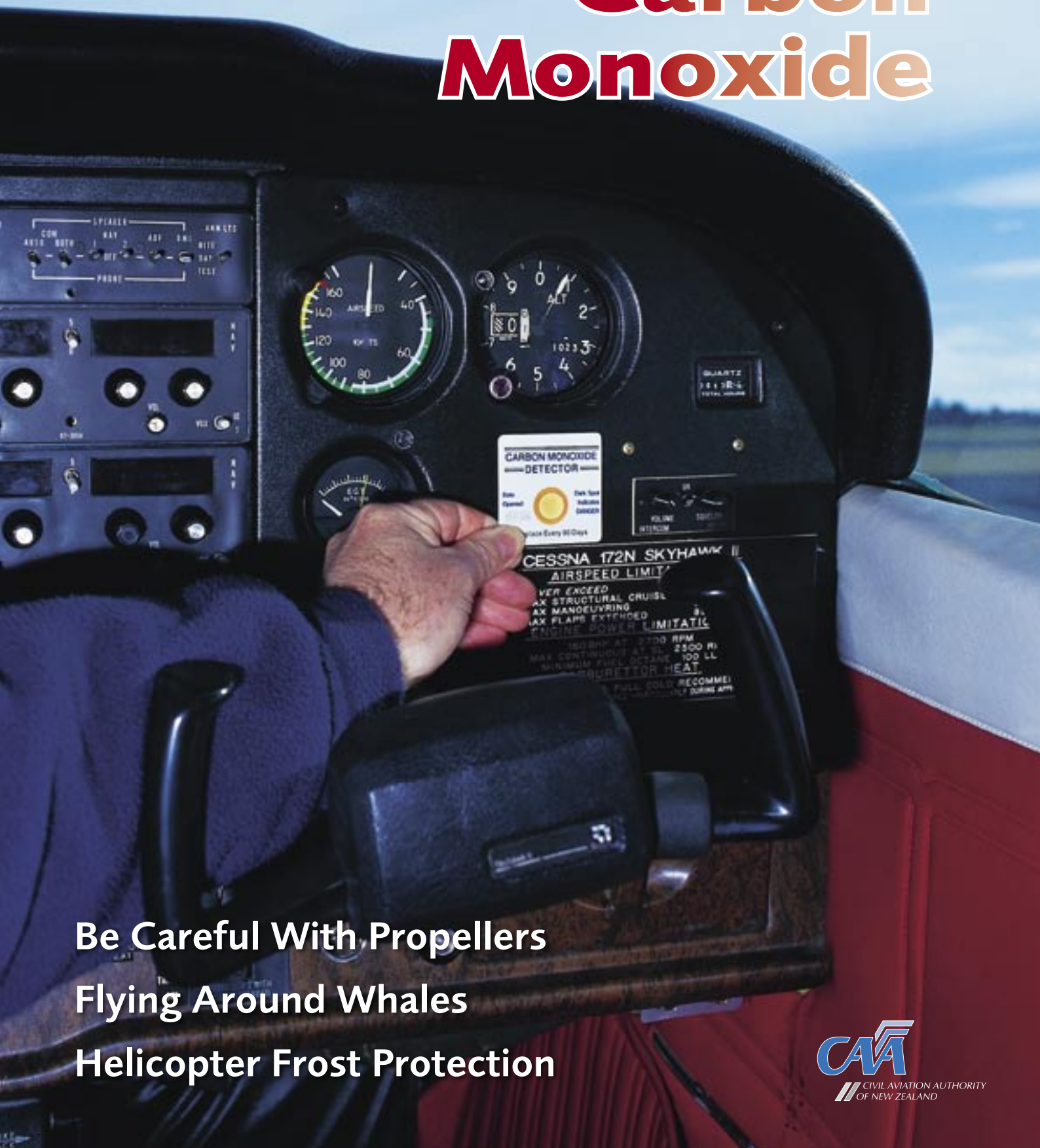


VECTOR

Pointing to Safer Aviation

Carbon Monoxide



Be Careful With Propellers
Flying Around Whales
Helicopter Frost Protection

VECTOR CAA NEWS

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Manager Communications: Bill Sommer.

Editor: Peter Singleton.

Publishing team: Gareth Clare, Pam Collings, Cliff Jenks, Peter MacDonald, Jim Rankin, Anna Walkington, Rose Wood.

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Carbon Monoxide



In this issue of *Vector* there is an article about the tragic loss of an aircraft and pilot due to the effects of carbon monoxide. This article takes a generic look at carbon monoxide, how it is formed, the effects on the human body, and some preventive measures to help you avoid a fate similar to that of the unfortunate pilot in the accompanying article.

Carbon monoxide (CO) is a by-product of combustion in engines. If you can remember your high school chemistry, you will recall that the process of combustion combines oxygen from the air with fuel – basically a series of carbon, oxygen and hydrogen molecules – to produce as the main exhaust products, carbon dioxide (CO₂) and water (H₂O). If the combustion is incomplete, or if there is a shortage of oxygen in the burning mixture, then sometimes instead of forming carbon dioxide, the result is an increase in the levels of carbon monoxide (CO).

Carbon dioxide (CO₂) forms a small but significant percentage of the air around us. Indeed, when you breathe out, the air you exhale contains CO₂ that your body has produced as part of your metabolism. In that respect, your body is just like an engine; it turns oxygen and food (carbon/oxygen/hydrogen molecules) into energy, water and CO₂. The oxygen that keeps this process going is carried around your body in the red cells of your blood, attached to molecules of haemoglobin. The CO₂ produced by the cells is also carried away by the haemoglobin, to be excreted through your lungs. Your body actually needs a certain level of CO₂ in it to trigger and regulate your breathing and cardiovascular system.

The key difference between carbon monoxide and carbon dioxide, from our point of view, is their effect on our bodies.

Carbon dioxide (CO₂) is a natural part of the respiratory cycle, and it is constantly being exchanged for oxygen in our blood.

Carbon monoxide (CO) is a much more reactive molecule, and it has a far greater affinity for haemoglobin in the blood. Rather than being easily exchanged for oxygen in the lungs, it tends to stick to the haemoglobin, and this prevents the blood picking up oxygen. This lack of oxygen has basically the same effect as hypoxia – that of being at too high an altitude. Early symptoms include degradation of vision and increasing loss of concentration and cognitive skills. Skin colour changes as the blood loses oxygen. Motor skills also degrade, making it harder to keep coordinated, or to carry out manual tasks with any degree of finesse. Prolonged exposure to high concentrations of CO can lead to loss of consciousness – then death. Unlike lack of oxygen due to being at high altitude, CO poisoning can not be fixed quickly or simply by descending to thicker air, or by taking some breaths of oxygen. Because of the affinity of the CO molecule for haemoglobin, it takes quite a while (up to several hours) for the body to replace the CO in the blood with oxygen.

CO is tasteless and odourless, which adds to the danger it poses to pilots. Where CO poisoning has occurred through a fault in the exhaust system, it is possible that the pilot may detect other smells from exhaust gases, but the CO itself is undetectable. Given the very insidious nature of the symptoms of CO poisoning, similar to hypoxia, it would be easy to miss the telltale signs until it is too late to react effectively.

Carbon Monoxide Detectors

One line of defence is to fit the aircraft with a CO detector. These come in two basic types.

The simplest, and initially the cheapest, are panel mounted 'spot' detectors. About the size of a credit card, these units have an exposed spot of a chemical that changes colour in the presence of CO.

