July / August 2008

VECTOR

POINTING TO SAFER AVIATION

Deep in Night Flight Season

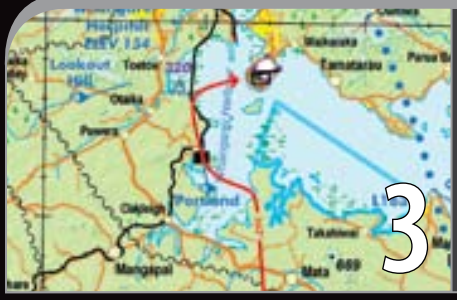
Missed Approach for Real

Operator Certificates – Valid Five Years

New Tool to Reduce Controlled Flight Into Terrain

CAA
CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

VECTOR



Missed Approaches

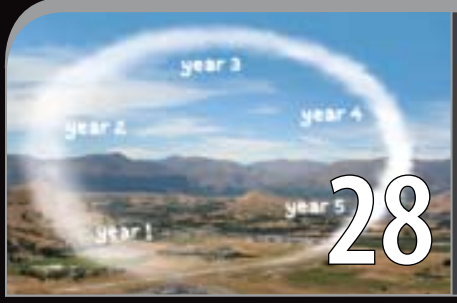
When training, you know a missed approach is coming. The speed at which a real missed approach happens can come as a surprise. Be prepared and unload your brain.

Night VFR

It's deep into night flying season. Here's a reminder on how to protect your night vision, what to carry, and tips for navigating VFR at night.

Airways Helping to Prevent CFIT

Airways has launched a new tool that aims to reduce Controlled Flight Into Terrain. Pilots will receive warnings from controllers.



Operating Certificates Valid Five Years

Operating certificates are valid for only five years maximum. Re-certification is not just another audit. Plan ahead and be prepared.

In this issue...

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New Zealand Government

Missed Approaches

Flying a missed approach is hard enough without having to think – what next? – at the same time.

The missed approach is an extremely high workload situation. There are many important considerations – terrain clearance and accurate tracking for starters. Our brains can handle only so many things at once, so planning what you will do in the event of a missed approach, before it happens, means you will be better able to concentrate on flying the aircraft – your primary task.

Carrying out a missed approach 'for real' is very different from the training environment. In training, you know it is coming, and missed approaches are generally practised on one engine. In reality, a missed approach can be quite a shock, particularly if you are accustomed to always landing off an approach. There may be an element of 'I can't believe I didn't get in' going on in your head. On top of this, be aware that a missed approach on two engines is going to happen a lot faster than you are used to, having practised them on one engine.

Plan Your Missed Approach

There are many important things to consider before deciding on your missed approach plan, such as weather, aircraft performance, and fuel.

Think about the quantity of fuel you have and whether it limits the number of further approaches you can attempt, or requires an immediate divert to a suitable alternate aerodrome. This may be influenced by company policy.

Many missed approaches (especially in uncontrolled airspace) require an entry into a hold. It is a good idea to work out the required hold entry in advance, and calculate how long you can hold before diverting.

On some missed approaches, where a turn is required to enter a hold overhead the aerodrome, there may be minimal time to get established in the hold – especially in high performance aircraft. In situations where the turn is to be made **not below** a particular altitude, it can be delayed to provide more time to establish in the hold, for example, the Timaru NDB/DME RWY 20. The only time you cannot delay the turn is if it must be carried out **at** a particular altitude, for example the Woodbourne VOR/DME RWY 24.

You could consider attempting a different approach, as localised conditions at the aerodrome may be different from one approach path to the other. For example, after missing on the VOR/DME ALFA at Nelson, you could attempt the VOR/DME 02.

On an air operation, be aware that an early missed approach may be necessary if the visibility falls below the prescribed minima before you pass the Final Approach Fix (FAF) or Final Approach Segment. In this instance, a missed approach must be initiated at the FAF. You cannot continue to the Decision Altitude (DA) or missed approach point (Civil Aviation Rules 135.159, 125.159, 121.159).

If circling is required at your destination, think about the following points. If at any time during a circling manoeuvre an identifiable part of the aerodrome is not distinctly visible (except when obscured by the normal manoeuvring of the aircraft), while at or above Minimum Descent Altitude (MDA) the published missed approach must be executed. At some aerodromes, however, it is not possible to carry out the published missed approach when you are below MDA – due to local terrain considerations.

PANS-OPS (ICAO Document 8168 – Procedures for Air Navigation Services – Aircraft Operations) states that because circling manoeuvres can be carried out in more than one direction, different actions will be required to establish an aircraft on the prescribed missed approach depending on its position at the time visual reference is lost. To transition from the visual circling manoeuvre to the missed approach, a climbing turn should be made within the circling area, towards the landing runway, to return to MDA. Once above MDA, the published missed approach should be executed.

A good example of this is while circling for Runway 06 at Whangarei. The published missed approach for the Twin NBD/DME, Twin NDB, and RNAV (GNSS) ALFA requires a climbing left turn. While tracking via the runway 06 gate and lead in lights, a left turn would take you straight towards terrain. A right turn would take you over the harbour – a much safer option. Once above MDA, the missed approach can then be flown.

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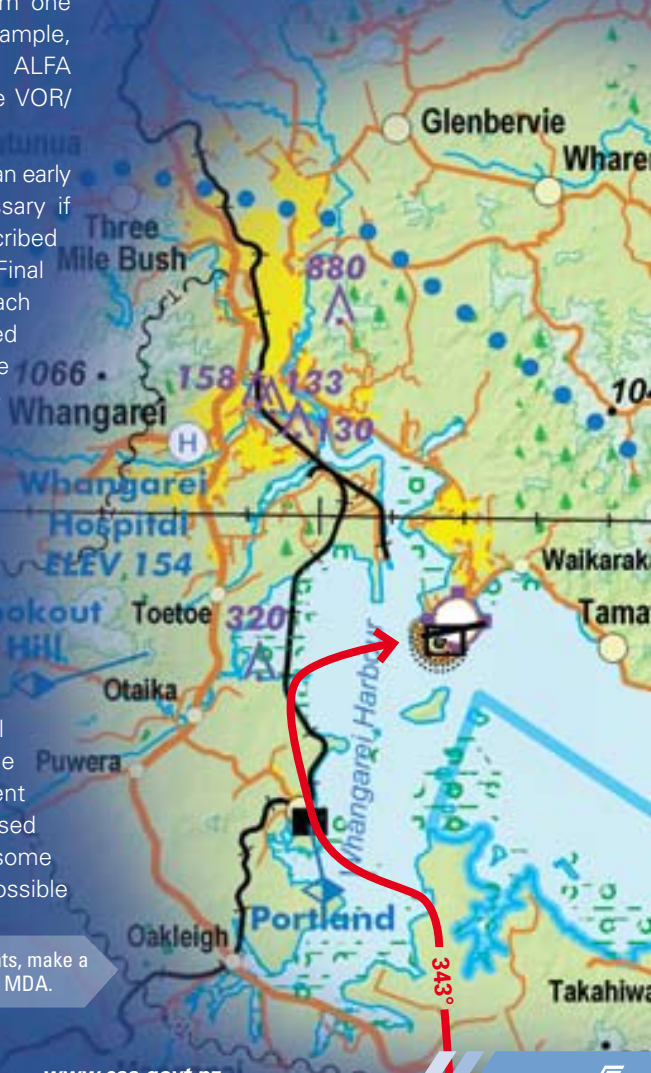


If you lose visual reference at Whangarei while tracking via the Runway 06 gate and lead in lights, make a climbing right turn over the harbour. Only carry out the published missed approach when above MDA.

›› *Continued from previous page*

After considering all of this, formulate a plan and incorporate this into your missed approach brief. Always brief the missed approach section as thoroughly as you brief the actual approach.

Your workload on the missed approach can be reduced further if you use as many tools as possible, for example the autopilot.

Mindset

It is easy to have a mindset that a missed approach occurs only due to marginal weather conditions. Even if the weather is suitable for a landing after your intended approach, it is good airmanship to decide on a backup plan in the event your approach is affected by Air Traffic Control (ATC), other aircraft, or a navaid failure. Even on a visual approach there remains the possibility of having to fly a missed approach or a visual go-around into the circuit.

