January / February 2004

VECTOR

Pointing to Safer Aviation

So, You Want to Be a Glider Tow Pilot?

Crossing Cook Strait

Generators and Alternators – What's the Difference?

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VECTOR CAA NEWS

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Cover Photo: Airborne from Runway 27 at Omarama with the Benmore Range in the background is Canterbury Gliding Club's Piper Pawnee ZK-CNG piloted by Roger Harris towing the club's Schempp-Hirth Janus two-seat glider ZK-GPB. Taken in January 2004 by Sean Stevens.

So, You Want to Be a Glider Tow Pilot?

Bob Henderson of Gliding New Zealand (GNZ) writes about being a glider tow pilot. If you want to tow, or even if you are already a rated tow pilot, read on as he explores and refreshes on some of the intricacies around the art of being a really good tow pilot.

Glider towing is a very necessary art. Necessary in that few New Zealand gliders are capable of self-launching, and an art because it involves blending the skills and knowledge of two pilots – the tow pilot and the glider pilot. They need to function as a high-performance formation flying team for the duration of the aero tow.

What Are Good Tow Pilots Made Of?

In most cases the gliding club tow plane is the most valuable asset on the club's books. Often the tow-plane insurance bill is the biggest cost faced every year, rivalled only by tow-plane maintenance bills. While the average glider pilot ought to rate 'an efficient tow' as the number one requisite of a good tow pilot, the 'correct operation of the tow plane' can be seen to be the prime consideration when looking at the overall picture. The glider pilot relies on the tow pilot to provide the service of launching and should be appreciative of this.

An inefficient tow pilot can cost glider pilots a lot of money over a season, and this has nothing to do with operating the tow plane incorrectly or unsafely. Conversely, an efficient tow pilot will optimise the tow flight to deliver the glider in the right place at the right height – or into lift as soon as possible – and return as quickly as possible without compromising operating procedures or safety.

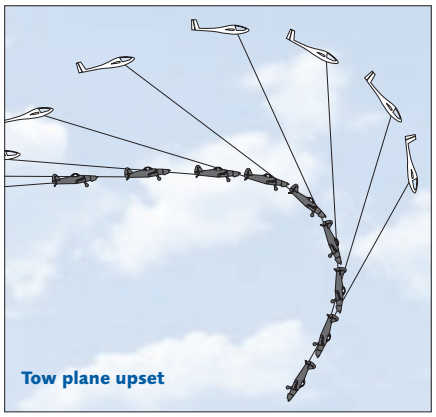
Becoming a Tow Pilot

The requirements for becoming a tow pilot are covered in CAR Part 61, Subpart M. In essence you require 200 hours total time in aircraft (this has been recently amended from "aeroplanes"), of which 100 hours must be as the pilot-in-command of a powered aeroplane. The tow rating training must be carried out by an approved Part 149 organisation (currently this is only GNZ) and you must have your logbook endorsed. You may choose to pay the required fee to CAA and also have your pilot licence endorsed. To retain competency, you need to conduct at least six glider tows every 12 months, or demonstrate competence to an approved person.

Is That All?

That's all pretty easy, but Part 61 does not cover it all. Part 91 (91.709) specifies your responsibilities in terms of towing. It talks about towing speeds and loads, pre-flight checks, takeoff distances, rates of climb, and towline requirements. The rule requires that signals "…established by a gliding organisation holding an aviation recreational certificate issued under Part 149 …" (ie, GNZ) must be used.

The GNZ *Manual of Approved Procedures* and the associated GNZ *Manual of Glider Tow Pilot Training* specify the various signals for all normal and abnormal aero-tow situations. This includes the required actions, not only if the glider has a problem – such as not being able to release from tow, or having the air brakes deployed while on tow – but also covers the actions if the tow plane has a problem. The training manual also covers situations such as launching a glider with one wing on the ground if there is no wing runner.



The glider kites rapidly after a pitch-up displacement as it runs out of elevator authority.

Tow plane upset. A glider can kite rapidly unless the pilot reacts quickly and appropriately to any pitch-up displacement. In this situation, the tow pilot's only recourse is to release the glider immediately.

The key issue here is knowledge because, for example, the tow plane upset situation (see diagram) might only happen once, but if it does, it happens very quickly. There is no easy way to practise this upset!

The GNZ *Manual of Approved Procedures* requires the tow pilot to be responsible for adhering to the various CAR requirements and GNZ procedures governing glider towing operations. It also states that tow pilots are responsible for ensuring that the glider pilot they are about to launch is authorised for the flight.

Any changes in procedures or qualifications that have been found to be necessary because of incidents, experience, or improvements in best practice are, in the first instance, communicated to all members of GNZ through the *Gliding Kiwi* magazine. (Note: You must be a member of GNZ to receive the magazine.) Eventually, these changes in procedure will be promulgated via the *Manual of Approved Procedures* and the *Towing Manual*, both of which are available on the GNZ web site.

The Bottom Line

Tow pilots are valuable contributors to a successful gliding club – but they should be more – they should also be members of the Club. This will ensure that the communication loop is closed and that we are all operating to best practice. ■

Crossing Cook Strait

Ohau Point

Crossing Cook Strait can be a daunting undertaking for some pilots. By careful planning, and by maintaining situational awareness during the flight, the crossing can be a most enjoyable and spectacular experience. This article should assist VFR pilots to predict the most suitable weather conditions for crossing the Strait, to examine the most appropriate route to follow, and to consider actions during a possible emergency situation.

Weather Information

Obtaining accurate weather information for Cook Strait can be difficult, because forecasts and reports available from the Airways Corporation web site (www.ifis.airways.co.nz) are specifically for Wellington and Woodbourne. Often the actual weather at these two locations is quite different from the weather in the Strait. Some inferences can be made, however, by examining the strength and direction of the upper level winds provided by these forecasts, and by examination of current weather charts and briefings from MetService.

Northwest Conditions

Pre-frontal weather conditions in strengthening northwesterly and westerly winds over 25 knots can provide very turbulent conditions over the area identified in red in Figure 1. It is recommended that pilots avoid low-level flight in the lee sections of this area and fly above ridge height to avoid turbulence. Generally, this means that the flight across the Strait should be above 3500 feet. Pilots crossing the Strait (north or southbound) should fly as high as possible (request a clearance above 2500 feet from Wellington Control on 122.3 MHz) and track on a course between Ohau Point and White Bluffs.

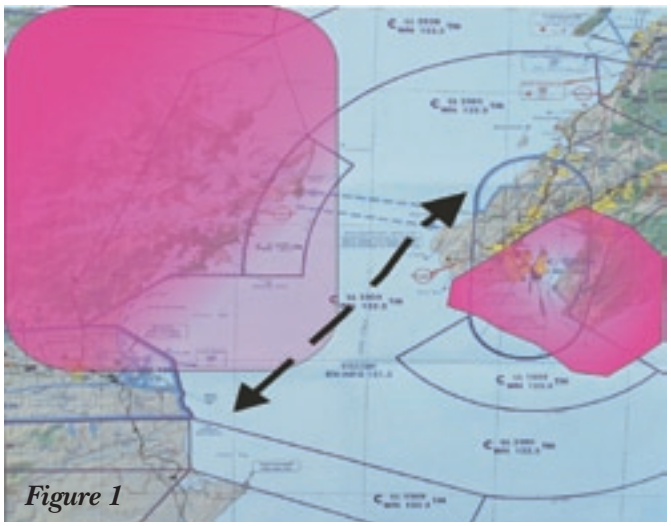


Figure 1

Area of turbulence, if the aircraft is flown below the ridge heights. Shading indicates severity of turbulence, from severe (dark shade) to light (light shade)

◄ – ► Recommended route to travel across Cook Strait

Northerly Conditions

In weather conditions with moist northerly airflows, typically associated with the approach of warm or occluded fronts, the northern and eastern sections of the Strait will usually have low-lying stratus and the entire area will be covered by nimbostratus cloud. VFR flight in these conditions is not advisable as cloud bases are generally low and visibility associated with nimbostratus cloud can be below five km. Such conditions can prevail for several days if the front is slow moving.