These cards do have a downside, in that all of the currently available products have a limited life in service. While the chemical reaction that causes the spot to darken is nominally reversible, in practice most units discolour over time. The instructions that come with the unit will state the in-service life of the particular product. They typically range from one to 18 months, depending on the cost of the unit. Costs are generally in the order of \$10 to \$20.



Place your CO detector where it can be easily seen.

The *Vector* observation is that, towards the end of the stated in-service life, most of these detectors start to show significant darkening or discoloration. This could pose a dilemma to the pilot who isn't sure whether the colour observed is due to the age of the detector, or is a result of the presence of CO. It therefore pays to replace the units whenever discoloration is apparent, or the stated life, whichever comes first.

These units are also passive, which means they won't explicitly warn you about CO – you have to look at them. This means that they have to be part of your regular cycle of instrument scan or airman's checks. The unit should also be located in the cockpit in an easily seen, prominent location. The expiry date of the unit should be clearly marked on it.

The other generic type of CO detector uses similar technology

Continued over ...

to that found in home smoke alarms. They are generally about the size of a cigarette packet, and they use an electronic system to provide programmable warnings about CO levels.

These units are more expensive than spot detectors, around \$80 to \$100 for the cheapest, with more expensive ones available. Some of these units have a limited service life, but this is usually measured in years rather than months.

They have the distinct advantage of providing an alarm function, normally visual (flashing lights) as well as audio, so give a better warning of the presence of CO. Another advantage these units have over the spot type is that they generally have a shorter reaction time, and they can indicate the presence of CO much more quickly than the spot type. They can also show when the ambient CO level has decreased (eg, from turning off the heater), while the spot type take some time to return to the original colour. Like all things electronic, they are only as good as the battery, so this needs to be checked regularly and changed when necessary.

An increasing number of GA aircraft are being fitted with a detector, which is good to see. Some pilots are also choosing to purchase their own personal detector, which they carry with them in their flight bag. Given the low cost of detectors, this is a fairly cheap form of insurance. Note that such detectors have uses apart from aviation – CO poisoning from vehicles or gas burners is not unknown.

The *Vector* advice is that all piston-engine aircraft, where there is a possibility of exhaust gas reaching the cockpit, should be fitted with a CO detector. Pilots should check the detector as part of the preflight. The check should include colour and expiry date for the spot type, or a system and battery check for the alarm type.

Preflight and Inflight Precautions

The preflight check should always include a careful examination of the exhaust system and any heating ducts that the aircraft uses. Cracks in the exhaust pipes, or perished ducting, can increase the potential for CO to enter the cockpit. At a deeper level of check, the firewall should be inspected to ensure that all holes and gaps remain sealed. Similarly, all cowls and seals around the engine and cockpit should be regularly checked for integrity.

Even a well-tuned engine with the right mixture setting will produce some carbon monoxide. A poorly-tuned engine, damaged spark plugs, or incorrect mixture settings can all significantly increase the amount of CO being produced.

A regular check of the CO detector should be part of your activity cycle in flight. It would pay to be particularly vigilant if using the cabin heating.

Suspected CO Poisoning

What are you going to do if your detector indicates that you have been exposed to carbon monoxide? The actions you take will depend on circumstances, including the location of the aircraft, the proximity of somewhere suitable to land, and the degree of exposure. We can't legislate for all circumstances, but we can give some general guidelines.

Firstly, try to isolate the source of the CO. If cabin heat is selected on, turn it off. Ventilate the cabin with as much fresh air as you can. If you are fortunate enough to have oxygen available, use it. Changing power setting, mixture setting, aircraft configuration

or speed may all change airflow and CO levels in the cabin.

Check yourself for symptoms. Check your vision. Advanced CO poisoning may show up by a change in your skin colour – maybe your fingernails have turned bluish (but be careful not to confuse temperature effects, such as cold fingers, for CO exposure).

Let someone know of your predicament. A PAN or MAYDAY call to ATC may be in order. They may be able to help you to the nearest suitable landing place, or monitor your flight path.

Remember that the effects of CO take a considerable time to clear. A couple of breaths of fresh air might make you feel better, but the effect of the CO on your cognitive ability and motor skills may take some time to disperse. For that reason, it will generally be advisable to land as soon as you can. You might have to remain airborne a long time to regain your full faculties, and in that time may continue to be exposed to CO, or have more of a chance to make a mistake. Think carefully before you do anything, and make the simplest arrival you can. Don't make life any harder on yourself than it has to be.

Summary

- Carbon monoxide is a known killer of pilots.
- Carbon monoxide has an effect on the body similar to hypoxia, but it takes longer to clear after the source of CO is removed.
- Carbon monoxide is odourless and tasteless.
- The only sure warning is an up-to-date CO detector.
- Check exhaust and heating systems thoroughly as part of the preflight.
- Be particularly vigilant for the effects of CO if you are using cabin heating.
- If CO is detected or suspected, isolate the source and ventilate the cabin.
- Let someone know of your predicament, and land sooner rather than later. ■

STOP PRESS

In recognition of the safety hazard posed by carbon monoxide, the CAA has decided to present a CO detector to most piston-engine aircraft operators in New Zealand. These will be delivered about the same time as this issue of *Vector*. We are sending CO detectors to operators of the aircraft we think most applicable. If you have received one and do not need it, please pass it on to someone who does. If you have not received one and feel you should have, please email info@caa.govt.nz with your client number and aircraft registration.

The units chosen are the commercially available 'Dead Stop' detectors available from a number of sources within New Zealand. They have a limited life of not more than 90 days. If you are already using a detector in your aircraft, well done – consider this a bonus. If you are not, CAA hopes this will act as the impetus for you to continue to fit a detector to your aircraft.

The CAA has consulted with a number of importers of detectors. Choosing the 'Dead Stop' detector is in no way a CAA endorsement of this or any other product. Nor is it expected that the importers will lose business as a result of this initiative. Rather, it is expected that there will be an increased demand for detectors once operators get into the habit of having one fitted to their aircraft.



This is a further article in a series that considers 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 or brief can be found on the CAA web site at www.caa.govt.nz.

Rand KR2 ZK-CSR

Occurrence No 03/1675



On 8 June 2003, the owner of ZK-CSR got airborne from Woodbourne to fly around a military tented camp located nearby. The pilot was an Air Force Engineering Officer, who was associated with the personnel at the camp.

Various witnesses saw the aircraft as it flew at about 500 feet agl up the valley where the camp was located. After the aircraft had flown over the camp, it banked steeply to the left, initially to an angle of about 90 degrees, paused, reduced bank to about 80 degrees, then flicked into a spin to the left. The spin continued, with no signs of any recovery action, until the aircraft hit the ground. The pilot was killed in the impact.

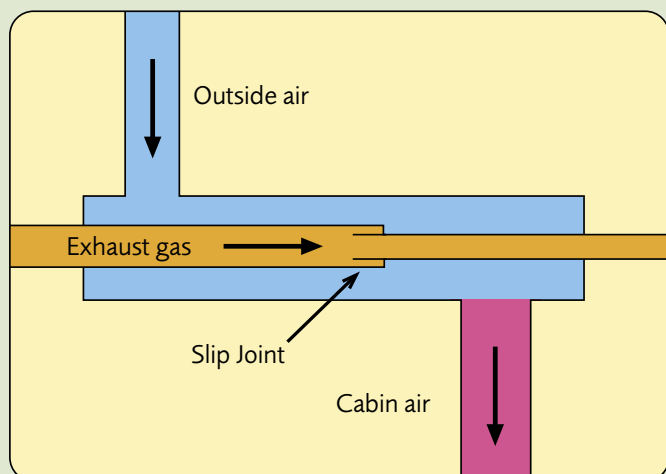
As can be seen in the accompanying photograph, the composite aircraft was demolished by the crash, making the accident unsurvivable. It also made the investigation of the accident much more difficult for the CAA investigator involved. The KR2 aircraft is known for a narrow C of G range, and an occasionally unforgiving stall characteristic. Some of the initial investigations did look at that aspect of the aircraft handling, to try to figure out what went wrong, and why the pilot got into the spin in the first place and then failed to recover.