In the event of a navaid failure, it is good airmanship to carry out a missed approach. Brief a new approach using a suitable alternative aid before you fly it, rather than continuing and switching approaches half way through (without briefing the new one).

Making the Grade

Missed approach procedures are designed to provide a minimum obstacle clearance of 98 feet to aircraft climbing at a gradient of 2.5 percent, or 150 feet per NM, from the missed approach point or DA. At a ground speed of 100 knots this equates to a rate of climb of 250 feet per minute.

Many light twins will not be able to meet this gradient on one engine. As part of your preflight planning process, work out what climb gradient your aircraft can achieve on one engine given the weight, temperature, and altitude on the day.

If a 2.5 percent climb gradient cannot be achieved, then work out how much the DA or MDA needs to be increased by to ensure obstacle clearance on the missed approach. Alternatively, leave enough weight behind to ensure your rate of climb will be enough to meet the gradient.

Let's take the Dunedin ILS/DME RWY 21 as an example. In some light twins at all up weight, on one engine, in certain ambient conditions, your average rate of climb would be 150 feet per minute (worst case scenario). This equates to a climb gradient of 1.48%, well below the required 2.5%.

Climbing at 150 feet per minute, and based on a ground speed of 100 knots, you would reach only 1382 feet overhead the Berridale NDB. Be aware that it may be even less than this because there will be a period of time when your aircraft has no rate of climb at all (while the gear and flap are still extended).

Climbing at the 2.5% (or 250 feet per minute) required for obstacle clearance would see you achieve 2126 feet overhead the Berridale NDB. You can then climb to the minimum hold altitude of 3500 feet in the hold.

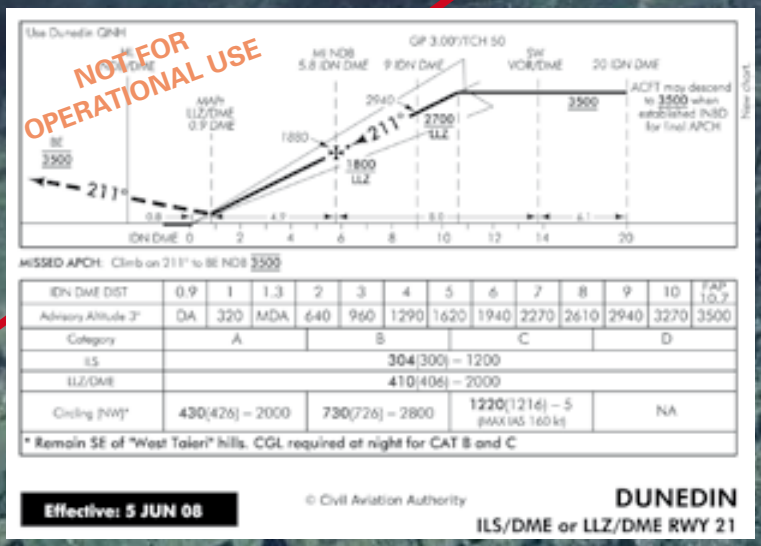
In order to achieve 2126 feet by Berridale, while on one engine, you could only descend to a DA of 1047 feet, compared to the published DA of 304 feet. You may wish to add in a further fudge factor to account for the fact that a positive rate of climb will only be achieved once the aircraft has been configured for the missed approach, and to counter any sink known to be encountered on the missed approach.

It is a good idea to write check distances and altitudes on the approach plate to help you monitor whether you are making the missed approach gradient or not. Using the same example as above, a light twin climbing at 150 ft per minute at 100 knots ground speed, will climb 90 feet per NM.

Check altitudes for the Dunedin ILS/DME RWY 21 missed approach:

24.9 SW DME Overhead BE NDB	2126
19.9 SW DME	1676
15.9 SW DME	1316

Think about a back up plan you can implement if you are not making the gradient. In the case of the Dunedin ILS/DME RWY 21, at a safe altitude for turning you could carry out a left procedure turn, taking you to the east of the missed approach track and away from high terrain. You could then carry out the ILS/DME RWY 03 approach to land or continue climbing on the missed approach for the ILS/DME RWY 03.



IDN DME DIST	0.9	1	1.3	2	3	4	5	6	7	8	9	10	FAP 10.7
Advisory Altitude 3°	DA	320	MDA	640	960	1290	1620	1940	2270	2610	2940	3270	3500
Category	A			B				C			D		
ILS	304(300) – 1200												
LLZ/DME	410(406) – 2000												
Circling (NW)*	430(426) – 2000			730(726) – 2800				1220(1216) – 5 (MAX IAS 160 kt)			NA		

* Remain SE of "West Taieri" hills. CGL required at night for CAT B and C

Effective: 5 JUN 08

DUNEDIN
ILS/DME or LLZ/DME RWY 21

If you are not making the gradient, ask for help. If you are within radar coverage ATC can give you radar terrain clearance. If you are not, then they could give you suggested radar headings.

What rate of climb can your aircraft achieve on one engine? Does this affect what DA you can use to ensure obstacle clearance?

Missed Approach Tips

- Flying a constant profile will assist in preparing for and transitioning to a missed approach.
- If you have any doubts about terrain, profile, speed, continuing visually, or if anything distracts you from flying the approach, carry out the missed approach.
- When flying a non-precision approach single-pilot, in IMC, avoid the temptation to visually search for the runway before the missed approach point, as this can affect your tracking and instrument scan.
- Know the maximum speed for your category of aircraft while on a missed approach. Exceeding the maximum speed can jeopardise protection on the missed approach. Cat A – 110, Cat B – 150, Cat C – 240, Cat D – 265 (knots IAS, unless otherwise specified on the approach chart).
- For single-pilot operations use the autopilot to minimise your workload. This will provide you with more time to monitor and evaluate your options.

The TOP 5

There are almost 1000 airspace occurrences every year. Here are the five most common.

ATS Clearance and/or Instruction Deficiency

While you may not be able to tell if a clearance you are given is correct, if you have doubts, you must check.

Examples

» A light aircraft was given incorrect joining instructions when joining the circuit. Both the pilot and the air traffic controller became aware of this error, and the correct instructions were provided, along with instructions to another aircraft in the circuit.

» While a small aircraft was on final, a larger aircraft was cleared for takeoff, and shortly afterwards the small aircraft was cleared for a touch-and-go. The pilot queried if the appropriate wake turbulence delay had been applied. The controller admitted that there should have been one more minute remaining. The aircraft was then cleared to land and backtrack, with a departure after the minute had passed.

Loss of Separation

These occur when aircraft infringe the separation standards, or when aircraft that are outside controlled airspace come too close to each other.

Examples

» The tower controller did not realise that the pilot had incorrectly read back diversionary climb instructions. As a result, the aircraft climbed towards another aircraft flying in the opposite direction.

» A commuter aircraft was on climb-out after departure and making radio calls on the current (new) frequency when they noticed traffic directly ahead on ACAS. They could not contact the traffic, so took avoiding action. They tried the old frequency and spoke to a pilot inbound to the aerodrome who was unaware of the frequency change. The crew felt that if the other aircraft's transponder was not on, a near collision would have occurred.

ACAS

Airborne Collision Avoidance System (ACAS) predicts the future position of aircraft and generates warnings to the pilot. It can work only from known information. When aircraft come too close, or rates of climb or descent are high near level-off altitudes, it generates a warning. When it predicts an imminent collision, it generates a resolution advisory (RA) which pilots must respond to and then report to ATC.

The majority of these occurrences are VFR traffic conflicting with IFR arrivals on visual approaches, in both controlled and uncontrolled airspace.

Examples

» An IFR flight on a visual approach, joining downwind, advised that a light aircraft on opposite base and positioning number two behind had generated an RA alert because of its positioning close behind. The light aircraft had the preceding aircraft in sight and was positioning number two ahead of further traffic joining on a 5 NM final.

» An RA alert in controlled airspace was generated because of a high rate of descent too close to the cleared level and separated traffic below.