Pilots attempting to cross the Strait from south to north should be aware that they would likely encounter lowering cloud bases and reducing visibility. (Refer to Figure 2). There is a high risk of being caught mid-strait with neither island in sight, which makes navigating extremely precarious. Always maintain a visual reference with at least one island. It is dangerous to proceed in the 'hope' of seeing the other side of the Strait if you cannot see the island you have just come from.

If in doubt, turn back early and contact Wellington Control if confirmation of position and heading is required.

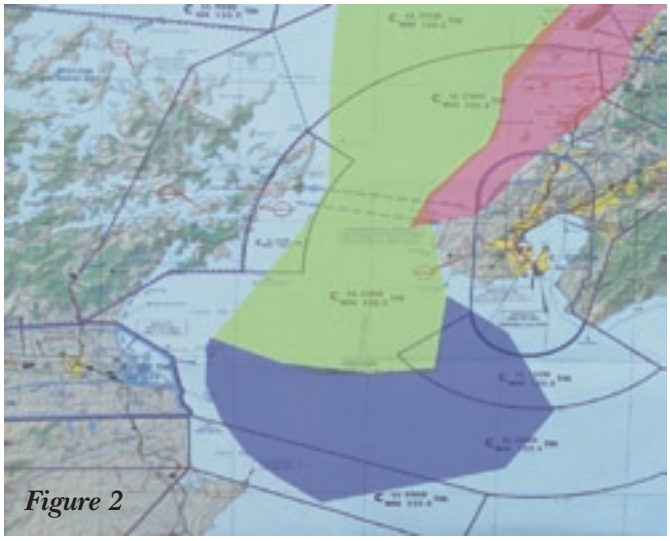


Figure 2

Cloud Base height

Below 500 feet

500 feet to 1000 feet

1500 feet and above

Southeasterly Conditions

Moist easterly, southeasterly and southerly airflows (except for abating southerlies behind a cold front) provide the worst weather conditions in the Cook Strait area. Figure 3 shows the cloud base heights to be expected in southeasterly wind conditions. In conditions of easterly wind, the cloud base will be below 500 feet throughout many areas of the Strait, possibly with sea-fog in very moist flows and visibility less than five km. Consequently, VFR flight in these conditions is usually not possible. Pilots caught in such conditions should request assistance from Wellington Control. When these conditions are forecast, pilots intending to transit north should divert to Omaka, and those intending to transit south should divert to Paraparaumu.

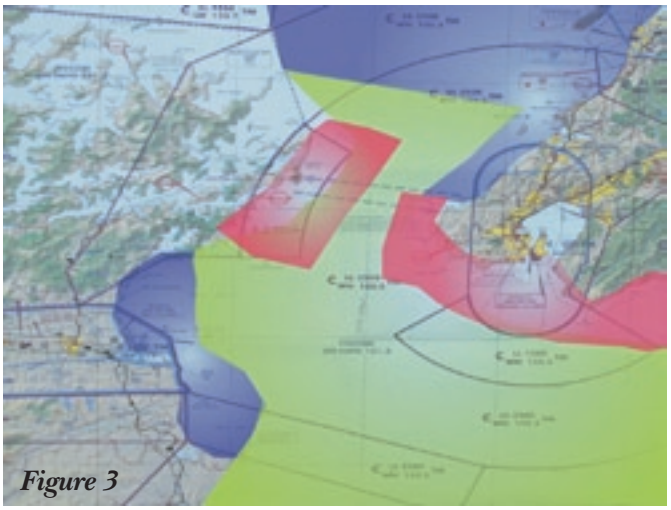


Figure 3

Cloud Base height

- Below 500 feet
- 500 feet to 1000 feet
- 1500 feet and above

In conditions of strong easterly flow the Cloudy Bay section can have cloud bases below 500 feet

The Best Crossing Conditions

Crossing the Strait in dry air with light winds is most preferable. Typically this occurs during anticyclonic conditions and after a southerly change when the winds trend to below 20 knots. Be very aware, however, of the 'decaying' anticyclone which has been dominating for four days or more, because stratus can develop as the air-mass gradually moistens over the sea.

Flight after the passage of a cold front in southwesterly conditions can also be suitable. When a strong southwesterly airflow associated with a low pressure system exists however, cumulonimbus showers and turbulence can provide unpleasant crossing conditions. Weather factors to watch for in the METARs, which indicate good conditions for crossing the Strait, are falling dew points, rising QNH and decreasing wind strength.

In addition to Wellington and daytime Woodbourne reports from **www.ifis.airways.co.nz** pilots can obtain reports for Paraparaumu, Brothers Islands, night-time Woodbourne, Ngawi and Cape Campbell – from MetFlight, a new service from MetService (contact **ray.thorpe@metservice.com**). This service provides an animation of radar and satellite imagery covering Cook Strait, which shows the passage of cloud and precipitation moving through the area; and an area forecast called "Straits". This gives forecast winds at 1000, 3000, 5000, 7000 and 10,000 feet, temperatures from 5000 to 10,000 feet, freezing level, visibility, cloud type/base/top, and significant weather for the next 12 hours. Essentially it is similar to a GAWX but is focused on Cook Strait.

Local Knowledge

It is good airmanship to talk to a local operator. Their knowledge of local weather patterns and conditions can be invaluable when planning a flight in the Cook Strait area.

Should I Ask for Controlled VFR?

To a large degree, the weather will dictate which route to follow across the Strait. The best advice, however, is to cross Cook Strait at the shortest point and at as great a height as possible. The shortest crossing distance (13 NM) is between Ohau Point and The Brothers Islands or Arapawa Island. Pilots can cross the Strait beneath the Control Area (below 2500 feet maintaining a listening watch on Christchurch Information 121.3 MHz), or they can contact Wellington Control and request Controlled VFR at a higher altitude. IFR traffic considerations could mean that the route offered may not be the most direct. When operating Controlled VFR, remember that if you need to change altitude or heading, an amended clearance is required.

Controlled VFR often reduces pilot workload. The controller can, if necessary, provide information on the most appropriate headings, groundspeeds, and on the location of other aircraft in the area. In most situations Wellington Control will clear your aircraft into the Control Area. At certain times of the day, however, a clearance may not be possible, particularly early morning and late afternoon, when IFR arrivals and departures are at their maximum. Another advantage of requesting Controlled VFR is that ATC is aware of your position at all times.

The Brothers Islands

Engine Failures

Crossing the Strait at a higher altitude provides more time to handle an emergency situation. It is recommended that pilots of single-engine aircraft fly above 6000 feet, if possible, to assure gliding range to a shoreline when crossing via the shortest route. Observe the wind direction and strength on the sea surface and listen to the Wellington ATIS for the 2000-foot wind – this will assist in deciding which side of the Strait to glide towards in the event of an engine failure.

Typically, northwesterly winds prevail. In these conditions pilots should consider attempting to glide towards Ohau Point – the tailwind will increase gliding distance.

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Additionally, rescue assistance is closer at hand on the Wellington side of Cook Strait.

If an engine failure does occur, set the aircraft up for the best glide speed, make an early MAYDAY call, and squawk 7700. Making an early distress call will assist Wellington Control to find your location and ultimately will reduce the time taken for search and rescue personnel to locate you. Brief your passengers on the situation. During the last 500 feet, orientate the aircraft parallel with the swell line and slow the aircraft to the minimum airspeed prior to touchdown without allowing a full stall to develop. Try to land on the upwind side of the crest of the swell in a tail-low attitude.

It is recommended that all pilots view the *Marine Survival* video, and read "The Most Useless Things" article in the September/October 2003 *Vector*.

Rununder Point

Emergency Equipment

A range of emergency equipment may be carried, from lifejackets through to liferafts and survival suits. At the very least, pilots should ensure passengers wear lifejackets, as it can take a considerable amount of time to don them in an emergency. Passengers should be briefed as to the actions to be taken in the event of an emergency.

In addition to the passenger brief required under Civil Aviation Rule Part 91.211, passengers should be advised to remove footwear and to inflate their lifejacket **after** they have vacated the aircraft. Passengers should be encouraged to retain clothing as it will reduce heat loss in the water. See "Don't Judge a Jacket by its Cover" (*Vector* 1997 Issue 5).