The post-mortem revealed that the pilot had a blood carbon monoxide level of 23 percent. At this level of saturation, impairment of the pilot's cognitive and motor skills was likely.

The aircraft was on the first flight following modification to the cabin heating system. In common with most light aircraft, the aircraft cabin was heated by using air passing through a shroud

around the exhaust pipe. The installation had proven to be ineffective, so the pilot had relocated the shroud. In doing so, the shroud had been positioned over a slip joint on the exhaust pipe (see Figure 1). Slip joints are designed to allow the pipe to expand and contract with changes in pipe temperature. They are not gas tight. Exhaust gas was therefore able to enter the cabin. The carbon monoxide in the exhaust was apparently sufficient to impair the pilot to the extent that he lost control of the aircraft, leading to the crash. Note that the pilot was an extremely fit young man. It is likely that most pilots would have been impaired much more quickly than he was in this case.

The aircraft was not fitted with a carbon monoxide detector.



Lessons

The root cause of this accident was the modification to the exhaust system. **Any modification to an aircraft** must be carefully thought out. Particular attention should be paid to modifications to control systems, the engine and the exhaust system. The rules for modifications are found in Civil Aviation Rules, Part 43.

This accident may have been prevented had the aircraft been fitted with a carbon monoxide detector. ■



Be Careful With Propellers

Introduction

At the Royal New Zealand Aero Club National Competitions at Gisborne earlier this year, pilots were invited to participate in the CAA Trophy and Airwork Cup, involving a preflight inspection of an aircraft which had been set up with a number of defects. It was observed that many of these pilots did not check that the magneto switches and master switches were turned off before moving the propeller. Indeed, one contestant was observed to have his neck under the propeller while he moved it to check the tension in the alternator belt! Aircraft propellers should be **regarded as always live**, even when the magnetos are confirmed switched off. A fault in the system is always a possibility.

A Recent Accident

The Alpi Pioneer 200 microlight is equipped with electric flaps, and it is reportedly normal practice to lower flap when entering or exiting the aircraft. This is to ensure the pilot does not damage the flap by walking on it. If there is any baggage in the back, the type is also prone to tipping on its tail when the pilot exits. To prevent the aircraft from tipping, the pilot asked his colleague to hold down on the propeller spinner. At the same time the pilot turned on the master switch to lower the flap. In this aircraft, the master switch is also the first position of the key start switch. The start position was inadvertently selected during the process, resulting in the person holding the spinner falling into the propeller arc. Fortunately, the engine did not start (the magnetos are separately switched), but enough rotations took place to cut his face to the extent of requiring stitches.

This accident reinforces the policy of **always treating a propeller as live**. If it is necessary to keep the aircraft from falling on its tail, then it should be held up at the tail end and not by pushing down on the propeller spinner.

Preflight Inspection

Conducting the preflight inspection is a very important task, but not all pilots are as proficient at it as they should be. The aircraft's preflight checklist describes the model-specific items, but there are often other items you should be aware of – check with your instructor.

There are many variations on the way pilots carry out the preflight check. Some may be better than others, but there is no absolute right or wrong method. The important thing is to use the same method each time. If you follow a set routine, then you are less likely to overlook an item. Distractions that interrupt your pattern can cause checklist items to be overlooked. If you do get interrupted, it is best to go back to the beginning of the checklist, or at least to a point that you are certain you covered.

Most preflight inspections start in the cockpit. There are several good reasons for this. Firstly, if the paperwork isn't in order, then there is little point in continuing with the rest of the inspection. Secondly, other items can be checked with the master switch on, such as fuel gauges, landing gear warning lights, flap operation, navigation and landing lights. After these items have been checked, turn the master switch OFF. Before leaving the cockpit, ensure the magnetos are switched OFF, the mixture control is at idle cutoff, and the throttle is closed – to minimise the chances of the engine accidentally starting during the preflight inspection.

Note: If the key and/or the magneto switch key chamber is badly worn, there is a danger that the magnetos can be in the ON position even when the key is removed. Checking that the magneto switch is in the OFF position and the key is out is fundamental – not a quick glance, but a proper visual check, and manual check if required.

The rest of the preflight inspection will be specific to the checklist

for the aircraft type, but as this article is primarily concerned with propeller handling, we will take a closer look at this aspect of the inspection.

Propellers and Spinners

Ensure the spinner is secure. This item is generally made from lightweight aluminium, which can be easily damaged. It should not be leaned on nor have undue pressure put on it when ground handling the aircraft. In some aircraft types, the spinner can be critical in improving engine cooling, by improving the airflow entering the engine compartment.

Inspect the back, front, and leading edges of the propeller for nicks and other damage. Nicks can cause stress points, which could develop into cracks and result in propeller failure. Even if a small piece of the propeller is lost, the propeller will become severely imbalanced. This will cause vibrations that can become so severe that the engine may depart the airframe.



Inspect the back, front, and leading edges of the propeller for nicks and other damage.

When inspecting a constant-speed propeller, check the cowling and windscreen for any signs of oil spray, as this can indicate damage to the propeller seals. Twist the blades and note any play in the hub. For some propeller types, a small amount of play is acceptable, but for others it is not. Also, check that there is no fore or aft movement in the propeller blades. (For further reference, see “Propeller Care” in the July/August 2001 issue of *Vector*.)

Handling the propeller during the preflight inspection must be done with the utmost caution – it is possible that, due to a fault in the system, the propeller may be ‘live’.

They Can Start So Easily

Many modern light aircraft engines are fitted with at least one magneto incorporating an impulse coupling. This generates a ‘fat’ spark at the spark plug points. If the mixture is right, even a small jarring or bumping may start the engine.

Ensure that non-aviators do not ‘play with the propeller’, and avoid leaning on it yourself while chatting to a colleague!

Conclusion

In this article, we have discussed some basic aspects of safe propeller handling. Before handling aircraft propellers, it is important to check that the magneto and master switches are OFF; the mixture is at idle cut-off, and the throttle is closed. To minimise the risk of the engine starting, you should incorporate these as checklist items on the preflight inspection. However, it is still possible that a fault has occurred, so never forget the golden rule – **always treat a propeller as live.** ■



Hand-Swing Starting

With electric starting being almost universal, starting by hand is rarely attempted on most aircraft types. If hand-swinging is necessary, then it should be attempted only by someone who is conversant with the correct procedures.

Consider, firstly, if it is necessary to hand-swing. If the reason is due to a flat battery, then an external start, battery replacement or battery recharge may be a better option. Secondly, is it possible? Some engines are too big to hand-swing, or they may be in such a position as to preclude a safe hand-start, eg, a high-wing aircraft with wing-mounted engines.