Airspace Occurrences

2 Breach of Other Clearance

This is where a clearance has been issued but not followed, and includes;

» deviating from a clearance when Controlled VFR – track or altitude, and

» not following clearances to line up, takeoff, touch-and-go, or instructions to maintain altitude or radar heading, and to follow departure or arrival instructions.

Examples

» The aircraft had received a clearance to operate VFR in controlled airspace. However, it was then seen to deviate from the assigned altitude without a clearance. The pilot said they had descended to avoid cloud.

» A VFR flight was cleared to depart via the VFR departure procedure. The pilot failed to comply with this procedure and tracked through the instrument approach sector.

1 Unauthorised Airspace Incursion

Straying into airspace without a clearance is by far the most common occurrence and is usually caused by not being completely sure of your position at all times. Flying too close to the lower level of airspace, and not maintaining your altitude may lead to an airspace bust.

Examples

» The pilot was carrying out a general handling flight when they misidentified a point on the coast and climbed to 3000 feet – entering controlled airspace.

» A VFR flight entered controlled airspace without a clearance. The pilot had become distracted while searching through paperwork for information on the destination aerodrome.

How to Avoid Making These Mistakes

Pre flight planning and a thorough briefing is the key to avoiding most of these occurrences. Having a clear understanding of where you are, where you are going and what you plan to do when you get there is essential. Make sure you have up-to-date charts, are well prepared so you can manage your in-flight workload, and have a good understanding of the airspace you will be operating in or near.

When you get a clearance, write it down if you can, mentally picture the limit of that clearance, understand the clearance, make sure you read back exactly (and only) what you are supposed to, and if you don't understand – ask for clarification.

With regards to ACAS occurrences, getting too close to an aircraft with ACAS, even though you have visual separation and may even be behind it, could lead to an RA.

Credit: Tranz/Reuters

Security is **Everyone's** Responsibility

On 8 February 2008, it is alleged that a Somali woman attempted to hijack an Air National Jetstream 32 aircraft on a flight from Blenheim to Christchurch. The woman, armed with a knife, and claiming there were bombs on board, demanded to be taken to Australia. The aircraft landed safely in Christchurch, but both pilots and a passenger were injured during the event.

As a result of this incident, a review of New Zealand's domestic aviation security is being carried out. In the meantime, the CAA and the Aviation Security Service (AvSec) have developed a security awareness training programme for airport staff, police and other emergency services. This has been delivered by AvSec at 26 regional aerodromes that cater for aircraft of 19 seats and over on regular domestic passenger flights.

The training aimed to provide airport staff with useful information to help them identify and diminish potential security threats. The key to security awareness is using your observational skills. Take note of unattended bags and odd or suspicious behaviour.

What to look for:

- **Nervous behaviour** – this can be detected in a person's speech or their habits such as nail biting, touching their nose, eyes, or ears, or avoiding eye contact
- **An aggressive or defensive stance** – crossed arms, clenched fists, and tone of voice
- **Fidgeting** – foot tapping, pacing, or shifting their weight from side to side
- **Laughter** – forced or nervous
- **Licking lips** – a dry mouth can be due to excess adrenaline
- **Being uncooperative**
- **Sweating** – having a flushed appearance, or high colour
- **Intoxication**
- **Dilated pupils**
- **Over-friendly or flirtatious**
- **Over-protective of bags**
- **Concern about getting a specific seat number**
- **Unusual interest in aircraft and airport procedures**

Remember there can be other explanations for all of these behaviours. They do not necessarily mean someone is a threat. For example, someone that is sweating or flushed could just be a nervous flyer or rushing to catch their flight – use conversation to determine this. Talking to anyone you have doubts about is the key. A few short questions about their flights and why they are travelling may be enough to either confirm your suspicions or put them to rest.

If you think a passenger may be a threat, there are several options available to you depending on how strong your suspicion is. These range from notifying a supervisor, advising the pilot, or refusing to carry the passenger, to calling the police (in the case of aggressive behaviour).

Always act on doubts and use common sense. Everyone working in the airport environment has a role to play in ensuring the safety of aviation in New Zealand. ■

Credit: Tranz/Reuters

New **Microlight** Pilot's Exam

The Recreational Aircraft Association of New Zealand (RAANZ) has introduced a new human factors section into its training manual. It means novice microlight pilots will now sit a human factors exam before being granted their Intermediate Pilot Certificate.

Microlight Pilot Certificates are administered by organisations certificated under Part 149 *Aviation Recreation Organisations – Certification*. RAANZ is one such organisation. Administration Officer Stuart Parker says the human factors section was added voluntarily by the organisation because the subject had such a significant impact on safety.

"More and more of the incidents and accidents that occur involve some element of human factors, and in a microlight you are more exposed to the outside world," Stuart says.

"The exam focuses on human factors topics that are particularly important for microlighting, such as the effects of altitude and hypothermia. We would certainly encourage all microlight pilots to read the material, even if they have already been granted their certificate."

CAA Manager Sport and Recreation Rex Kenny said RAANZ should be commended for continuing to evolve requirements that would have a positive effect on safety in the sector. ■

> More and more of the incidents and accidents that occur involve some element of human factors, and in a microlight you are more exposed to the outside world.

To view the RAANZ Training Manual, see their website
www.raanz.org.nz

Flying and **Pregnancy**

Pregnancy is a natural event and most pilots can continue to fly throughout much of their pregnancy. However, pregnancy must be notified to the Director of Civil Aviation, as a change in medical condition.

Each pregnancy is unique, but the following conditions and restrictions will generally apply:

» Class 1 and 2 medical certificate holders may not fly until reaching the end of 12 weeks of pregnancy. At the end of the first 12 weeks, the CAA requires a satisfactory ultrasound confirming the dates of the pregnancy, and a report from the pilot's Lead Maternity Carer (LMC). This should include full clinical details and blood test results.

» Class 1 holders flying passenger-carrying air operations must fly either with or as a co-pilot during pregnancy.

» Class 1 privileges are suspended at 28 weeks of pregnancy.

» Pilots may continue to exercise Class 2 privileges from 28 weeks until the end of 32 weeks, provided they fly with a safety pilot.

» Class 1 and 2 holders cannot resume the full privileges of their medical certificate until six weeks after delivery, and following a satisfactory clearance from their Medical Examiner.

» During the pregnancy, the pilot must provide the CAA with a brief report following each visit with their LMC (a photocopy of the LMC notes is best), outlining any concerns, and including any laboratory and ultrasound reports. The CAA must be notified of any complications, need for medications or referrals to a specialist.

» Pregnant pilots who experience complications or feel unwell should immediately ground themselves and notify the CAA. ■

Flying After **Maintenance**

There is no longer one single document that proves airworthiness after maintenance, but by following some simple steps, pilots and operators can be confident that an aircraft collected after maintenance is airworthy.

Airworthiness – What is it?

An airworthy aircraft is one that:

» Complies with all the rule requirements relating to design, manufacture, maintenance, modification, repair and safety. Which means:

- it conforms to its design and manufacture specifications,
- all modifications and / or repairs are installed correctly,
- it is maintained in accordance with all the applicable rules,
- all due maintenance is completed on time and correctly, and
- all of its components, substances, fuel and fluids are included in its airworthiness status.

It is the *operator's* responsibility to ensure the airworthiness of the aircraft. It is the pilot's responsibility to ensure the aircraft is airworthy before they fly it.

Continued over ››

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Airworthiness is a shared responsibility – the operator, the maintenance engineer and the pilot are all responsible for the airworthiness of an aircraft. The operator ensures that the required maintenance is scheduled and carried out; the maintenance provider ensures it is carried out in accordance with acceptable standards, is correctly documented, and a release-to-service is completed; and the pilot checks the aircraft before each flight.

Before an aircraft can be flown after maintenance, both the aircraft operator and the pilot must ensure it is airworthy. Under rule 91.101(a)1 a person may not operate an aircraft unless the aircraft has a current airworthiness certificate and is in an airworthy condition. Rule 91.603(a) requires (among other things) the operator of an aircraft to ensure that the aircraft is maintained in an airworthy condition.