Use of Nav Aids

Pilots who are suitably qualified to use DME and VOR can select Tory VOR/DME (114.6 MHz) located on Arapawa Island. This can assist in determining which shoreline is closest in the event of an emergency. It can also make navigation easier, as position reports can be made by reference to a distance along a radial from the VOR station.

Mana Island

VFR pilots are increasingly using GPS as it becomes more accurate and affordable. GPS, when used correctly, can give a continuous update of groundspeed, time and distance. This is only useful when flight in a straight line can be achieved. In conditions of fluctuating weather a pilot must be prepared to alter course as necessary to maintain VFR. There is a tendency for some VFR pilots using GPS, to continue flying in marginal conditions. GPS should **not** be used to help a pilot to fly VFR in IFR conditions. It should only be used as a **secondary** aid to navigation. Never go anywhere with GPS that you would not go without it!

Summary

The height and route at which aircraft can cross the Strait will be dictated by the weather conditions on the day, and may depend on a clearance from Wellington Control. If flight cannot be made above 2500 feet, it is important that the shortest route be flown to minimise the gliding distance required in the event of an engine failure.

Crossing Cook Strait should be an enjoyable experience for pilots and passengers alike. If it's not, then it is likely due to stress caused by poor weather conditions, by turbulence due to poor route selection in the prevailing conditions, or because appropriate safety equipment is not being carried.

Pilots are encouraged to study weather information carefully, plan a suitable route that minimises time spent over water, and ensure that passengers are adequately briefed on emergency equipment and procedures and that they are wearing serviceable lifejackets. ■

This article was contributed by Gareth Clare. Gareth is a B-category instructor with the Kapiti Aero Club.

This is the second in a series of articles that consider recent aircraft accidents in New Zealand. The aim is to amplify the safety messages that can be derived from the accident. The official accident report (Bantam B22J ZK-JME Occurrence No 01/2660) can be found on the CAA web site at www.caa.govt.nz under "Accidents & incidents – Fatal accident reports".

On 7 August 2001, Bantam ZK–JME crashed through a set of power lines, a fence and a tree before coming to rest against a farmhouse, about six miles south of its Te Kowhai base. The accident was survivable, but the single occupant was pronounced dead at the scene. He died from a heart attack, and indeed he may well have been dead before the aircraft hit the ground.

Immediately prior to the crash, the aircraft had been observed to be flying in the cruise at about 500 feet agl. A witness then observed that the power was reduced, the aircraft turned into wind, and a rapid but stable descent was commenced. We can infer that the pilot may have been attempting to make an immediate landing. As the accompanying photograph shows, the obstacles the aircraft hit were in an area of generally open farmland. This implies that by the time impact occurred, the pilot was no longer in control of the aircraft. It was also noted that the pilot had removed the glove from his left hand, and in the wreckage was a bottle of his prescribed medication. The two-seat Bantam has a single control column between the seats, and the pilot, sitting in the left seat, would have kept his right hand on the control column. If he was attempting to access his medication, he would therefore have used his left hand to do so.

The sudden change in flightpath, the failure to subsequently avoid the ground obstacles, and the removed glove combine to indicate that the pilot had suffered an in-flight cardiac problem, and was attempting to land the aircraft, and access his medication, when the accident occurred.

The pilot's family doctor advised that the pilot had a history of cardiac events commencing in February 2001 (six months before the accident). His last known cardiac event was on 7 May 2001, only three months before the crash, and had required hospitalisation. The pilot's medical condition was severe enough that he was ineligible for a taxi driver's licence. At the time of the accident, the pilot's microlight pilot certificate had lapsed, because he had failed to provide updated medical details at the last renewal date, so no new certificate had been issued.

It would be fair to assume that the pilot had allowed his passion for flight to override the common sense that should have said he was in no condition to fly solo.

There are a number of pilots who have taken up flying microlights or gliders as a way of getting around the medical issue. The purpose of this article is not to open up that particular can of worms again, but to remind pilots that changing to flying microlights and gliders does not make the medical problem go away, it just makes it easier to continue flying with that problem. In some cases, such as this one, this is not such a good idea.

We are all getting older, an immutable fact of life. Sooner or later **all** of us are going to have to give up flying. We would, of course, prefer that it was later, rather than sooner. Some of you might argue that the pilot died doing what he loved – what better way to go! There is certainly a 'quality-of-life' issue about being able to continue doing whatever you want to for as long as you are able, but when your medical condition has deteriorated to the extent that continued flight is hazardous, then it is perhaps time to call it quits. In most cases that does not stop you from flying dual if the passion for flight still burns within you. ■

Generators and Alternators – What's the Difference?

Adapted from an article by H Dean Chamberlain published in FAA Aviation News, October 1999.

Recently two people I work with had an electrical problem in a light twin. Fortunately the electrical failure happened in day VFR conditions and the aircraft had two pilots on board. The benefits of being day VFR and having two pilots on board cannot be over-emphasised. Although a single pilot could have safely handled the problem, being able to share the workload with someone else makes any problem easier to handle.

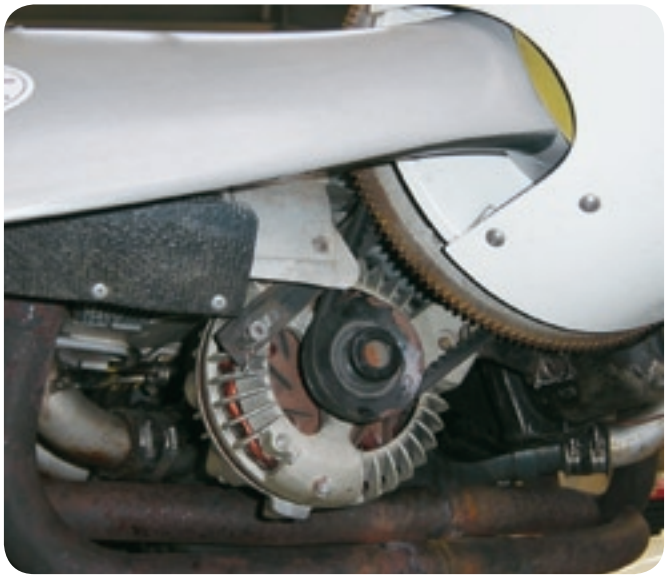
With two pilots working on the problem and being in visual meteorological conditions, it was easy for one pilot to fly the aircraft while the other pilot ran through the appropriate pilot operating handbook electrical checklist. They were able to return to their home airport without incident. They were landing at an airport with a relatively short runway where they wanted to use flaps. Once they had the runway made, they were able to lower the electrically-operated flaps using battery power without any problem. They had left the gear down when they discovered the problem after takeoff from a nearby airport to minimise the electrical drain on the battery. If the electrical system had to fail, it chose the best possible time to fail. Some pilots aren't so lucky.

NTSB and FAA Data Review

A cursory Internet review of the National Transportation Safety Board's (NTSB) and Federal Aviation Administration's (FAA) accident and incident data bank produced some interesting reading.

First, we want to acknowledge that accidents have occurred as a result of electrical problems in flight. We want to emphasise that a serious electrical problem under the worst circumstance can be a potential killer. One such bad situation could be a total electrical failure in a complex, high-performance aircraft on a dark and stormy night in instrument meteorological weather conditions over hostile terrain on an instrument flight plan with only one pilot aboard. A pilot who has worked all day, and who is now fatigued trying to get home. Now, if you really wanted to make this a difficult situation, add in some snow or freezing rain and the risk factor would go sky high. In such a situation, what would you do? Fortunately, most electrical failures aren't this serious.

Although we are discussing general aviation (GA) aircraft, history has shown that modern air carrier aircraft can crash under such conditions the same as a typical GA aircraft can. We want to emphasise that these kinds of problems can be very serious, especially for the unprepared, regardless of the type of equipment being flown.



However, our non-scientific look at a handful of GA electrical-related problems that made the NTSB or FAA incident or accident reports were more typical. In many cases the damage to the aircraft was minor or none. The same was true of injury to pilot or passengers.

Typical Types of Problems

A review of some of the general aviation reports seems to indicate that pilot error in responding to the situation caused more of a problem than the electrical problem.

Because many of the reports had little or no damage reported, the narrative of the reports were very brief without a lot of details. For example, one report about a Cessna 182 stated, "Electrical problem. Overran runway returning. Alternator field wire loose. Struck runway light." The airport conditions were day VFR. Although no damage was reported, could the private pilot have handled the situation better? We don't know. But the report begs the question of why did the pilot hit the runway light in day VFR conditions?