General Rules for Hand-Swing Starting

- Only a person trained in hand-swinging should be permitted to start an aircraft engine by this method. Since the propeller swinger will be in a more dangerous position than the person at the controls, the person swinging should assume command of the situation.
- A qualified person (preferably a pilot or maintenance engineer) should occupy the pilot’s seat.
- The aircraft should be positioned so that the person swinging the propeller can obtain a firm foothold with both feet.
- The propeller must not be touched until the person in the cockpit and the person swinging the propeller are certain that the ignition switches are in the OFF position. An aircraft with a magneto switch ON is as lethal as a loaded rifle with the safety catch off.
- Prior to starting, the parking brake (if fitted) must be firmly applied. Push the aircraft to make sure the brakes are holding. If at all in doubt – or if no parking brake is fitted – chock the wheels or tie the aircraft securely.
- Ensure there is good visual and verbal contact between the person in the cockpit and the person swinging.
- Ground rules should be established so that both persons clearly understand the procedure to be followed. The person swinging must insist that their commands and/or signals are repeated by the person in the cockpit (both should speak loudly and clearly).

A more comprehensive article called “Hand-Swing Starting” was published in the July/August 2000 issue of *Vector*.



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

Cautionary Tales on Starting

Incident One

It was a cold morning, and although the aircraft, a Cessna 150 Aerobat, had a starter motor, I decided to prime the engine. I had read an article recently about a priming method to achieve an easy start.

The procedure was: Brakes on, fuel on, give three pumps on the throttle to activate the accelerator pump and deliver fuel to the intake manifold, then mixture to idle cutoff, ignition off, throttle closed. Then pull the prop through by hand. On the second pull of the prop the engine fired once, and the propeller blade caught the first and second fingers of my right hand with a glancing blow. Ouch!! Minimal injury, just a slight cut and later a ridge across the bone which disappeared after a few weeks.

Further enquiries revealed that the previous week the engine had fired when a pilot had rotated the prop from vertical to horizontal prior to hauling the plane out of the hangar. He hadn't reported this incident to the engineer.

I reported it, and it was found that there was a faulty earth from one magneto. I was brought up on hand-propping Tiger Moths, and I should have shown more respect for the sharp metal prop of the Aerobat!

Lessons Learnt

Don't try that again. Always treat the prop as **live**. Use the starter. Always report defects – it may help some fellow pilot to avoid injury.

Thanks to David Pottinger for sharing this experience. The following incident highlights another hazard.

Incident Two

Following an engineering inspection, the pilot of the Cessna 182 carried out an engine run-up before taxiing to the fuel pumps and refuelling the aircraft.

After refuelling, the aircraft was taxied back to the hangar to collect the aircraft logbooks and other paperwork.

When leaving for home a few minutes later, the pilot was unable to get the still-hot engine to start and climbed out of the machine to discuss this problem with the engineer.

At this point clouds of black smoke were observed coming from



the engine, and the engineer almost qualified for the Olympics with his sprint for the fire extinguisher, which was promptly discharged into the engine compartment.

Fortunately, because the engine had been cleaned at the inspection, the only fire damage was to a length of "Scat" tubing between the carburettor and the hot air source for 'carb heat'. This was replaced, soot in the engine bay cleaned off, and a thorough inspection for further damage was carried out. None was found.

The engine was run up and the aircraft released to service.

The pilot advised that, prior to the unsuccessful start attempt, he 'pumped' the throttle several times, as was his habit.

Although this procedure is a well-recognised cause of engine induction fires, it is still practised by a significant number of pilots.

Had the fire occurred when the engine was greasy, and had no fire extinguisher been available, the outcome may well have been the loss of a valuable aircraft.

Correct Priming Technique

*A comprehensive article on primers and priming technique was published in **Vector** 1999, Issue 4. The key points are repeated here.*

A primer system is used on aircraft engines to introduce a small amount of atomised fuel into the engine to improve cold starting. It is a stand-alone system and is not part of the carburettor.

The priming system consists of a fuel pump, discharge nozzles, and interconnecting plumbing. There are two types of systems in use. One type uses a small, manually operated fuel pump located in the cockpit. The other type uses the aircraft electric

boost pump to provide fuel pressure to the discharge nozzles. The electric primer system also incorporates an electrically operated valve to control the fuel flow to the nozzles. The discharge nozzles and plumbing (normally one-eighth-inch tubing) are the same for both systems. Most small aircraft use a manual primer system, while large or multi-engine aircraft may have electric primer systems.

The discharge nozzles of the priming system have a small discharge orifice, which causes the fuel to atomise much like the nozzle on a spray bottle of window cleaner. The nozzles are usually located in the cylinder head in front of the intake valve.

Priming techniques vary among aircraft; it is important, therefore, to determine the best method for the aircraft that you fly regularly. The engine may not require priming on every start, depending on the ambient temperature and the engine temperature.



Manual primer system, on a Piper Tomahawk.



Electric priming system, on a Piper Seneca (buttons top middle).

Priming With the Throttle

Some pilots – even instructors – say that they pump the throttle a few times when starting a stubborn, cold engine. This is **not a recommended practice**. Aircraft engines generally have up-draught or horizontal-draught induction systems, which means that air and fuel must flow upward or horizontally through the carburettor and the induction tubes on their way to the cylinders. If the fuel is not completely picked up by the air and taken into the cylinders, it will drain away from the cylinders and back into the induction system, where it may form puddles of raw fuel.

The fuel is especially likely to ‘drop out’ or fail to mix with the air stream if it is introduced in a coarse, heavy stream rather than a fine, atomised mist. Compare the results of using the “spray” and “stream” nozzle settings on a window cleaner spray bottle. With the nozzle set in the “spray” position, the cleaner is dispersed in a fine mist and does not run off as easily as with the coarse “stream” setting.

The fuel that is discharged from the acceleration system of the carburettor when the throttle is pumped is a coarse, heavy stream – not a fine mist. It is very likely to run down the inside of the induction tubes and form puddles. The primer nozzles are very important, because they atomise the fuel. It is possible to form puddles even when using the primer system, so do not over-prime. If you do create puddles of fuel in the induction system and the engine backfires during starting, the fuel can ignite or even explode. This is called an induction system fire and can result in serious injury or damage.

Even if you’ve had success ‘priming’ with the throttle, it’s only a matter of time until an induction system fire occurs and spoils your whole day.

Don’t be afraid to try different priming techniques to discover what works best for your aircraft. Just remember that there are only two universal rules for priming:

- Less is best, and
- Do not attempt to prime the engine with the throttle. ■

Raglan Aerodrome

After complaints from pilots about persons and animals using the Raglan aerodrome, the CAA made enquiries with the aerodrome operator, Waikato District Council (WDC), as to the current status of the aerodrome.

The WDC advised that it is Public Reserve Land, and while the aerodrome is the major function, it is not the only reason that the public may use the area. Many persons use the aerodrome to access the harbour beach on foot. Vehicular access is prohibited unless specific council approval has been obtained, and the gate is kept padlocked at all times.

Warning signs have been erected by the WDC at several locations around the perimeter. These state that persons using the aerodrome should check carefully for aircraft taking off and approaching to land.

The WDC also requires that animals to be kept on a lead while crossing the reserve, and that the area is crossed without delay.

Raglan is becoming increasingly popular as a destination for pilots and holiday-makers alike. Skydiving, scenic flights (both fixed-wing aircraft and helicopters), and flight training take place at the aerodrome. The WDC wish to remind pilots that a nominal landing fee of five dollars is payable at the Camp Office 50 metres from the aerodrome. Pilots are invited to leave comments at this office regarding any problems they may have had with using the aerodrome.

As Raglan aerodrome is available for the public to carry out recreational activities other than aviation, it is strongly recommended that pilots using the aerodrome be **extra vigilant** and maintain a good lookout for people and animals in the landing and takeoff areas.

Flying Around Whales

In recent years Kaikoura has changed from a sleepy coastal village into a busy, vibrant mecca for tourists, most of who are drawn by the opportunity to view the various marine mammals in the area. You can view seals on a walk around the end of the Kaikoura Peninsula, take a boat trip and swim with the dolphins and, most popular of all, view whales from a boat or from the air.