The Technical Log is Not a Maintenance Release

The technical log is now the document used to inform the pilot of the current maintenance status of the aircraft. However, the technical log is not the same as the old-style maintenance release, which is no longer in existence.

Incidents and Accidents

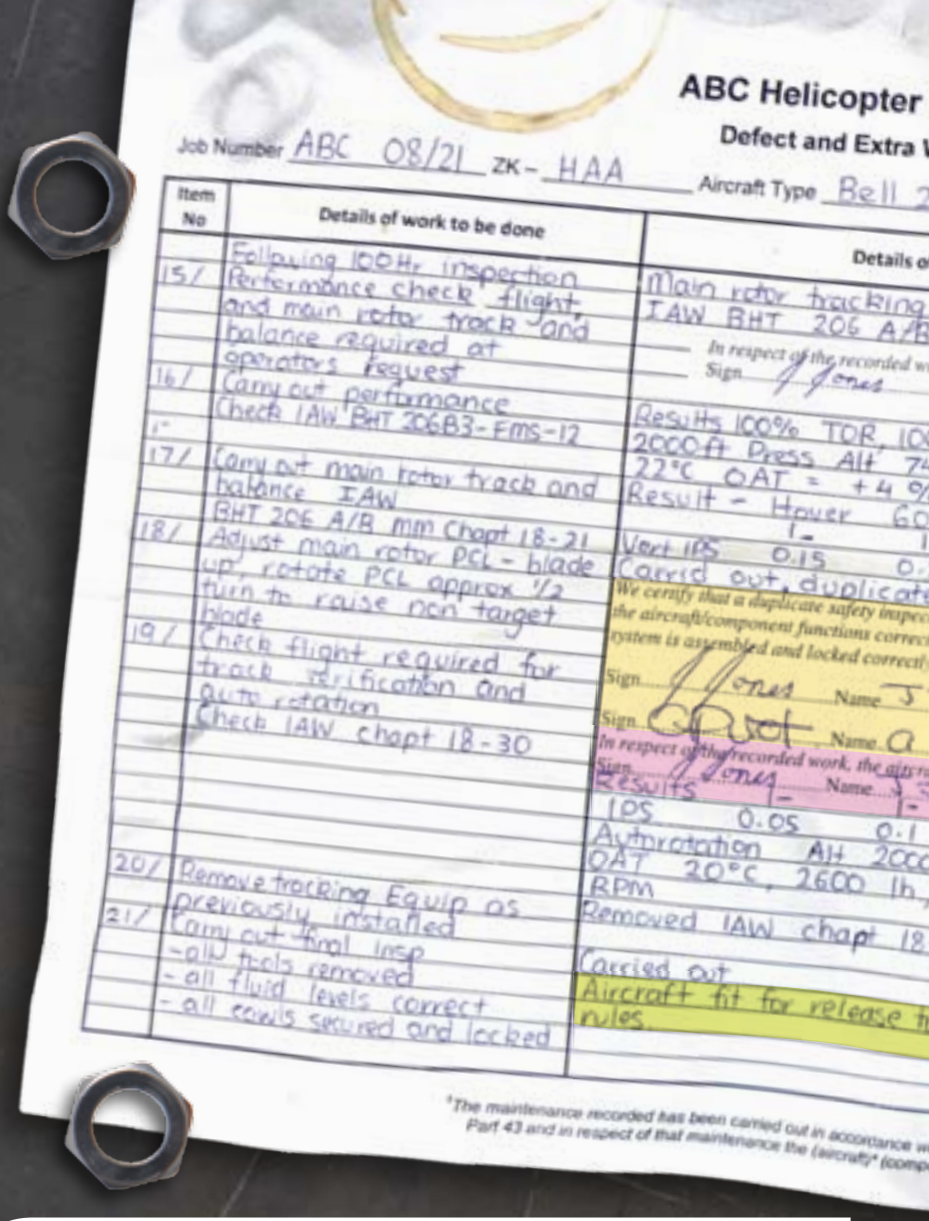
In recent years a number of helicopter accidents were caused by poor or non-existent back-up inspections on dual flight controls. One JetRanger could produce barely enough power to fly, and several EC120 helicopters have had engines over-temp during start.

In these cases, the accident causes were traced back to maintenance not being carried out correctly. A thorough check of the maintenance paperwork may have caught these mistakes.

Engineers are often asked to come along on flight checks, but if the paperwork has not been checked off properly, having the engineer on board may not save you. In fact, there have been instances of engineers being on board during accidents.

While pilots and operators are not expected to physically check that the work has been carried out correctly, you can do a common sense check of the maintenance records for all appropriate entries and signatures.

All of the checks below – checking the work package, the duplicate inspection of controls, and preflight checks are important elements of the safety net, designed to help catch any errors and mistakes.



Change to the Technical Log

The Technical Log has been altered in response to industry feedback. The latest revision has removed the area on the front cover (section one) for the name and signature of the person transferring the information from the work records / logbooks to the technical log. This signature was mistakenly being considered a release-to-service.

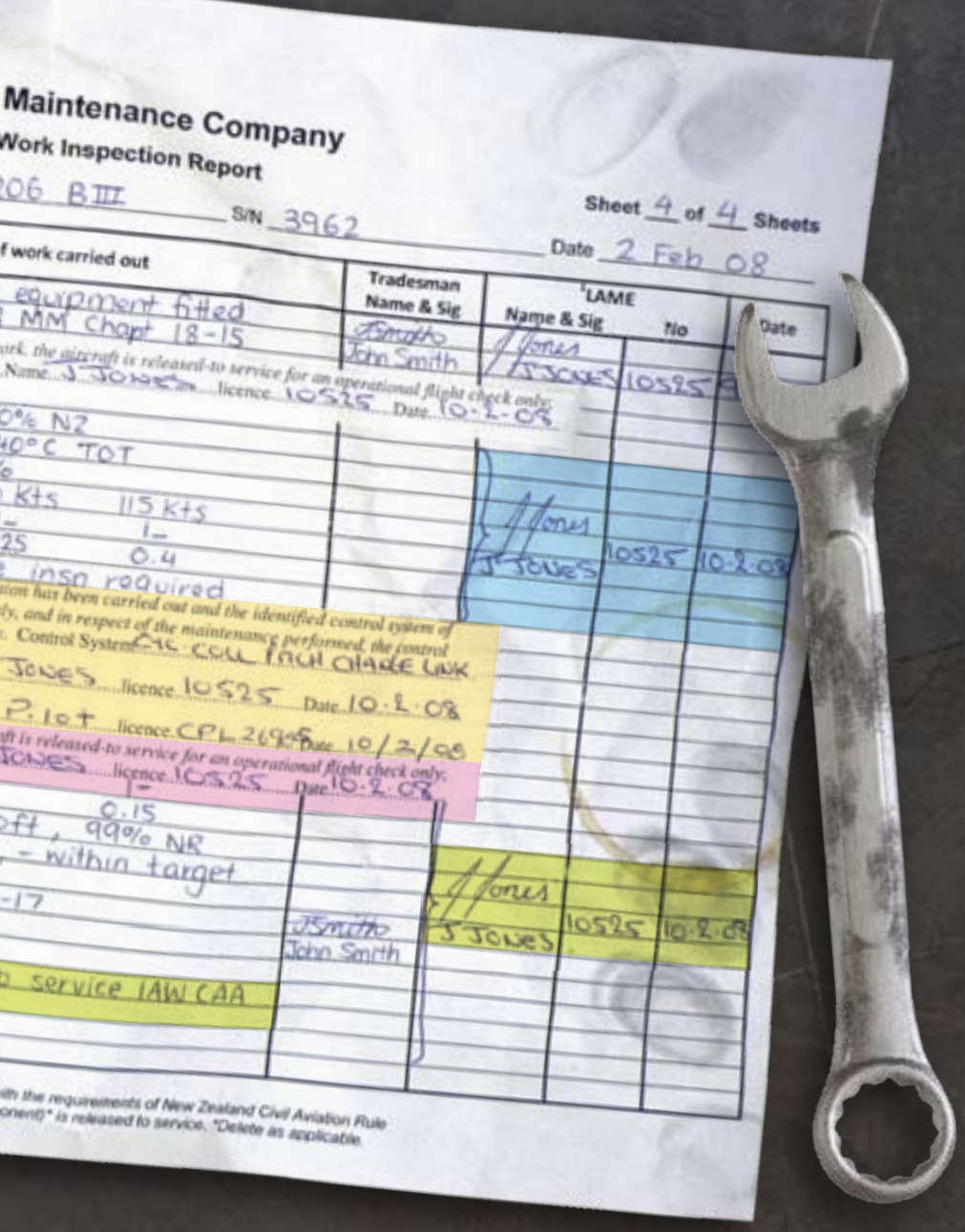
Section three has also been amended by adding an area to provide a release-to-service for rectification of defects, permitted inoperative equipment, maintenance required, or operational flight check.