"…a serious electrical problem under the worst circumstance can be a potential killer."

The following incident is even more common. The narrative said the air taxi "Departed alternators off. Drained batteries. Used manual gear. Not locked down. Folded landing."

Another report said, "Alternator failed en route. Diverted. In confusion landed gear up." Again, minor damage was done to the aircraft. The question is why did the pilot, a commercial pilot and flight instructor, land gear up?

Another pilot while descending from altitude did a "long cruise descent with the engines at a very low power output. He said he was unaware that the aircraft had generators instead of alternators, and that the engine speed he was using for the descent was below the speed required to keep the battery charged." After landing and discharging his passenger, the commercial pilot and flight instructor discovered the aircraft's battery was too low to start the aircraft. The pilot set the brakes and hand-propped the twin's right engine. He then tried to use the operating engine to produce enough electrical power to start the twin's left engine.

When that idea failed, the pilot got out of the aircraft and tried to hand-prop the left engine. When the left engine started and went to a high power setting before the pilot could get back into the aircraft, the twin went out of control and started turning in circles eventually striking a fence and a tree with substantial damage to the aircraft. The report listed a probable cause of the incident as, "The pilot's failure to ensure the aircraft was secured prior to attempting an engine start by hand-propping."

To Hand-prop or Not to Hand-prop

A good recommendation for anyone attempting to start an engine by hand-propping it is that a qualified, trained pilot, knowledgeable in hand-propping techniques, be in the pilot's seat to safely operate and control the aircraft. Although people have hand-propped aircraft engines for decades, it is not without risk. Only trained people should attempt to hand-prop an aircraft. A rotating prop has the potential to inflict serious or deadly injuries to those who make a mistake. Of course, the safest option is to have the aircraft's battery replaced or charged and avoid the hand-propping completely for those aircraft with an electrical system.

Lack of Aircraft System Knowledge and Stress

In another case there were reasons to suspect a low-voltage situation before the flight departed. There had also been a previous electrical discrepancy reported. While preparing to land at night, the electrical system failed and the aircraft hit trees during the landing. Later it was discovered that a wire had broken.

A common thread in several incidents was the failure of aircraft with retractable landing gear to land with all of their wheels down and locked. In some cases because of distraction or stress, the pilot failed to extend the gear. In others, the manual gear extension procedure was not done properly. Adding to the problem is the fact that in a complete electrical failure, for those aircraft with landing gear indicator lights, the lights probably will not be working. Without the lights, the pilot may not realise the gear is not down or not down and locked properly. Adding to the problem is the fact that most retractable gear aircraft have generally high performance and therefore require more pilot attention to fly them.

Typical GA Aircraft Electrical Systems

Since aircraft electrical problems can occur at any time, we want to review the major differences between aircraft electrical systems in a typical GA aircraft.

For readers with little knowledge of aircraft electrical systems, we will provide a very brief discussion on a typical GA aircraft's electrical system.

First, modern piston-powered GA aircraft have two totally separate electrical systems. One engine-driven, self-contained system provides the electrical power for the ignition system needed to keep the engine running once it starts. This system is based upon a self-contained magneto electrical generating system that can keep the engine running whether or not the aircraft has any other type of electrical system on board. For those not familiar with a typical GA piston-powered aircraft, you can compare such an engine's electrical ignition system to that of a typical gasoline-powered lawn mower. Although it has a much simpler kind of magneto system, the lawn mower, once you start it by pulling on its starting rope, will continue to run until it is out of gas or it is shut off. The same concept is true of most small GA aircraft engines.

"…a piston-powered aircraft engine does not need an alternator-based or generator-based electrical system or battery to fly."

This is why older aircraft such as the classic Piper Cub can fly without any other onboard electrical system. To start a J-3 Cub, just like a gas lawn mower, the engine must be rotated fast enough to start running. Someone normally does this by rapidly turning the propeller until the engine starts. Hence the term, 'hand-propping'.

The fact that a piston-powered aircraft can be started by rapidly turning its propeller when the magneto switch is turned on and the fuel is on is why anyone working or standing around a propeller is always warned to stay out of the propeller's arc when handling or turning the propeller. The engine could inadvertently start and the rotating propeller could injure or kill anyone within its rotational plane. Although a magneto switch placed in the OFF position is designed to prevent the engine from starting by grounding the output of the magneto, a defective switch or a loose magneto grounding wire could allow the engine to inadvertently start if the propeller is turned rapidly enough and there is enough fuel for the engine to start.

Magneto Systems

Although the magneto system can pose a potential safety problem for those turning the propeller, its biggest advantage is that it provides an independent electrical system to keep the aircraft running until the magneto system itself fails or the fuel is exhausted or the engine stops running. To reduce the probability of a magneto failure, modern piston engines have two separate magneto systems firing two separate spark plugs in each cylinder. Although both systems are normally used together, in the case of a magneto failure, one system is adequate to fly the aircraft to an airport

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where repairs can be made to the broken system.

The important thing to remember is that a piston-powered aircraft engine does not need an alternator-based or generator-based electrical system or battery to fly. This is an important safety point. As part of your preflight briefing to your passengers, you may want to remind your non-aviator passengers that if they hear you say, "We have lost our electrical system," the aircraft will continue to safely fly and not fall out of the sky. Better yet, use your preflight check as a way to educate your passengers about how your aircraft operates and important safety issues such as propeller safety.

Following an electrical system failure, we may have a problem communicating and navigating. There are safe operating Civil Aviation rules for that eventuality. If you are in VFR conditions, stay in them. If you are in IFR conditions, follow the rules outlined in rule 91.429 *IFR operations – radio communication failure*. So read on.

Then why have an alternator or generator and battery in an aircraft? There are many reasons. The most important is that pilots, like the drivers of the early automobiles, didn't want to hand-start their engine. It is potentially dangerous, and it is nasty to do in the rain or snow. It is also desirable to have two qualified people available to do it. So like automobiles, GA aircraft started being manufactured with electrical starters in them.

The Generator

This development required not only a starter, but some means of powering it. All of which led to the need for some type of battery to provide the necessary stored electrical power, a means of keeping the battery fully charged, and a means of regulating the charging process. Voilà – the first aircraft electrical system based upon a battery, a generator, and the all important electrical starter.

Once you had an electrical system, it was easy to add all of the radios, navigational, and electrical equipment we now have in modern aircraft.

But generators have a slight problem. They like a minimum rotational speed to produce a specified amount of electrical power. Too slow a speed and the output drops. If you want to make sure the battery is being charged, you have to operate the engine faster. This is normally not a problem in flight, but if you are number 25 waiting for takeoff, it can become a problem on the ground. Or like the pilot listed in one of the accident/incident reports who noted how his long, low-powered descent caused him problems with his generator-equipped aircraft. Generators are also somewhat heavier than what has replaced most of them – the alternator.

The Alternator

Enter the alternator; a different way to make power. Again, like in cars, as electronics and technology advanced, so did the way to produce power. Today, instead of a generator, cars and new aircraft normally have alternators in them. The main benefit of the alternator is that it can produce a specified amount of power at a much lower rotational speed than a generator.

An alternator also operates differently. It produces alternating current that is then rectified or converted into direct current for use in most piston-powered GA aircraft. An alternator is normally lighter in weight than a comparable generator. All of which provides important advantages to the aircraft manufacturer and pilot. Better output at lower revolutions per minute at a lesser weight not only improves efficiency, but it also improves the useful load of the aircraft by a small amount.

The Battery

If, for some reason, you end up with a low battery voltage condition (after leaving the master switch on, for example) it is preferable to remove the battery and re-charge it in accordance with the manufacturer's recommendations.

There are pitfalls associated with hand-propping or jump-starting the aircraft in this situation. The rapid charge capability of the alternator can shorten a battery's working life or, in some cases, cause battery damage with the possibility of accompanying caustic fumes, heat and, at worst, fire.

Also, you should remember that the alternator requires an excitation voltage to operate. If there is insufficient excitation voltage, hand-propping may start the engine but the alternator will not charge the battery so you will still have no electrics.

