrod bolt fails

The engine and transmission had just been fitted to the helicopter. The engine was test run at 2100 rpm for three minutes. While increasing the power past 2700 rpm, a loud bang was heard and oil and smoke were seen. The engine was shut down immediately.

At the engine stripdown, it was discovered that one of the number 5 cylinder conrod bolts had come loose and fallen out. The conrod end cap had in fact broken away. The conrod departed the crank and punched a hole in the crankcase.

After extensive investigation, it could not be positively determined what caused the bolt to fall out of the conrod. The manufacturer's representative advised that the most common cause of this happening is due to the installation of an old bolt, which has already been in a sudden stoppage and is plastically deformed. When the bolt is tightened up to a stretch length, the incorrect torque is applied ie, the bolt is under torqued. The nut could, therefore, come undone in service and the bolt fall out.

This particular engine had been overhauled just 53 hours prior and fitted to ZK-HIN, which then had an accident 6.7 hours later. The engine was bulk-stripped as a result and fitted to ZK-HID, which was involved in yet another accident. The engine was removed from this aircraft and stored. The number 5 cylinder was replaced some time later due to corrosion, just prior to it being installed in ZK-HUO and the conrod bolt falling out.

It is probable, that at some stage during one of the previous maintenance events, a problem with the bolt was introduced. As the engine had run 47 hours since bulk-strip, it is likely that the best opportunity for this to have happened was when the number 5 cylinder was changed. However, the maintenance organisation involved has stated that the bolt was not removed at this point. It is possible that the bolt was manufactured to the incorrect length, however this is unlikely.

As it appears that only the cylinders had been inspected since the last accident, there is a possibility that the engine could have been carrying other damage, such as that associated with a sudden stoppage. However, the other conrod bolts, when measured in situ, were the correct length.

There is a Service Instruction 1458 specifically dealing with the significant issues relating to the installation of conrod bolts in Lycoming engines.

ATA 8500 CAA Occurrence Ref 00/1000

Micro Aviation B22 Bantam – Fuel flow restriction causes engine failure

Unbeknown to the pilot, the electrical system charging coil had suffered a short circuit. This, coupled with an ineffective charge warning light, resulted in battery exhaustion, which caused the electric fuel pump to fail during takeoff. The engine failed as a consequence of this, and a forced landing was carried out onto a downwind runway.

The charging coil was replaced, but another engine failure on takeoff was experienced soon after this. This failure was found to be due to a loose electrical terminal in the cockpit. After re-securing the terminal, the pilot attempted to takeoff again, but this time he experienced a significant reduction in power, which necessitated another forced landing.

After trouble-shooting, he replaced the fuel lines, as one was found to have a kink in it, removed the primer bulb, as it may have added to the fuel flow restriction, and installed an in-line automotive "disc" type fuel filter. It appears that this restriction may have explained the mechanical fuel pump's inability to feed fuel to the engine after the electrical fuel pump failure during the first event.

After 1.8 hours of trouble-free operation, the pilot again experienced a significant engine power reduction caused by a blockage in one carburettor fuel inlet port. The blockage was found to originate from the automotive in-line fuel filter. The engine has now been fitted with a high-flow mesh type fuel filter.

ATA 2800 CAA Occurrence Ref 01/685