The inclusion of the release-to-service section in the technical log is intended to be used for defect recording and rectification, as well as inspections carried out. It is not the place to sign the release-to-service for scheduled maintenance; this must still be included in the work records and logbooks. Any defect / inspection entered in section three must also be duplicated in the appropriate maintenance logbook.

The maintenance logbook is the primary source of all maintenance information for the aircraft.

The CAA has produced a 'maintenance record sheet' to be used in conjunction with the technical log when performing maintenance or inspections away from base. The tear off sections can be included as loose leaf entries in the logbook.

The new technical log and maintenance record sheets are provided free by the CAA via your local Aviation Safety Adviser or email info@caa.govt.nz.



All entries signed off

Duplicate inspection signatures

Flight check

Release-to-service

The Paperwork

In order to check the airworthiness status of your aircraft after maintenance you need to refer to the documents.

Firstly, speak to the maintenance company's Chief Engineer or Maintenance Manager, and arrange to look through the work package. The work package is made up of the inspection schedule and any extra work sheets. The aircraft's logbooks will probably not have been updated so soon after the completion of the check, so you should start by examining the work package.

Professional maintainers are typically happy to provide you with the documentation, and should be encouraged that you want to do this important double check.

Check Sheet

Some certificated operators, along with their maintenance contractor, have developed a 'receipt from maintenance check sheet'. This sheet is worked through and signed off by both parties before the aircraft is flown away.

This checklist approach is one way you can be confident you are meeting your responsibility to check the airworthiness of the aircraft before you fly.

The following points could be used as a basis for developing your own checklist.

All entries are signed off

Make a common-sense check of all the items listed. For example, if an oil change is required, find the corresponding statement that says oil has been replaced and how much of it was used. There has been at least one helicopter run with no oil in the gearbox.

» If the aircraft was in for scheduled inspection, check the inspection items are all individually initialled by the person who did the tasks.

» Check any extra work items have been rectified, or properly deferred, and are individually initialled.

» Ensure the certifying engineer's signature, LAME (or authorisation) number, and the date are present and in the correct column.

Duplicate inspection signatures

Rule 43.113(a) requires a duplicate inspection (a secondary inspection and sign-off) after "initial assembly, subsequent disturbance, or adjustment of any part of the control system of the aircraft or the control system of the component". This includes changes to the flight-control rigging or engine controls, and the removal and / or installation of dual flight controls.

» Check any work requiring a duplicate inspection has had both inspections appropriately signed.

Flight check

If the maintainer has determined a flight check is required, the pilot doing the flight must be briefed on exactly what is to be checked. There must also be a release-to-service signed statement specifically detailing that the aircraft is released to service **only** for the purpose of the flight check. On an operational flight check no passengers may be carried, and the *release-to-service for flight check only* is just that – the aircraft can be flown only to check the flight characteristics, and for no other reason.

» Check the *release-to-service for flight check only* statement is included and signed.

Release-to-service

Once any flight check has been completed (if required), and any defects rectified, then the release-to-service should be certified (signed off).

» The scheduled inspection, e.g. 50-hour / 100-hour, is separately listed as being carried out and has a release-to-service. This statement will either be found somewhere on the actual inspection schedule or separately listed on the maintainer's additional work sheet.

Once satisfied that the aircraft has been properly inspected and / or the defects have been rectified, the work has been certified, and the aircraft has been correctly released to service, you can check the flight manual documentation and do a preflight on the aircraft. ■

Cessna **Control Column** Fails

A Cessna 172 control column failed just after landing – this could have been prevented if a seven-year old Service Bulletin had been followed.

This control column failure while taxiing happened in March 2008 at Awaroa airstrip. It failed below the pivot point at the lower elevator control lug, resulting in a loss of elevator control. The C172's design has a closed tube section below the pivot point where moisture can collect. This led to corrosion and failure of the control column assembly. Failure above the pivot point would have resulted in loss of aileron *and* elevator control.

What is a Service Bulletin?

Service Bulletins are produced by aircraft manufacturers to communicate continuing airworthiness information to the owners and operators of their aircraft. The generic term "Service Bulletin" covers all types of service information issued by manufacturers, such as Service Letters, and Service Information Notices, among others.

Service information can also be published by vendors who supply aircraft manufacturers, and by product original equipment manufacturers (OEM).

There are three general types of information contained in Service Bulletins:

» Recommended methods, techniques, and practices for the performance of maintenance.

» Recommended modifications or inspections.

» Mandatory actions established as part of the type certification process.

Service Bulletins are usually generated as a result of defect reports received by the manufacturer and / or the regulator of the state of design.

> While most Service Bulletins may appear on the surface to be optional (not mandatory like Airworthiness Directives) they should not be disregarded.

Defect reports of control column failures received by Cessna and the FAA, led Cessna to issue Service Bulletin No. SEB01-3, in 2001. This applies to Cessna and Reims Aviation 172, 180, and 185 series aircraft with serial numbers listed in the Service Bulletin. The C172 whose control column failed at Awaroa is one of those affected. The Service Bulletin recommends an in situ ultrasonic inspection of the lower section of the control column assembly. The assembly should be replaced if the tube wall thickness is less than 0.037 inches. The Service Bulletin contains a detailed list of affected aircraft, instructions for performing corrosion treatment and recommends an annual external visual inspection of the control column assembly.

This assembly has since been redesigned to eliminate the potential for moisture collection, which is why later serial number aircraft are not affected. After the control column failure in New Zealand, the CAA issued a Continuing Airworthiness Notice (CAN 27-001) recommending that operators and maintainers comply with the instructions in Cessna's Service Bulletin SEB01-3.

While most Service Bulletins may appear on the surface to be optional (not mandatory like Airworthiness Directives) they should not be disregarded.

Civil Aviation Rules require operators to ensure their aircraft are maintained in an airworthy condition (rule 91.603(a)(1)). To do this, operators must have access to all available instructions for continued airworthiness (including Service Bulletins), assess whether the information applies to their operation, and take the appropriate action. This review must be carried out by a competent person, and the outcome of the review must be recorded and signed by the aircraft operator in the appropriate maintenance logbook.

If an operator decides not to carry out a Service Bulletin, they must have a good reason for it, and the reason must be recorded. Part 119 operators and those with a maintenance programme approved under rule 91.607 should have a documented process for conducting and recording the evaluation of Service Bulletins. For example, after assessing Cessna Service Bulletin SEB01-3 the operator of a C172N with a serial number greater than 17274009 should note N/A by S/N (not applicable by serial number) in the Service Bulletin section of the aircraft logbook as the reason it is not carried out.

The CAA does not monitor all Service Bulletins for all aircraft. Operators must work together with their maintenance provider to ensure this material is monitored.