Four to six years can be considered a reasonable battery life for most GA fixed-wing aircraft assuming regular maintenance is carried out. Never allow a battery to sit around for an extended time in a discharged state as it will degrade in performance much more rapidly than if it is parked up in a healthy state of charge.

Maintenance and In-Flight Decision Making

So how do you know whether your aircraft has a generator or an alternator? The best way is to read the pilot's operating handbook. Reading the handbook does several important things. First it allows you to hangar fly with the best of pilots. You can also join any argument about the type of electrical system in your aircraft. Plus when you have a problem you can talk intelligently with your maintenance technician.

But the most important reason for reading your operating manual or aircraft flight manual is to learn how to identify and possibly handle any electrical problem in flight. Electrical problems need to be handled correctly and promptly because they could cause an onboard electrical fire, damage other electrical gear, or cause problems with other systems.

Another reason is once you understand the electrical system in the aircraft you fly, you can make important decisions about what you are going to do in case you have a generator or alternator failure.

For example, by knowing and understanding your electrical system, you may decide to continue your flight by turning off non-critical electrical items such as a second radio and other redundant electrical gear or start looking for the nearest airport to land.

Equally important is knowing critical flight data such as what to do if you have electrically-operated flaps or gear. More than one pilot has put him or herself in a 'box' with no way out by making the wrong decision during a 'minor' incident or problem. Putting electrically-operated flaps down early and not having the electrical power to raise them may mean having to fly with increased drag or minimal lift during a go-around or while having to divert to another airport. The same may be said of electrically-operated landing gear, although in some aircraft the increased drag produced by the lowered landing gear may be worth the drag penalty considering the potential problems later of having to either manually lower them or forgetting to lower them. If flying in cloud, the pilot may decide that being able to talk and navigate is the most important use of any remaining battery power.

Because each flight is unique, and the needs of each pilot are unique, it is hard to say which electrical devices should remain on and which devices should be turned off. This is why it is important that each pilot review his or her aircraft's electrical system and know and understand it to the point where they can make the best decision about the aircraft's electrical system before the loss of the generator (or is it an alternator?) becomes critical to flight safety. Knowledge is power (pun intended). And if your aircraft has electrically-operated retractable landing gear? Please remember that you still have to lower the gear before your next landing, so you just may want to review your aircraft's emergency gear operating procedure before your next takeoff.

Have a great season of flying. ■

Planning an Aviation Event?

Do you have a significant event or airshow coming up soon? If so, you need to have the details published in an AIP *Supplement* rather than relying on a NOTAM. (Refer to AC 91–1 *Aviation Events* for operational requirements.)

The information must be promulgated in a timely manner, and should be submitted to the CAA with adequate notice. Please send the relevant details to the CAA (ATS Approvals Officer or AIS Coordinator) at least one week before the appropriate cut-off date indicated below.

Supplement Cycle	*Supplement* Cut-off Date (with graphic)	*Supplement* Cut-off Date (text only)	*Supplement* Effective Date
04/2004	5 Feb 2004	12 Feb 2004	15 Apr 2004
05/2004	4 Mar 2004	11 Mar 2004	13 May 2004
06/2004	1 Apr 2004	8 Apr 2004	10 Jun 2004

Radiotelephony Manual

With the advent of the *AIP New Zealand*, some material relating to radio phraseology in the OPS section and COM section of the old *Planning Manual* was removed.

This information has been combined along with some additional material into one document, which has been published as Advisory Circular AC 91-9 and 172-1 *Radiotelephony Manual*. It has a similar structure and layout to its ICAO equivalent.

The Advisory Circular provides examples of standard radiotelephony phraseology for use by pilots and Air Traffic Services (ATS) and is based on several relevant ICAO documents.

Radiotelephony provides the means by which pilots and ground personnel communicate with each other. Used properly, the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. However, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology. **The importance of using correct and precise standard phraseology cannot be over-emphasised.**

Obviously, it is not practicable to detail phraseology examples suitable for every situation that may occur. If standard phrases are adhered to when composing a message, however, any possible ambiguity will be reduced to a minimum. Concise and unambiguous phraseology used at the correct time is vital to the safe and expeditious operation of air traffic.

This principle should apply, whether you are communicating with a controller, flight information officer or conveying your intentions to other pilots in an uncontrolled environment.

This Advisory Circular is a very useful study document for the student pilot and trainee air traffic controller, and it is a compact reference document for those already holding relevant qualifications.

We recommend you check it out and give yourself a refresher – you may be surprised at what you have forgotten, or perhaps find you have lapsed into using non-standard phraseology, or that something has changed that you were not aware of.

You can find this Advisory Circular on the CAA web site under "Rules & more – Advisory Circulars (ACs)". ■

Readers are encouraged to share their aviation experiences in order to alert others to the potential pitfalls. Please send your experiences to: Bill Sommer, Managing Editor, Communications and Safety Education Unit, CAA, P O Box 31–441, Lower Hutt or email sommerb@caa.govt.nz. Note: We will only publish an article if it contains a valid flight safety message. The article can be anonymous and de-identified if you prefer – you will have the final say on what is published. We can help you write the article if required.

Thanks for the excellent response to the introduction of this column in the last issue. We have received several contributions already. Please keep sending them in.

A Tiger By the Tail

Many years ago, as a raw private pilot with my own Tiger Moth, I had to fly from New Plymouth to Ardmore on engineering business for several days. With a solidly built colleague in the front seat, both of our toolkits and overnight bags on board, a full top tank and an auxiliary tank as well, we were near, but not over, maximum weight. I did a quick check of the weight-and-balance data in the Flight Manual to ensure we were within the limits. We were very close to the aft limit, but again, not over it, so off we went.

It took a long time to get airborne, but all went well until we had burned off about an hour's fuel, which moved the centre of gravity (C of G) slightly more aft. I became aware of a very odd feeling when we hit a bit of turbulence. Any time a wing dropped, instead of self-righting, the tail would begin to fall away in the direction of the dropped wing. I could pick up the wing, but it was obvious that the C of G was too far aft.

Fortunately, this was a New Zealand cabin Tiger, with access to the baggage tray behind the pilot. I had my passenger fly the aeroplane while I unfastened my straps and turned round. I was able to move a 30-pound toolkit to the deck between the two cockpits, and balanced it there while flying the aircraft. My passenger then removed his control stick, and moved the toolbox to the space between his knees. Being able to move 30 pounds six feet forward altered the C of G noticeably, and we continued on, landing at Ardmore with a lot of reserve speed to avoid stalling while on approach.

For me it underscored the importance of knowing my aircraft well, and checking that weight and balance are well within the limits for every flight. I have never before, or since, had such an uncomfortable feeling in flight!

Vector Comment

We thank the contributor for sharing this incident with us and endorse his conclusion that a weight-and-balance calculation should be made for every flight. How does fuel burn affect the C of G position in your aircraft?

Don't Be Afraid to Say No

Christchurch Helicopters have forwarded this account received from a former student, who completed his CPL training in May 2003. Their accompanying comments follow the report.

I thought I'd write a quick note to let you know of my whereabouts and what I'm up to. I'm working on a two-million-acre cattle station in West Australia. We run about 80,000 head of cattle, so you can imagine what it's like trying to work with them in hot temperatures. I think the hottest it's been since I've been here is 54 degrees, far too hot.

They have three R22s here, two Beta 2s and a Mariner, so I'm right in my element. I've been doing lots of ferry flying, looking for fires, finding water and checking dams, etc, which is good. I did my check flight with the most experienced cattle musterer in the area, and he was impressed by my level of professionalism. That's what helped me jump in the chopper straight away; it usually takes fellas three or four flights with him first.

Getting used to the conditions here is hard, for one thing the heat is scary, and also it's starting to get really humid here as the wet season approaches. I think the hardest thing I've had to do was when I took my boss out looking for cattle and he wanted me to land in a dried-up dam surrounded by tall trees. The temperature was 48 degrees, he weighed 100 kg, and we had already pulled 25 inches [manifold pressure] at the hangar to put it into a one-foot hover. As you can imagine, the only way in was a towering descent, so I figured it might all turn to custard. He told me there and then that if I didn't land there I was to pack my bags as soon as we landed. I agreed to pack my bags, but luckily he changed his mind that night when he found out

that there was an accident on the neighbour's farm, killing two, in what they think was due to overpitching the blades.