Whale-watching is a very popular tourist option. From a pilot's perspective, this means increased activity at Kaikoura aerodrome and in the offshore area as commercial whale-watch operators, in both fixed-wing aircraft and helicopters, offer their passengers an aerial view of a whale. The helicopter operator is based in the township. Skydiving operations are also planned to take place from Kaikoura aerodrome, and this will add a different traffic element to the mix. The area of most intensive whale-watching activity extends up to 15 miles offshore to the south of the Kaikoura Peninsula.

Because of the amount of traffic generated by commercial whale-watch operations, and the number of itinerant aircraft flying along the coast on this major north-south route, a Mandatory Broadcast Zone was established some years ago.

Some specific operating procedures for the Kaikoura MBZ have been published in *AIP New Zealand Vol 4* (in the amendment effective 2 Sep 04). These elaborate on the general procedures for Mandatory Broadcast Zones (found in *AIP New Zealand ENR 5.3* paragraph 3.6) and mention some requirements of the Marine Mammals Protection Regulations. The desirability of obtaining a briefing from local operators is emphasised, and contact telephone numbers are included.

Protection Considerations

We are fortunate in New Zealand to be able to come into close proximity to whales, dolphins and seals, but, to ensure this situation can continue, we must all be mindful of acting appropriately. The Marine Mammals Protection Regulations 1992* are designed to regulate human contact or behaviour with marine mammals, in order to prevent any adverse effects on them.

Regulation 18 outlines conditions for behaviour around any marine mammal. It requires people to operate in a manner that does not disrupt the normal movement or behaviour of the

mammal, and to abandon contact if at any stage the mammal shows signs of becoming disturbed or alarmed.

The regulations seek to protect the whales by preventing any loud or disturbing noise near them. To this end there is a 'cone of silence' created, with boats being allowed to approach no closer than 50 metres from a whale, and aircraft no closer than a 500-foot (150 metres) horizontal distance.



The Kaikoura MBZ can be very busy. Look out for other aircraft flying in the vicinity, particularly around the whales.

There are specific requirements for aerial viewing. When operating below 2000 feet amsl, aircraft must not fly closer than 500 feet horizontally from a point directly above any marine mammal (and, of course, not below 500 feet amsl under CAA legislation). Pilots of commercial whale-watch aircraft are asked to avoid placing the aircraft shadow directly over the whale whenever possible.

Regulation 19 outlines special conditions relating to whales. These include the requirement that no vessel or aircraft shall approach within 1000 feet of any whale if there are three vessels and/or aircraft already positioned for watching that whale. Regulation 20 contains similar requirements for watching a pod of dolphins or a herd of seals. Furthermore, where two or more vessels or aircraft approach a whale, the boat skippers concerned and the pilots concerned shall coordinate their approach and manoeuvres.

Obviously, the commercial operators are fully versed with these regulations, but itinerant pilots unfamiliar with the requirements can be a cause for concern, both in terms of safety in the air, and with respect to the appropriate behaviour for the protection of the whale.

Incident

There have been a number of incidents involving visiting aircraft, mostly involving a lack of communication and lookout. In an incident earlier this year, two aircraft from a large training organisation were operating in the whale-watch area obviously keen to view a whale. The safety of the whale-watch operation depends on good communication and appropriate aircraft separation. The pilot of a commercial whale-watch aircraft, which was maintaining 1000 feet while searching for a whale, asked these two aircraft to remain at 1500 feet or above to ensure a safe vertical separation.

When a whale was located, the whale-watch aircraft made a radio call descending to 500 feet and the itinerant aircraft were then invited to descend to 1000 feet around the whale (still maintaining a 500-foot vertical separation). There were now two whale-watching boats around this whale and a third approaching, so when a second whale surfaced close by, the whale-watch aircraft moved to the second whale to allow the third boat to continue its approach.

One of the itinerant aircraft then called descending to 800 feet over the three boats. The whale-watch aircraft informed the itinerant that they should not descend because of aircraft separation requirements. The itinerant replied that they would continue to descend to see the whale. By doing so, they not only jeopardised the safety of the whale-watch aircraft operating close by, but they also infringed the Marine Mammals Protection Regulations. When informed of the regulation, the itinerant eventually agreed to climb back to 1000 feet. Meanwhile, the other itinerant aircraft made no radio calls at all while operating around a whale in close proximity to two other aircraft.

The actions of these itinerant pilots were considered unsafe, inconsiderate, and unprofessional. They may not have been aware of the regulations regarding marine mammals, but they disregarded good safe operating practice in their desire to see a whale.

Similar situations have occurred at other times – sometimes forcing the commercial whale-watch aircraft to abandon their viewing to ensure the safety of their passengers.



Looking north towards the Kaikoura Peninsula from the whale-watch area.

Airmanship Considerations

There are pitfalls in operating at low level over the sea with no ground features for reference. The commercial operators have the training, experience, and currency for this type of operation. Itinerant pilots should bear this in mind and maintain suitable margins appropriate to their level of skill and experience. Focusing on a whale and forgetting to fly the aeroplane has the potential for disaster.

Try to be accurate when making position reports. This is not easy when you are over the water with no specific landmarks to precisely identify your position. The local pilots report that itinerants often overestimate distance. They will report five miles from the shore, for example, when in fact they are only two miles

from shore. Use whatever references you can to help you make accurate distance judgements. For instance, the peninsula is two miles long; a line from Haumuri Bluff (south of Oaro) to the tip of the peninsula is about three miles off shore. Reporting points you may hear the locals use are “The bluffs” (Haumuri Bluff) and “Sharktooth” (which juts out to the south from the tip of the peninsula).



Kaikoura Aerodrome.

Contact locals for information and take heed of their advice! They are willing to assist you to see a whale – they know where to look and what to look for. If you take the time to land at Kaikoura, they can offer a briefing on operations in the area, you can learn more about the whales from their educational displays, and you can enjoy a cup of coffee at the terminal café. In the busy season they have limited time in the air to advise visiting aircraft – with several whale-watch aircraft operating, communications and concentration are centred around their own separation requirements. Hence, a ground briefing first is desirable.

It is important to understand that any commercial operation to view whales requires a permit from the Department of Conservation.

Finally ...

Be considerate and display good airmanship – the commercial operators are willing to help you but you must communicate with them and courtesy is appreciated.

Be aware of the Marine Mammals Protection Regulations.

Remember the following basic points.

- If you are flying below 2000 feet, you must not fly over a whale or any closer than 500 feet horizontally from a whale (and not below 500 feet amsl).
- If there is already a total of three boats and/or aircraft around a whale, you must stay away or remain above 1000 feet.
- Ensure that you communicate and coordinate with any other aircraft in the vicinity. Please give local aircraft priority.
- Apply good airmanship at all times. ■

*The Department of Conservation administers the Marine Mammals Protection Regulations. If you require further information, please contact DOC directly.

Helicopter Frost Protection

The Hughes 300 lifted off at approximately 0615 local time, with the pilot and a passenger on board, for a photographic sortie to capture the sunrise over local vineyards. At 0630, witnesses saw the helicopter descend in the dark, and crash. The helicopter's engine had failed at around 500 feet agl. This left the pilot in the dangerous position of having to attempt an autorotation at night, onto undulating terrain. The pilot attempted to use whatever rotor rpm the engine would produce, hoping that the situation would improve. Inevitably, the rotor rpm could not be sustained, and the helicopter impacted the ground in an uncontrolled state. The pilot sustained severe spinal injuries, and the passenger was killed.