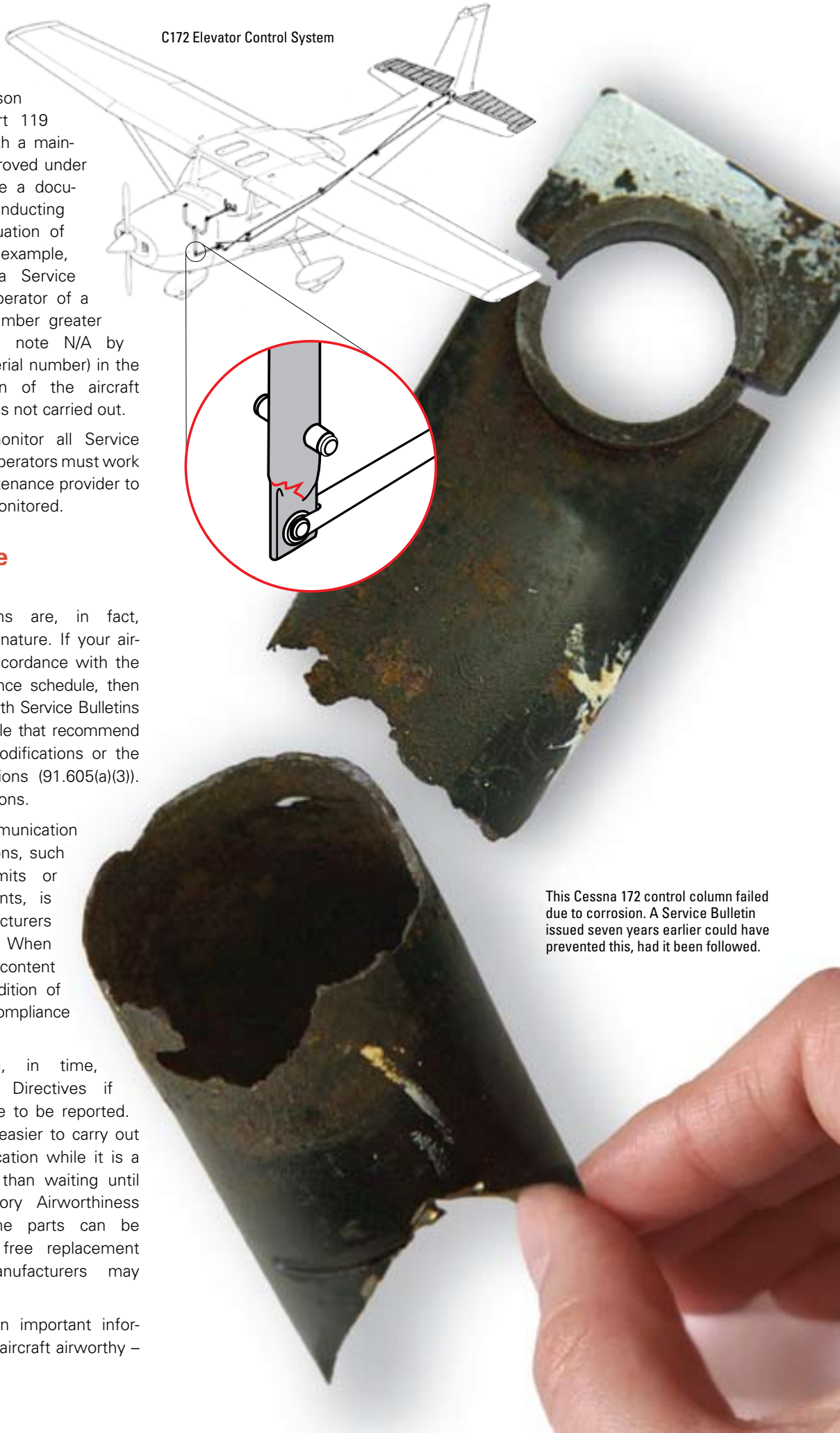
Elements Can be Mandatory

Some Service Bulletins are, in fact, mandatory due to their nature. If your aircraft is maintained in accordance with the manufacturer's maintenance schedule, then compliance is required with Service Bulletins referred to in the schedule that recommend the incorporation of modifications or the performance of inspections (91.605(a)(3)). This applies to all operations.

Occasionally, the communication of airworthiness limitations, such as component life limits or maintenance requirements, is accomplished by manufacturers issuing Service Bulletins. When used in this manner, the content of the bulletin is a condition of the type certificate, and compliance is mandatory.

Service Bulletins can, in time, become Airworthiness Directives if enough defects continue to be reported. It is often cheaper and easier to carry out an inspection or modification while it is a Service Bulletin, rather than waiting until it becomes a mandatory Airworthiness Directive. By that time parts can be harder to obtain and free replacement offers made by manufacturers may have expired.

Service Bulletins contain important information for keeping your aircraft airworthy – don't dismiss them. ■



This Cessna 172 control column failed due to corrosion. A Service Bulletin issued seven years earlier could have prevented this, had it been followed.

Night VFR

A Good Aviation Practice (GAP) booklet on flying VFR at night will be published later this year to provide pilots with relevant principles and considerations. As it is night flying season now, here are some of the key points to consider when night flying.

Vision

The ability to see at night is dependent on the human eye's adaptation to the dark. Full dark adaptation can take approximately 15 to 20 minutes in a dark environment, and can be destroyed in seconds by any light. Red lighting will preserve your night vision the best.

Pre-Flight Inspection

» Do your pre-flight inspection before last light if possible, if not, use a torch.

» All interior and exterior lights should be thoroughly checked. Also check the light dimmer is set correctly.

» Make sure the windscreens are scrupulously clean.

Pre-Takeoff

» Carry a torch and spare batteries.

» Check the electrical system is working and charging correctly.

» Make a deliberate effort to taxi slower than usual, as speed is difficult to judge at night.

» Double check that the ground ahead is clear, if in doubt, stop and investigate.

Navigating at Night

The key to successful visual navigation at night is good planning. Know which visual features you will use as checks, and highlight them clearly on your chart. Features that show up well at night are coastlines, rivers, and some towns.

The principles for navigating visually at night-time are the same as those for daytime, but techniques must be adjusted. Here are some key considerations:

» Dead-reckoning navigation should be backed up by another navigation tool, such as a GPS, ADF, VOR, or DME.

» Fly as high as reasonably possible as this will aid your navigation, give you more forced-landing options, and provide you with better terrain clearance.

» Make sure that you have the next visual feature in sight before you lose sight of the one behind you.

» Flight following or filing a flight plan is a must and ensures that someone will come looking for you if something goes wrong.

» Make sure your transponder is turned on and squawking the correct code.

Weather

Before you go night flying, check the forecast and actual conditions at aerodromes in the vicinity of your destination and on the intended route. If the temperature and dew point are close together, suspect fog even if it is not forecast.

On dark nights the only time you will see fog, mist, cloud or rain is when they are situated over a lit area. It is very easy to enter cloud without realising it.

Watch for any township light patterns that adopt a different shape from that expected, which change their shape while you watch, or which disappear altogether. In such cases, you should suspect low cloud, fog, or terrain.

Extra Safety Margins

Flying VFR at night can be challenging. You should extend your personal minimums at night.

» There may be no clear horizon at times. Back up your superimposed horizon with instruments.

» Don't attempt to fly a route at night that you haven't flown during the day.

» Tune your second radio to the nearest available radar service or ATS unit.

Emergency

If you do get caught out with nowhere to go, do not hesitate to declare an emergency and seek assistance from the nearest Air Traffic Service unit. ■

A GAP booklet on night VFR flying will be published later this year.

What is Night?

Night is classified as the hours between the end of evening civil twilight and the beginning of morning civil twilight.

AIP New Zealand GEN 2.7 shows the times of daylight by zone. Times outside of these figures are classified as night.

For moonrise and moonset times see the Metservice web site, **www.metservice.co.nz**.