I've been asked back here next year, hopefully to do some mustering and get my endorsement. They have four pilots here; they are all Kiwis. I was lucky to get this job, sort of got it through a contact and the fact that the boss needed a fourth pilot. Its not all flying though, you have to go through the hard yards too, slogging out long hours in the yards in the heat, getting knocked round by mad bulls.

We try to impress upon all our students the need for a professional attitude. This pilot took this on board, and it was this attitude and professionalism that more than likely saved him from a potentially fatal accident. He passed his CPL less than six months prior to this incident, and this was his first job as a pilot. How difficult do you think it would be for a young chap trying to get his foot in the door to have to make the right decision with that kind of pressure. All credit to him, he is well on his way to a 'professional' flying career.

I would hope that all the new pilots (and old pilots) out there take note of this young pilot's dilemma and will be prepared to make the right decision, as he did, if faced with it. Our industry needs more of these pilots out there and less of the cowboys. New Zealand and Australia have no reason to feel good about the helicopter accident rate, and hopefully with a few more pilots coming through of this calibre, the accident rate will fall. ■

Agricultural Industry Education Package

Photo courtesy Dustan & Kingg

There have been approximately 97 accidents involving New Zealand agricultural aircraft (66 fixed-wing and 31 rotary-wing) over the last five years. Thirteen of these have resulted in serious or fatal injuries to the pilot or crew. Many of the accidents can be attributed to such factors as lack of climb performance due to overloading, higher stalling speeds due to overloading, collisions with transmission lines and fences, hung loads, fuel starvation or exhaustion, undercarriage failure, loss of control while manoeuvring to avoid terrain, insufficient takeoff or landing distances, and poor airstrip surface conditions.

Under new legislation, airstrip owners will be required to maintain their airstrip and facilities to an acceptable standard.

More specifically, CAA statistics show that the accident rate per 100,000 flying hours has been trending upwards over recent years for both fixed-wing and rotary-wing agricultural operations. Comparing 2003 agricultural operations with 1999, the accident rate per 100,000 hours for fixed-wing went from 19 to 22, a 16 percent increase, and rotary-wing from 12 to 16, a 33 percent increase. These increasing rates are concerning the CAA and the NZ Agricultural Aviation Association (NZAAA) – especially the high fixed-wing rate.

In an effort to reduce the number of accidents, the CAA and NZAAA are about to launch a safety education campaign aimed at pilots and operators of agricultural aircraft. The campaign will focus on reducing the fixed-wing accident rate, but rotary-wing operators will still find elements of the education campaign relevant. Airstrip owners will also be targeted. The educational package will consist of:

- A series of *Vector* articles addressing issues such as overloading, airstrip condition, fuel management, bulk product storage, wire strike awareness, fatigue management, aircraft time-in-service recording, employer obligations under the Health and Safety in Employment (HSE) Act, and industry standards. (Note that best practice guidelines for airstrip maintenance and bulk fertiliser storage are currently being developed and should be available by mid 2004.)
- A Good Aviation Practice (GAP) booklet detailing the key aspects outlined in the *Vector* articles that will provide a more permanent reference for pilots and operators.
- A series of articles are also planned in several rural press magazines, targeting airstrip owners and outlining their responsibilities under the HSE Act. Under new legislation, airstrip owners will be required to ensure that they maintain their airstrip and facilities to an acceptable standard (ie, a smooth and well-drained surface free of obstacles in the aircraft's loading, takeoff and landing path). They will be required to provide suitable (water-tight) bulk storage for fertiliser products and provide a well-maintained access road. Airstrip owners who do not meet the minimum standards and fail to make the required improvements may be blacklisted by the NZAAA and prosecuted by the CAA under the HSE Act.
- Posters reminding pilots and operators of the dangers of overloading and operating aircraft off rough farm airstrips are also planned.

Watch out for the first *Vector* article in the series. The GAP booklet and posters should be released late 2004 and will be distributed to agricultural operators. Hopefully these education initiatives will help to kerb the present upward accident trend and save lives. ■

Flight Plan Overdues Update

We continue our feedback on the campaign to reduce the number of flight plans going overdue.

VFR Overdues Statistics

Total plans filed and percentage overdue

2003	Jul	Aug	Sep	Oct	Nov	Dec
Number filed	1872	1661	1513	2555	2416	2201
Number overdue	163	133	148	216	181	160
Percentage overdue	8.7%	8%	9.8%	8.5%	7.5%	7.3%

The November and December figures are very encouraging, showing a downward trend with the December figure of 7.3% being the lowest figure for the year. The total number of plans filed over the last three months of the year reflect the seasonal increase in flying activity, so the reduction in overdue plans is very pleasing.

Keep up the good work and please continue to make a conscious sustained effort to **amend your SARTIME** as required and to **terminate your flight plan** at the end of the flight.

Don't forget the reminder posters and stickers that are available (full information in previous issues).

Reminder Suggestions

Further ideas to assist pilots to remember these flight plan tasks were offered to Airways staff by pilots attending the ACE day in Whangarei.

Broadcast Reminder

One suggestion was that the Flight Information Officer should broadcast a reminder about every 30 minutes. That was considered to be impractical, but what would be possible is to put a reminder message on the FISB (Flight Information Service Broadcasts) so that anyone who monitors it will get the reminder. (Currently there is only one FISB location in New Zealand – providing information for the northern half of the North Island.) Airways have implementation of this under way, and it should be on the Northern FISB before too long.

Checklist Item

Another person suggested that SARTIME checks should become a check associated with every pilot checklist conducted in flight. That way the **Amend SARTIME or Terminate Flight Plan** action would become an integral part of pilot culture and be less likely to be forgotten.

This idea has great merit. We consider that the relevant checklists would be those conducted in cruise or prior to joining.

During cruise the most likely action required would be to amend SARTIME rather than terminating the flight plan. A widely used cruise checklist is CLEAR, and it is simple enough to add an S for SARTIME to make it CLEARS.

C Compass – check DI with compass, check heading.

L Log – update.

E Engine – Fuel, Ts & Ps, carb icing, mixture.

A Altitude (QNH set), Airspace. Amps.

R Radio – as required.

S SARTIME – amend if necessary.

On joining an aerodrome, the likely action required would be to amend SARTIME for the next destination if this is a brief landing, or to terminate the flight plan if it is the final destination.

If you are landing at an unattended aerodrome, you would probably terminate your flight plan (or amend SARTIME) before changing to the unattended frequency. Therefore the additional check should probably come before your other joining checks.

A widely-used joining checklist is FIRE H

F Fuel – contents, select fullest tank.

I Instruments – DI aligned with compass, check latest QNH set.

R Radio call – ATIS/AWIB checked, joining call.

E Engine – Ts and Ps, mixture rich, check carb heat.

H Harnesses, loose objects secure.

Others use FMHR – Fuel, Mixture, Harness, Radio.

An additional F at the beginning of these, to make them FFIRE H or FFMHR would work. Just stutter a bit! Or alternatively have two separate checks under the F.

F Flight Plan, terminate or amend SARTIME.

We would welcome comments on this, or further suggestions, particularly from instructors. Let's see if we can gain a general consensus and standardisation of checklists and then encourage their use both in initial training of students and also actively promoted to qualified pilots in refresher courses or BFRs. ■

Inflated Hours

CAA field staff have recently noted a trend among a few agricultural helicopter pilots with regard to recording inflated flight times in their pilot logbooks. These pilots are logging the total time that the rotors are in motion as flight time rather than 'skids-off to skids-on' time in accordance with the definition for 'flight time' in CAR Part 1, which states: "…the total time from the moment the aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight."

Discrepancies of up to 40 percent between the total engine running time (which includes ground running time) being logged and the actual 'flight time' are occurring in some cases – the latter being the figure recorded in the helicopter's technical log for maintenance purposes. Pilots are starting their machines and leaving them unattended with the rotors turning while they organise equipment, etc and then recording it as 'flight time'.

The rationale that some pilots are using is that because they are responsible for the aircraft (as the pilot-in-command) while the helicopter is running on the ground (eg, ensuring that someone does not walk into the tailrotor), they should be allowed to log the time as flight time. This is **not** correct. Flight time is by definition supposed to record flying experience, **not** ground running experience.