The fact that the pilot could not see the ground had a very profound influence on the outcome of the emergency. The pilot probably did the best he could in that situation, but one can only surmise how the same situation might have been handled if the flight had commenced just 10 minutes later, at dawn.

This accident illustrates that night flying operations can be dangerous. Helicopter frost protection work is no exception, but the risks can be reduced by careful consideration and planning.

The Rules

Last year, a letter regarding helicopter frost protection operations was posted to many New Zealand helicopter pilots. This letter outlined the regulatory requirements for pilot night proficiency, and the required aircraft equipment for night VFR (rule 91.511 *Night VFR instruments and equipment*). Excerpts from this letter are reprinted in this article for the benefit of pilots who did not receive the letter, and who intend to conduct frost protection operations this year.

This year, the CAA General Aviation Group's Rotary Unit will again be monitoring frost protection operations around the country.

The Pilot

If it is an operation for 'hire or reward', the pilot must hold a Helicopter Commercial Pilot Licence (CPL H). The pilot is required to have local night privileges (within 25 NM) certified in their logbook by an A- or B-category instructor. If passengers are to be carried, then night currency is also required – three takeoffs, translational circuits, and three landings in the previous three months.

If it is required to transit more than 5 NM from a lighted heliport or aerodrome (not recommended for frost work), one hour of instrument flight time is required in the previous three months.

Local night privileges training requirements include:

- 10 hours night flying in helicopters, including 5 hours dual.
- 10 takeoffs, translational circuits, and landings, solo.
- 2 hours of dual instrument flight time in helicopters.

See Civil Aviation Rule Part 61 *Pilot Licences and Ratings*.

Care must be taken to ensure that pilots do not exceed their Part 135 flight and duty times. It may be possible for pilots to be stood down from their normal duties, in preparation for frost protection work.

The operator is responsible for ensuring that pilots, flying frost protection operations within a control zone, are familiar with the required procedures. This includes having copies of *AIP New Zealand Vol 4*, (or the relevant plates), charts, NOTAMs and current meteorological information. A serviceable torch for each crew member is also required.

The Aircraft

Additional night instruments and equipment are required.

These include:

- a turn and slip indicator.
- position lights.
- an anti-collision light.

All of the required instruments are to be serviceable and illuminated.

When flying in controlled airspace, ensure the aircraft has a serviceable transponder, and ALT is selected.

It is advisable to remove the hook mirror to reduce the possibility of reflection from the landing light, as this will degrade night vision. Installation of additional lighting, as a back-up, must be



Additional lighting on a Hughes 369.

an approved modification in accordance with acceptable technical data (CAR Part 21 *Certification of Products and Parts*). For more information, contact the Aircraft Certification Unit at the CAA.

The Operation

If passengers, who are not crew members (refer to Civil Aviation Rules, Part 1 *Definitions*), are carried on the helicopter, the operation becomes an Air Operation, and this requires the operator to hold a Part 119/135 Air Operators Certificate.

Considerations

Before the Frost Season

Ideally, the grower and the helicopter operator should meet before the frost season starts. This assists the operator to identify potential hazards, and a hazard plan can be formulated.

The chosen landing site should be well lit and clear of obstacles. This includes the arrival and departure flight paths. Obtain a thorough briefing on the nature and location of all significant obstacles – it may be prudent to carry out a reconnaissance with the owner, in daylight, to achieve this.

Some obstacles to watch for include:

- television and radio aerials.
- power poles and lines.
- electric fence power supply wires.
- buildings and tall trees.



The landing and fuelling area should be on site, as this minimises ferry times and reduces noise pollution for the neighbours. The area should be secure from animals and from the general public. If intending to store fuel for the season, ensure it is kept safe from water contamination, and that it is in a suitable container. Fuel should be stored in a tanker, or a drum, and **not** in a plastic container. Care should

be taken to correctly identify the type and quality of the fuel – fuel does go stale.

One person, on site, should be appointed responsible for all activities around the helicopter and helipad. Also – ensure the vineyard owner is thoroughly briefed on safety around helicopters.

Discuss the callout procedure. It is useful for this to include the communications required on the night, including the method of notifying the pilot. The pilot and support crew should, preferably, be accommodated on site. This saves time in responding to the frost alarm. It also helps to ensure the pilot is well rested for the operation. The onsite accommodation should be comfortable, as there is nothing worse than being cold, hungry, and not being able to sleep, while waiting for the phone to ring!



Allow sufficient time to fly the helicopter to the site before ECT.

Emergency Callout

An operator may receive an emergency callout when frost conditions are forecast. The operator should have a written procedure for handling the situation, taking into account the daylight time remaining, pilot fatigue, and the following day's commitments. Sufficient time should be allowed for positioning the helicopter before Evening Civil Twilight (ECT), and to receive a briefing from the grower. Ideally, have the vineyard owner fax instructions, and a map of the area, before the operation begins. Avoid the temptation to travel at night, to assist in the 'emergency' situation. Do not be tempted to compromise your personal or company minimums, in the interest of what someone else considers to be an 'emergency'.

On the Night

After arriving on site, review the hazard plan and operational requirements with the grower. This review should be undertaken with other helicopter pilots involved in the operation, so that radio frequencies can be coordinated.

When the frost alarm has been raised, avoid being rushed by a stressed grower. It is important to allow 15 minutes for dark adaptation. This time can be



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used efficiently to establish the maximum flight time available for the fuel that is carried (including the reserve), undertaking a final fuel drain, and checking the helicopter for clear ice. It may be handy to have a ground power pack nearby, to assist in starting the helicopter.

After startup, check that the outside air temperature gauge is operational. Ensure that all condensation on the outside and the inside of the bubble has dried off. Some helicopter types require a considerable period of time before the heater becomes effective, and this needs to be factored into the time before lift-off, otherwise visibility will be impaired.

Each flight at night is different. Be aware of the visual illusions that can occur. In particular, judgement of distance is more difficult at night than by day. During daylight, the pilot estimates distance by comparing the sizes of nearby and distant objects. At night, this is rarely possible, with the only visible objects being 'points' of light. Only the brightness of these points of light can be used as a cue for judging distance. This is why, on very clear nights, lights will often seem closer than they really are, and on nights when the atmospheric visibility is low they will seem further away.

Flying at night is easier if there is a full moon; visibility is better, making observation of other helicopters, and hazards easier. If there is no moon, or the moon becomes briefly obscured by cloud, then awareness of your surroundings is more difficult.

Make sure you are able to communicate with other helicopters operating in the vicinity, and with the grower, throughout the operation. This will ensure safety and efficiency. If sharing the same block with other helicopters, a good lookout is important.



A temperature probe (circled), linked to a digital temperature display inside the cockpit.



Frost Protection Operations at Blenheim

The Blenheim area has a large number of vineyards, and during the frost season it can be extremely busy, with over 30 helicopters operating at night. Last year, Woodbourne Tower reported problems with the seasonal influx of helicopters entering controlled airspace at ECT without prior warning. This presented difficulties for the duty controllers, and a number of airspace occurrences were filed.

This year, in order to facilitate smooth coordination of helicopter traffic, give Woodbourne Tower as much notice of your expected arrival as possible. Telephone and enter a flight detail, with the expected arrival time, and destination. Ensure you have the appropriate aerodrome charts, a current VNC, and that you are familiar with the procedures for operating inside the control zone (including the reporting points). Remember, the aircraft must have a serviceable transponder, with ALT selected.