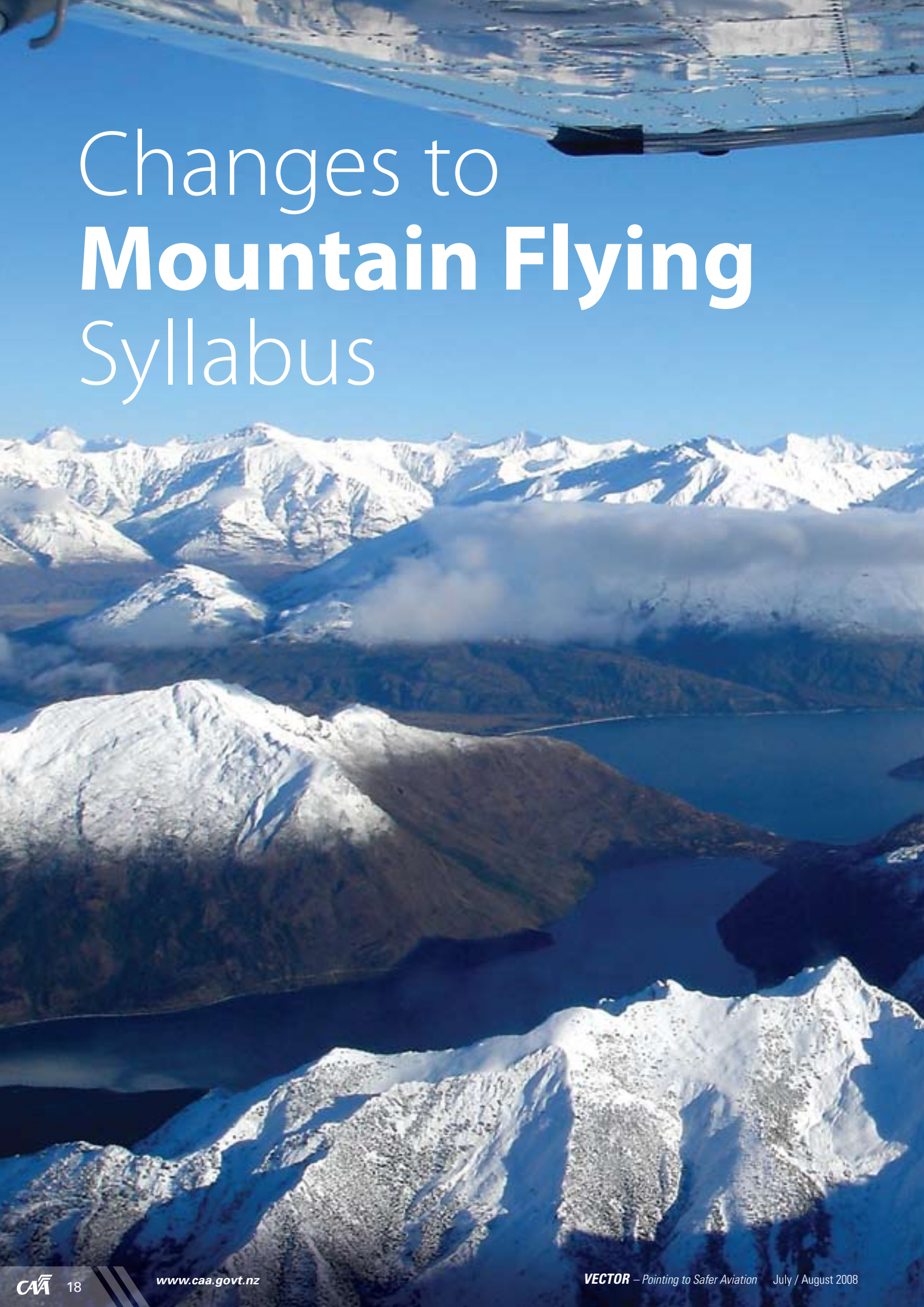
Legal Requirements

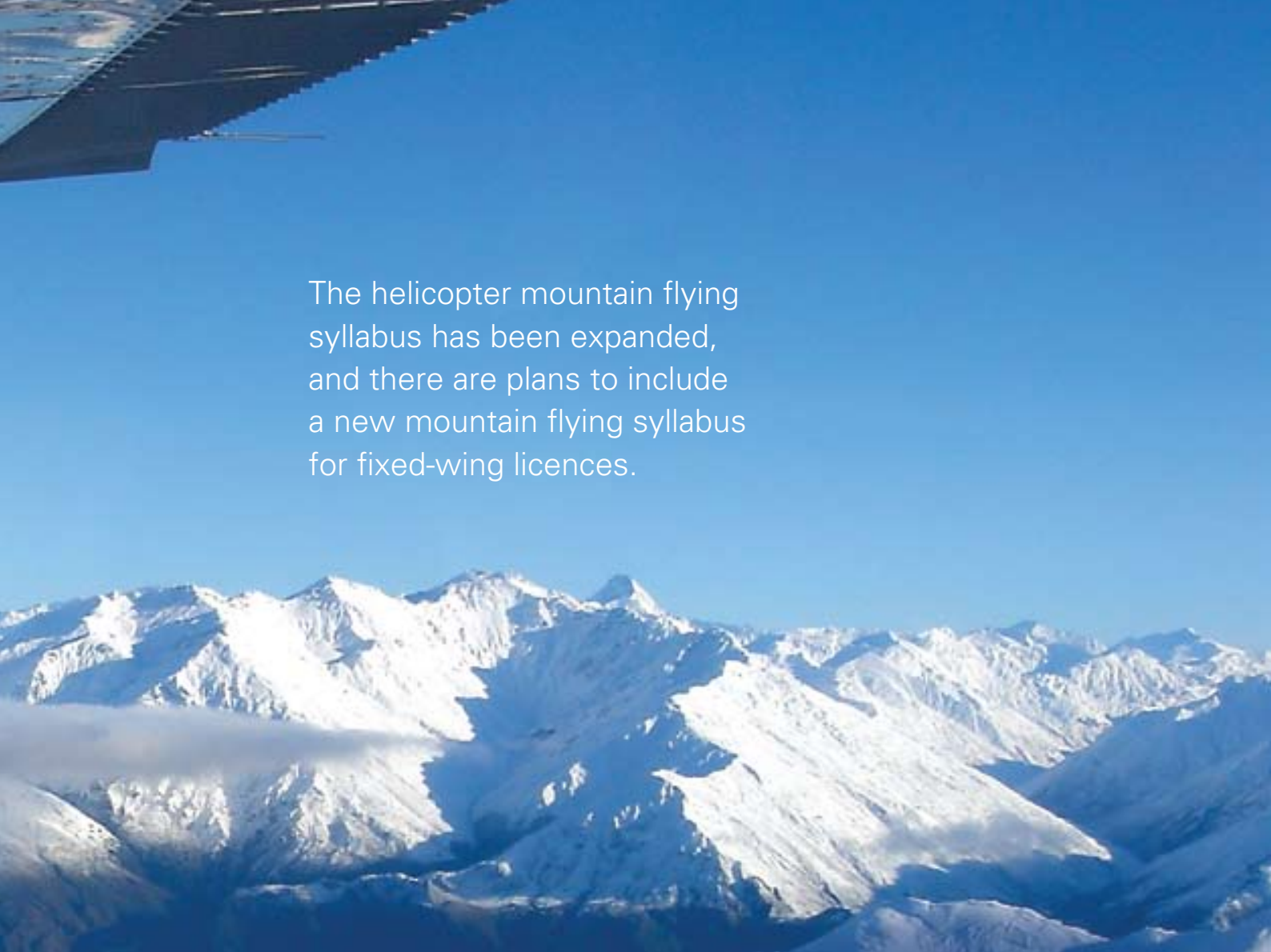
The rules for flying VFR at night are contained in various Civil Aviation Rules, while general guidance about standards, practices, and procedures is contained in Advisory Circulars (ACs).

Advisory Circular AC61 *Pilot Licences and Ratings* stipulates the required flight experience to gain a night rating. Rule 61.37 *Recent Flight Experience* outlines the minimum currency required to carry passengers on night flights. Rule 91.301 *VFR Meteorological Minima* outlines the meteorological minima for VFR flight. Part 91, *General Operating and Flight Rules* contains various requirements, ranging from the minimum aircraft instrumentation and equipment needed to fly at night, to the appropriate use of aerodromes.

Microlight aircraft are not allowed to be flown at night.

Changes to **Mountain Flying** Syllabus





The helicopter mountain flying syllabus has been expanded, and there are plans to include a new mountain flying syllabus for fixed-wing licences.