There are various minimum experience requirements that are in danger of being devalued here if this practice becomes widespread. Firstly, the agricultural rating training requirements for a Grade 2 Agricultural Rating (approximately 75 hours) and secondly the experience requirements for a Grade 1 Agricultural Rating (1000 hours of productive agricultural time – one of the requirements before pilots can run their own agricultural operation). The industry can not afford to let safety standards be eroded in this regard. All minimum experience requirements toward a higher licence or rating are there for a good reason and are based on pilots logging flight experience accurately. Trying to 'fast-track' things to achieve these requirements sooner is simply not acceptable. It breaches the law and can attract penalties!

While this trend is a factor in the rotary-wing sector of the agricultural industry at the moment, it must be borne in mind that the rules regarding the logging of flight time also include fixed-wing operations.

Apron Safety Video

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

Safety Seminars

– Aircraft Accidents –

The CAA will be conducting a new series of Av-Kiwi presentations over the next few months, with a theme of recent aircraft accidents in New Zealand.

The seminar examines several recent accidents. Many of the examples are from the sport and aviation sector of the aviation community. You will have noted the new "From the Accident Files" series of articles in *Vector*. The Av-Kiwi accident presentation is designed to complement this series. We can all learn from the accidents of others – it is easier, cheaper and less hazardous than having the accident yourself.

At the time of going to print many venues had been organised, but exact dates for presentations had not been confirmed. Dates will be available soon on the CAA web site, and watch out for flyers which will be distributed to relevant clubs and flying organisations.

Proposed venues, with dates if known, are as follows:

Tauranga – Friday 6 February, 15:00

Sportavex, Tauranga Airport

Mosgiel – Sunday 29 February, 15:00

Otago Aero Club, Taieri Aerodrome

Christchurch – Sunday 28 March, 19:00

Canterbury Aero Club

Auckland *date to be confirmed*

Pikes Point Airpark

Hamilton *date to be confirmed*

Waikato Aero Club

Nelson *date to be confirmed*

Nelson Aero Club

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

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

Letters to the Editor

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

Flight Plan Termination

Once a VFR flight plan has been accepted it is active. It cannot be cancelled. I normally file a flight plan on the internet before I drive to the aerodrome. If the flight is cancelled, for whatever reason, I must terminate the flight plan.

This might all seem terribly obvious, but it was not clear to me until recently. I kind of assumed that the flight plan was activated by my first call to Flight Information advising I was airborne.

That so many pilots are not terminating their flight plans is a matter of concern to all of us. I would like to make two points. I write the SARTIME on a sticky label and fix it near the brake. I want something that looks untidy and out of place, so I notice it. A neat little printed sticker becomes part of the background. Also, I terminate before I forget! That is, while I am still on Christchurch Information 10 miles out – before I change to the aerodrome frequency and become distracted joining. I want this to become a habit, because I know I will forget.

If pilots cannot terminate flight plans habitually, I suggest – and particularly for repeat offenders – a fine. Then the penny might drop.

Dennis N Horne, Auckland
December 2003

Vector Comment

Thanks for raising a point, which others may also be uncertain about. A flight plan becomes active as soon as it is submitted to the National Briefing Office (NBO), whether through IFIS, telephone or fax.

The En-Route (ENR) section of the *AIP New Zealand Vol 1* contains information on flight plans in ENR 1.10 *Flight Planning*. For a VFR flight plan, once submitted, a pilot must inform an appropriate ATS unit of any change to the details in the flight plan and of any change to the flight plan SARTIME before the expiry of that SARTIME; and terminate the flight plan before SARTIME.

This means that if, for some reason, you do not undertake the flight, you **must** advise the National Briefing Office or an appropriate ATS unit. We agree, it is logical that you are *cancelling* the plan rather than *terminating* in this situation as you didn't start the flight. The important thing is that you must take action, whatever the terminology.

If you normally file or submit (varying terminology again!) your flight plan through the IFIS web site, the action you select is headed "VFR Flight Plan Activation". The Help screen has a note "A VFR flight plan submitted via this website Form is not accepted until you receive confirmation of successful activation of your flight plan" so the attempt is there to ensure you understand that it is **activated**, once accepted.

Airways staff advise that they are currently looking at changing the IFIS screen choice "Terminate an active VFR flight plan" to read Terminate/Cancel … to more clearly cover the cancelled flight situation.

They also advise that if you do not undertake the flight, you can ring the NBO who are able to cancel (or terminate) your plan **and** advise Billing so that you will not be charged.

Thanks for your sticky label tip. Terminating your plan before joining an aerodrome circuit is a good idea in most situations, but if you are in an area where you might not be seen if you have a problem approaching the aerodrome or on landing, it may be prudent to delay terminating until after landing – allow a suitable buffer in your SARTIME for this.

You are not the first to suggest a fine for failing to terminate, particularly for repeat offenders – we wonder if there is a general acceptance of that proposal? ■

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

CA Act requires notification "as soon as practicable".

Aviation Safety Concerns

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

0508 4 SAFETY
(0508 472 338)

For all aviation-related safety concerns

Field Safety Advisers

Don Waters
(North Island, north of line, and including, New Plymouth-Taupo-East Cape)
Tel: 0–7–823 7471
Fax: 0–7–823 7481
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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 accessible on the Internet at CAA's web site **www.caa.govt.nz**. These include all those that have been published in *Occurrence Briefs*, and some that have been released but not yet published. (Note that *Occurrence Briefs* and the web site are limited only to those accidents that have occurred since 1 January 1996.)

Accidents

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

Some accidents are investigated by the Transport Accident Investigation Commission, and it is the CAA's responsibility to notify TAIC of all accidents. The reports which follow are the results of either CAA or TAIC investigations. Full TAIC accident reports are available on the TAIC web site **www.taic.org.nz**.

ZK-III, Kawasaki BK117 B-2, 14 Jan 03 at 22:20, Tararua Range. 4 POB, injuries 1 serious, damage substantial. Nature of flight, air ambulance. Pilot CAA licence CPL (Helicopter), age 40 yrs, flying hours 7350 total, 196 on type, 60 in last 90 days.

On Tuesday 14 January 2003, at about 2220, Life Flight Trust BK-117 helicopter ZK-III was on a night VFR flight from Wellington Hospital to Masterton Hospital to pick up an injured patient for an emergency medical transfer. After inadvertently overflying a waypoint by a short distance towards high terrain, the pilot began an emergency climb through cloud. During this climb, the helicopter collided with trees, but it was flown on to an emergency landing at Masterton. The helicopter sustained substantial damage, and the pilot received a serious hand injury. The other occupants were uninjured.

Safety issues identified include:

- The need for air operators to include in their Operations Manuals practical material for night VFR flights.
- The need for guidance material for all night VFR flying.

A full report is available on the TAIC web site.

Main sources of information: Abstract from TAIC report 03-001.

CAA Occurrence Ref 03/91

ZK-USA, Piper PA-38-112, 31 Jan 03 at 13:10, Raumati South. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, training solo. Pilot CAA licence nil, age 41 yrs, flying hours 57 total, 33 on type, 36 in last 90 days.

The student pilot was flying solo circuits after having been authorised to do so by the instructor following a dual check out. The student had carried out one circuit, which resulted in a go-around. During the turn onto base leg for a second approach, it appears that the aircraft entered an unintended spin, from which the pilot could not recover. No fault could be found with the aircraft.

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

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/249

ZK-CZB, NZ Aerospace FU24-950M, 5 Feb 03 at 10:30, Ashhurst. 1 POB, injuries nil, damage unknown. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 35 yrs, flying hours 1100 total, 850 on type, 180 in last 90 days.

The pilot noticed a major vibration from the lefthand wheel during the takeoff so dumped the load. As the aircraft became airborne, he noticed in the mirror that the main left wheel and oleo piston had fallen off. Some damage to the lefthand flap was incurred.

Inspection of the aircraft revealed that the oleo falling off resulted from the failure of the lower torque link bolt after only 215 hours since it was installed new.

Main sources of information: Accident details submitted by operator.