When the frost operation starts, Woodbourne Tower will usually be off watch (check the latest AIP supplement for hours of service), and the airspace is uncontrolled. Caution is required, if operating near Woodbourne aerodrome, as at various

times during the night, aircraft may be arriving via the instrument approach. If possible, maintain a listening watch on 122.8 MHz, and avoid operating near the final approach path.

For noise abatement, avoid overflying the built-up areas. This is particularly important if flying to Omaka to refuel. Good airmanship is required around the Omaka fuel facility, as it can be extremely busy.



When flying in the white boxed area, when the Tower is off watch, be aware of arriving or departing aircraft at Woodbourne. **Monitor 122.8 MHz.**

Use the radio to assist with separation – this will also help your concentration.

The nature of the frost protection operation will depend on the height of the inversion layer. The inversion layer is distinguished by a 'warmer layer of air' above which the temperature increases with height. Typically it is between 50 and 150 feet agl. Flying below the inversion layer is not efficient, because the helicopter will not be down-washing the warmer air onto the crop. To identify the height of the inversion layer, the helicopter needs to be fitted with an outside air temperature probe, linked to a digital back-lit display. The pilot can then vary the altitude of the helicopter accordingly.

The efficiency of down-washing the warmer air onto the crop depends on many factors – such as the height, speed, and weight of the helicopter. These factors need to be considered along with the safety of the operation. Consequently, in the event of an engine failure, it may be impossible to make a safe landing. It is important to have the ground, and any obstacles, in sight at all times.

The pilot should have a planned procedure, in the event of inadvertently entering IMC, or of suddenly losing visual contact with the ground. Such a procedure needs to be planned in advance.

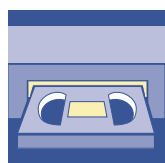
Fatigue is an important consideration. The pilot needs to have adequate rest, in suitable on site accommodation, before flying in the early hours of the morning.

Noise Abatement Procedures

The CAA does receive complaints from the public regarding night helicopter frost protection operations carried out around the country's vineyards and orchards. The number of complaints can be reduced by having the helicopter in position before nightfall. This minimises over-flight of built-up areas at unsociable hours. The landing site, and refuelling point, should be on or near the property of the owner, to eliminate ferry flights over built-up areas.

Conclusion

Night flying needs to be treated with the utmost care and respect. The risk involved in frost protection operations can be reduced by positioning the helicopter during the daylight hours, receiving a thorough briefing from the grower, and ensuring that the pilot and the helicopter are suitably qualified and equipped for night flying. ■



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 – Videos". Note the instructions on how to borrow or purchase.

Civil Aviation Authority of New Zealand

Safety Video Series

Title	Length	Year released
Airframe Icing	26 min	2003
Airspace and the VFR Pilot	45 min	1992
Apron Safety	19 min	2003
Collision Avoidance	21 min	1993
Decisions, Decisions	30 min	1996
Drugs and Flying	14 min	1995
ELTs and SAR	17 min	2004
Fatal Impressions	5 min	1995
Fit to Fly?	23 min	1995
Fuel Management	38 min	2002
It's Alright if You Know What You Are Doing – Mountain Flying	32 min	1997
Light Twins	23 min	2001
Marine Survival	42 min	2003
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

Other titles

All of Us (security awareness)	22 min	2003
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

These may be borrowed, but not purchased, from CAA.

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

Checked your ELT?

This poster reminds pilots of the need to check for inadvertent ELT activation, and of the correct actions to take if it is operating.

This poster is available in A2 size, and should be displayed on doors leading from the operating area, noticeboards, etc.

Posters can be obtained by contacting your local Field Safety Adviser (see the advertisement in this issue for their contact details), or the Communications and Safety Education Unit.

Tel: 0-4-560 9400

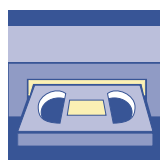
Email: publications@caa.govt.nz



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
04/13	15 Oct 2004	21 Oct 2004	23 Dec 2004
05/01	12 Nov 2004	18 Nov 2004	20 Jan 2005
05/02	26 Nov 2004	02 Dec 2004	17 Feb 2005



New Video – ELTs and SAR

A new 17-minute video, *ELTs and SAR*, has been recently released. This revised and updated video describes how SAR satellites and various emergency beacons interact.

It gives advice on how to look after the aircraft ELT, including the importance of correct installation, ongoing maintenance, and pre-flight and cockpit checks. Reasons for failure to activate are covered. Inadvertent activation is also addressed, with advice on how to avoid this.

The importance of amending SARTIME or terminating the Flight Plan is stressed.

Finally, the viewer is advised on what to do with the emergency beacon in the event of an accident.

See also, in this issue, the list of all the available safety videos and how to borrow or purchase them.

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

Mobile: 027-485 2096

e-mail: watersd@caa.govt.nz

Ross St George

(North Island, south of line New Plymouth-Taupo-East Cape)

Tel: 0-6-353 7443

Fax: 0-6-353 3374

Mobile: 027-485 2097

e-mail: stgeorger@caa.govt.nz

Murray Fowler

(South Island)

Tel: 0-3-349 8687

Fax: 0-3-349 5851

Mobile: 027-485 2098

e-mail: fowlerm@caa.govt.nz

Owen Walker

(Maintenance, North Island)

Tel: 0-7-866-0236

Fax: 0-7-866-0235

Mobile: 027-244 1425

e-mail: walkero@caa.govt.nz

Bob Jelley

(Maintenance, South Island)

Tel: 0-3-322 6388

Fax: 0-3-322 6379

Mobile: 027-285 2022

e-mail: jelleyb@caa.govt.nz

The A to Z of Flight Planning

Including:

- New Visual Navigation Charts
- New Airspace Poster
- New Airspace GAP Booklet
- MetFlight-GA – a new FREE internet weather service for GA pilots

An Av-Kiwi safety seminar presented by Jim Rankin, RNZAF Instructor, will focus on pre-flight planning and in-flight considerations. Mystified by airspace? Len Wicks, CAA, will be on hand to help you understand airspace, recent changes to airspace, and the new VNCs.

For further information, check out the CAA web site, www.caa.govt.nz.

Seminar Schedule

(duration approximately 2 hours)

Ardmore – Sunday 14 November, 15:00

Auckland Aero Club

Blenheim – Wednesday 1 December, 19:00

Marlborough Aero Club, Omaka Aerodrome

Christchurch – Thursday 2 December, 19:00

Canterbury Aero Club

Dunedin – Friday 3 December, 19:00

Otago Aero Club, Taieri Aerodrome

Hamilton – Wednesday 24 November, 19:00

Waikato Aero Club

Hastings – Thursday 9 December, 19:00

Hawkes Bay & East Coast Aero Club, Bridge Pa Aerodrome

Hokitika – Sunday 5 December, 15:30

Hokitika Aero Club

Invercargill – Saturday 4 December, 11:30

Southland Aero Club

Masterton – Friday 10 December, 19:00

Wairarapa and Ruahine Aero Club, Hood Aerodrome

Motueka – Wednesday 1 December, 10:00

Nelson Aviation College

New Plymouth – Tuesday 23 November, 19:00

New Plymouth Aero Club

North Shore – Sunday 14 November, 10:30

North Shore Aero Club

Palmerston North – Friday 26 November, 18:00

Manawatu Districts Aero Club

Paraparaumu – Wednesday 10 November, 19:00

Kapiti Districts Aero Club

Queenstown – Saturday 4 December, 18:30

Terminal Building, Queenstown Aerodrome

Rotorua – Wednesday 8 December, 19:00

Rotorua Aero Club.

Tauranga – Thursday 25 November, 19:00

Tauranga Aero Club

Whangarei – Saturday 13 November, 13:00

Northland Districts Aero Club



OCCURRENCE BRIEFS

Lessons for Safer Aviation

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

Accidents

The pilot-in-command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form 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 that follow are the results of either CAA or TAIC investigations. Full TAIC accident reports are available on the TAIC web site www.taic.org.nz.

ZK-IMG, Robinson R22 Alpha, 14 Jan 03 at 20:00, West Coast. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence Private Pilot Licence (Helicopter), age 47 yrs, flying hours 180 total, 180 on type, 10 in last 90 days.

The pilot reported that, while hovering, the helicopter's skid got caught on a rock. The pilot lost control in the ensuing dynamic rollover.

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

[CAA Occurrence Ref 03/92](#)

ZK-HVE, Schweizer 269C-1, 23 Jul 03 at 11:50, Mitre, Tararua Range. 2 POB, injuries 2 minor, damage substantial. Nature of flight, training dual. Pilot CAA licence CPL (Helicopter), age 28 yrs, flying hours 614 total, 539 on type, 116 in last 90 days.

The helicopter was on a dual training flight, and a landing was being attempted on a peak of about 5000 feet elevation. The performance had previously been calculated, and the landing was assessed as feasible. During the approach, the rotor rpm decayed to a point from where recovery was not possible. A go-around was attempted, but the machine sank and struck a rock, rolling over on to its side. Both pilots received minor injuries and were transported to hospital by rescue helicopter.

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

[CAA Occurrence Ref 03/2136](#)

ZK-HCL, Robinson R22 Beta, 30 Jul 03 at 12:45, Mount Ngauruhoe. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence Commercial Pilot Licence (Helicopter), age 23 yrs, flying hours 200 total, 3 on type, 10 in last 90 days.

It was reported that the helicopter had an accident while trying to land at 6,000 ft on the northern slopes of Mt Ngauruhoe. Both occupants were uninjured.

Main sources of information: Rescue Coordination Centre.

[CAA Occurrence Ref 03/2206](#)

ZK-BDS, Fletcher FU24-950M, 20 Sep 03 at 12:05, Matawai. 2 POB, injuries 1 serious, 1 minor, damage substantial. Nature of flight, ferry/positioning. Pilot CAA licence Commercial Pilot Licence (Aeroplane), age 34 yrs, flying hours 1462 total, 201 on type, 227 in last 90 days.

The aircraft encountered low cloud and poor visibility during the flight, so the pilot decided to turn back. It was during this turn that a high sink rate was encountered, which caused the aircraft to collide with a hillside. Both occupants were injured.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 03/2679](#)

ZK-HPI, Aerospatiale AS 355F1, 29 Oct 03 at 11:00, Central Otago. 1 POB, injuries nil, damage substantial. Nature of flight, ferry/positioning. Pilot CAA licence Commercial Pilot Licence (Helicopter), age 44 yrs, flying hours 1984 total, 27 on type, 24 in last 90 days.

The pilot had fitted dual controls and was to fly the machine 200 m to a helipad. He had, however, put the dual cyclic in backwards and once airborne could not control the machine. The resulting heavy landing caused substantial damage to the skids and tail boom. Service Letter 726-67-85 recognised this problem in 1985. It requires a rivet to be fitted to the cyclic base for one-way fitment, to ensure pilot proofing. This type of occurrence has happened on other occasions in New Zealand.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 03/3093](#)

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 9000 lb (4082 kg) or less. These and more reports are available on the CAA web site www.caa.govt.nz. Details of defects should normally be submitted on Form 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	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

Aerospatiale AS 350B

Aerospatiale AS 350B Rear frame

During an inspection to comply with requirements of Service Bulletin 05.00.43, the rear fuselage frame was found with minor cracks. The frame was repaired as per the Service Bulletin and a doubler fitted at the crack location. TTIS 5486 hrs.

ATA 5300

CAA Occurrence Ref 04/1719

Aerospatiale AS 350B

Turbomeca Arriel1B No.3 module Rear Cover P/N 0292507640

After shutdown, the pilot rotated the blades in the reverse direction and detected a noise coming from the exhaust system of the turbine. An inspection found that damage had occurred to the free turbine wheel blades. This damage appeared to have occurred from a failure of the number three module rear cover. The rear cover of the gas producer section may not have been installed correctly by the overseas manufacturer's overhaul agency. TTIS 341 hrs.

ATA 7200

CAA Occurrence Ref 04/890

Aerospatiale AS 355F1

Aerospatiale AS 355F1 Rear frame

Minor cracks were found in the rear fuselage frame, while the engineer was complying with Service Bulletin SB 05.00.42. The frame was repaired in accordance with SB 05.00.43. Three angle brackets were fitted. TTIS 5268 hrs.

ATA 5300

CAA Occurrence Ref 04/1720

Bell 206B

Boost pump

As the helicopter was about to leave the base, the fuel filter and boost pump warning lights illuminated. Investigation revealed a coloured substance in the fuel filter, but fuel samples taken from the tank and trailer tanker were free from signs of contamination. The helicopter's boost pump was replaced.

ATA 2800

CAA Occurrence Ref 04/1085

Bell 206B

Lower case

It was reported that the transmission was found to be making metal, 87 hours after a 4500-hour overhaul. The metal deposits were from excessive sun-gear spline wear, possibly caused by a misalignment in the lower case. TSO 87 hrs.

ATA 6320

CAA Occurrence Ref 04/892

Britten-Norman BN2A-26

Aileron cable

The right aileron control cable was found routed underneath the right fuel tank boost pump feed line instead of above it, as designed. The cable had worn two-thirds of the way through the fuel pipe. The pipeline was replaced, and the cable was correctly routed above it.

ATA 2711

CAA Occurrence Ref 03/3920

Cessna 182P

Precision MA 4 5 Metal Float P/N CF 30 764

The operator reported that the carburettor suffered from flooding. The engineer inspected it, and found one pontoon detached from the metal float assembly. The suspected cause was from poor soldering adhesion. The engineer recommended the fitting of polymer floats at the next overhaul, to all MA-33PA, MA-4-5, MA-4-5AA, and MA-6AA carburettors. TSO 130 hrs.

ATA 7300

CAA Occurrence Ref 03/3507

Fletcher FU24-950M

NAS Bolts u/c cylinder attach

The righthand landing gear lower forward clamp bolt failed. This allowed the outer portion of the lower clamp to move rearwards, bending the lower back bolt and causing the cylinder to move rearwards. All affected parts renewed.

ATA 3210

CAA Occurrence Ref 04/307

Gippsland GA8

Gippsland GAS 28206 43 Fuel strainers' cover

During the aircraft's first 100-hour inspection since import, the cover plate that fits over the fuel strainers and locks the fuel cocks in the ON position, was missing. Therefore, the ON position would not be able to be safely selected by the pilot. The original cover plate was located and fitted. TTIS 100 hrs.

ATA 2800

CAA Occurrence Ref 03/3495

Hughes 269C

Tank

Fuel was noticed seeping from the top of the tank near the fill point seam. Refuelling was stopped. A hairline crack was found.

ATA 2800

CAA Occurrence Ref 04/1721

Piper PA-28-161

Crankshaft inspection plug.

It was reported that shortly after departure, the pilot noticed oil rapidly coating the windscreen and requested an immediate landing. An engineering inspection revealed that the crankshaft inspection plug had blown out of the engine, allowing oil to escape. The plug had been refitted during scheduled maintenance prior to this flight. The plug was refitted with no further problems.

ATA 8500

CAA Occurrence Ref 04/1649