CAA Occurrence Ref 03/1339

ZK-GJU, ZSLS SZD-9 bis Bocian 1E, 16 Mar 03 at 14:40, Colyton. 2 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence PPL (Aeroplane), age 55 yrs, flying hours 866 total, 48 on type, 46 in last 90 days.

While landing in a paddock with a crosswind, the glider banked suddenly and the left wing clipped a fence post.

Main sources of information: Accident details submitted by operator.

CAA Occurrence Ref 03/778

ZK-DUJ, NZ Aerospace FU24-950, 25 Mar 03 at 08:30, Eketahuna. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 56 yrs, flying hours 28,000 total, 20,000 on type, 330 in last 90 days.

As the pilot was lining the aircraft up for a sowing run, the right wing struck a power line. The wire broke, enabling the pilot to regain control and fly the aircraft back to base. The right wing outer panel was replaced and the aircraft returned to service.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 03/843

ZK-TXS, Ultra Sports Tripacer/Vampire, 12 Apr 03 at 14:05, Loburn. 1 POB, injuries 1 minor, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age not known, flying hours 27 total, 27 on type, 2 in last 90 days.

The pilot was carrying out forced landing practice when the microlight clipped a pine tree and fell to the ground.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 03/1044

ZK-HQC, Robinson R22 Beta, 22 Apr 03 at 13:30, Haywards. 1 POB, injuries nil, aircraft destroyed. Nature of flight, agricultural. Pilot CAA licence CPL (Helicopter), age 54 yrs, flying hours 1128 total, 1114 on type, 81 in last 90 days.

The helicopter was engaged in a gorse spraying operation in a steep gully. During a spray run across the gully, the pilot changed heading to spray a small section, slightly uphill from the original track. The change in direction plus the required climb resulted in a loss of airspeed. The pilot attempted to dump the load and land, but the helicopter rolled over in the attempt.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 03/1149

ZK-RBB, Lake View Gyrocopter Top Flight, 28 Apr 03 at 15:10, Glenorchy. 1 POB, injuries 1 fatal, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age not known, flying hours 250 total, 230 on type, 60 in last 90 days.

The pilot lost control of the gyrocopter as he attempted to straighten out from a high-speed low-level sideways pass along the airstrip. The gyrocopter rolled left until the rotor blades were 90 degrees to the ground, at which point it descended vertically into the ground.

Main sources of information: Accident details submitted by Police.

CAA Occurrence Ref 03/1238

ZK-DUJ, NZ Aerospace FU24-950, 5 May 03 at 12:00, nr Masterton. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 56 yrs, flying hours 28,000 total, 20,000 on type, 350 in last 90 days.

The aircraft was carrying out a climbing turn when the pilot heard a loud bang and noticed a gap between the firewall and engine cowling. A landing was made back onto the airstrip, with some damage to the aircraft.

It was found that the top lefthand engine mount to the firewall attachment bolt had failed, allowing the engine and mount to become displaced. A metallurgy report concluded that the bolt had failed due to fatigue, probably as a result of being loaded in bending and not adequately tensioned.

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

CAA Occurrence Ref 03/1310

ZK-FRJ, Pitts S-1S, 25 May 03 at 15:30, Cust. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence ATPL (Aeroplane), age 38 yrs, flying hours 10,750 total, 30 on type, 150 in last 90 days.

The pilot reported that while landing, the aircraft drifted left due to a crosswind and the poor forward visibility characteristics of the Pitts. He did not realise how close he was to a fence that ran parallel with the runway. The aircraft clipped the fence and crashed onto its left side before stopping.

Main sources of information: Accident details submitted by the pilot.

CAA Occurrence Ref 03/1532

ZK-HUW, Hughes 369D, 5 Jun 03 at 11:00, Stockton. 1 POB, injuries nil, damage substantial. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 51 yrs, flying hours 11,365 total, 10,818 on type, 198 in last 90 days.

The pilot reported that engine power reduced to idle while in a low hover. The resulting heavy landing caused major damage to the airframe and main rotor blades.

Despite detailed investigation by engine and fuel system overhaul agencies, no mechanical anomalies were found with the aircraft or engine.

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

CAA Occurrence Ref 03/1634

ZK-JHY, Murphy Rebel, 6 Jul 03 at 12:30, Ashburton. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 49 yrs, flying hours 1103 total, 400 on type, 21 in last 90 days.

The amateur-built aircraft had just about completed its landing roll in light snow conditions when it nosed over, causing minor damage to the wings, tail assembly and propeller.

Main sources of information: Accident details submitted by pilot.

CAA Occurrence Ref 03/1909

ZK-RDL, First Strike Bobcat, 13 Jul 03 at 13:35, Foxpine Ad. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age not known, flying hours not known.

The microlight inadvertently became airborne during a fast-taxi exercise. Upon touching down again, it struck a runway-edge tyre and deflected off into a grove of trees.

Main sources of information: Accident details submitted by the pilot.

CAA Occurrence Ref 03/2080

GA Defect Incidents

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

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

Key to abbreviations:

AD = Airworthiness Directive
NDT = non-destructive testing
P/N = part number
SB = Service Bulletin
TIS = time in service
TSI = time since installation
TSO = time since overhaul
TTIS = total time in service

Cessna 172R
Rudder stops incorrectly mounted, P/N 051259-5

During a routine inspection, it was observed that the lefthand rudder stop was located higher in the rear bulkhead than was the righthand stop. During full deflection of the rudder, the bellcrank appeared to be in danger of 'jumping' the stop.

The New Zealand agent for the manufacturer was contacted, and it was established that the defect appeared to be confined to this individual aircraft only.

The engineering organisation has since designed a modification for approval to rectify the problem. TTIS 1305 hrs.

ATA 2720 CAA Occurrence Ref 01/2949

Cessna A185F
Impulse couplings fail

During a 500-hour inspection, both impulse couplings were found to have broken in the same place. The dogs on the coupling backplate had failed in overload. The probable explanation for this is that the engine had suffered a serious backfire at sometime, but the operator was not aware of this occurring.

ATA 7400 CAA Occurrence Ref 01/360

KHI H369HS
Tailrotor pitch-link found cracked

A crack was noticed in the eye end of the tailrotor pitch-link during a routine maintenance inspection.

Further detailed inspection determined that the crack had initiated in an area of paint damage. Pitting corrosion had developed, and the crack had propagated from this pitting. The crack had completely penetrated the cross section of the eye end. The localised paint damage was probably either as a result of being chipped or due to a poor painting process. This aircraft was normally operated in a coastal environment.

This highlights the importance of effective cleaning, ensuring the integrity of the paint finish on critical components, and taking the time to perform a thorough visual inspection for this type of damage.

ATA 6720 CAA Occurrence Ref 03/2854

Piper PA-32R-300
Nosegear actuator detaches, P/N 35797-02

The nosegear actuator detached at its anchor point (the rearward end) due to the actuator attachment lug cracking. Piper Service Bulletin 724A refers to a similar problem on PA-28R series aircraft.

It is considered by the defect report submitter that the gear 'up-stop' may not have been made when gear UP was selected. In-flight shaking may then have stressed the actuator lug.

The nosegear on this aircraft is held up by hydraulic pressure in the actuator up-line, and this should have acted against the 'up-stop' to prevent movement in flight. A new actuator (superseded type) was fitted, the rigging checked and the 'up-stop' adjusted to ensure the required contact was achieved. TTIS 3111 hrs; TSI 50 hrs.

ATA 3230 CAA Occurrence Ref 01/2400

PA34-200T
Nose gear trunnion fractures

The pilot felt a shudder on landing and was not able to steer the aircraft clear of the runway.

Inspection revealed a fractured nose gear trunnion. A new trunnion was fitted.

The maintenance organisation has since devised a process for detailed inspections of this hard-to-access area so as to avoid a recurrence of this incident.

ATA CAA Occurrence Ref 03/1345

Robin R2160
Stabilator bearings crack

The aircraft stabilator was found to have excessive play in the hinge bearing area. Two hinge bearings were removed and found to have broken outer cages.

The engineering organisation considered that it was possible that the bearings were too small to carry the loads experienced during aerobatics. They recommend a detailed inspection of the area every 100 hours and that the bearings be replaced every 500 hours.

ATA CAA Occurrence Ref 03/203