There have been at least three examples in the last 15 years of fatal air accidents caused by a lack of mountain flying skills. In 1993 an N22 Nomad aircraft impacted the Franz Josef Glacier killing all nine on board; in 1997 a Cessna 310 crashed on takeoff from Queenstown airport killing all six on board; and in 2002 a Cessna 207 was lost at Gertrude Saddle near Milford Sound killing another six.

Why change

With just under 60 percent of New Zealand's land area considered mountainous, flying in New Zealand will, at some time, involve flying in the mountains. Mountain flying is a skill that must be learnt and practised.

To help prepare New Zealand pilots for flying in the mountains, the CAA is amending the PPL(H) and CPL(H) syllabuses this year and plans to include the requirement for mountain flying training in the PPL(A) and CPL(A) syllabuses in the upcoming amendment to Part 61 *Pilot Licences and Ratings*.

What changed

The previous helicopter syllabuses did include the requirement for mountain flying training – five hours for a PPL issue and 10 hours for a CPL issue. But there was no detailed guidance on what to teach and what skills to master during mountain flying training. The CAA has now provided a detailed syllabus for both the theory and flight-test elements.

The syllabus is intended to provide structure and good guidance, as well as specifying realistic, achievable and measurable outcomes. This amendment has widespread support from the aviation community.

Topics covered in the helicopter syllabus include; aircraft handling, weather patterns and wind awareness, transit flying, approach and landing to unprepared sites, emergencies, and human factors.

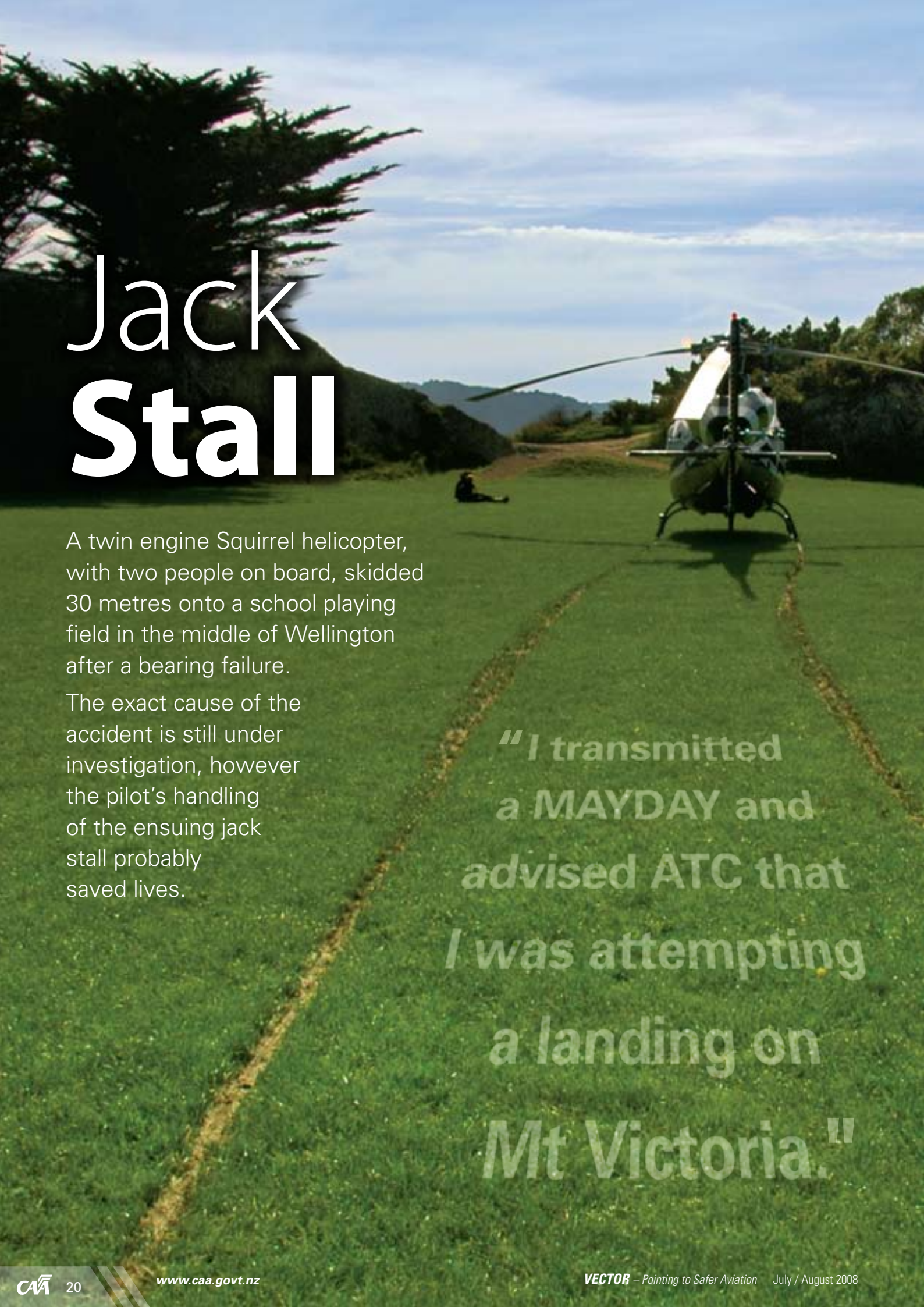
Timetable

It is expected that by the end of July, the helicopter syllabuses in *Advisory Circular 61-3 Pilot licences and ratings – Private pilot licence* and *Advisory Circular 61-5 Pilot licences and ratings – Commercial pilot licence* will be completed, and that the aeroplane syllabuses will be out for comment in the Notice of Proposed Rule Making (NPRM) to Part 61 later this year. ■

Jack Stall

A twin engine Squirrel helicopter, with two people on board, skidded 30 metres onto a school playing field in the middle of Wellington after a bearing failure.

The exact cause of the accident is still under investigation, however the pilot's handling of the ensuing jack stall probably saved lives.



In a jack stall, the flight control hydraulic jacks or servos become overpowered by aerodynamic forces transmitted through the main rotor blades. The helicopter flight controls become very heavy and difficult to move.

The jack stall is a known aerodynamic phenomenon that can occur to all AS 350 and AS 355 helicopters.

The Transport Accident Investigation Commission (TAIC) investigated a Squirrel accident which occurred north-east of Whitianga in 1994, and in which three people were injured and two were killed. TAIC concluded that the aircraft experienced a jack stall and, due to the low level of the helicopter, the pilot had little time to identify the phenomenon and take the appropriate recovery action before hitting the sea.

Mark Jennings, the Squirrel pilot who landed on the playing field, recounts the incident that led to his autorotation.

"I was flying over the Basin Reserve in Wellington when I heard a loud bang and felt a severe vibration. I immediately began to reduce speed by lowering the collective lever and raising the nose when a second, louder bang was heard, followed by an extremely severe vibration. This was followed by an uncommanded pitch up and rapid roll to the right.

"I tried to apply full left cyclic to prevent the aircraft becoming inverted, but the cyclic was too heavy," says Mark.

The correct recovery for a jack stall is to unload the rotor disc by lowering the collective lever, thus unloading the forces exerted on the hydraulic jacks.

"I reduced the collective lever to flat pitch and both the cyclic and collective controls instantly became lighter, enabling the aircraft to slowly roll left to a near level position.

"Straight away I realised that with flat pitch I would not be able to reach Wellington aerodrome, so I tried to determine the degree of control available. I carefully raised the collective lever, but immediately the controls stiffened and the aircraft made an uncommanded roll to the right. I realised that my only option was an autorotation, flat pitch approach limited to right turns only.

"I transmitted a MAYDAY and advised ATC that I was attempting a landing on Mt Victoria. At approximately 50 feet, I flared off excess speed and levelled the nose attitude. As the aircraft sank towards the run-on area, I made a mental note not to attempt to check the descent using the collective lever, as this would cause a roll to the right.

"During the run-on I kept the aircraft straight with the pedals and kept the cyclic forward until the aircraft slid to a halt," Mark said.

CAA Safety Investigator Tom McCready says that Mark did well in getting the helicopter onto the ground.

"Mark made the correct decisions and handled the aircraft in a manner that I would expect from a commercial pilot. He not only recognised the jack stall, but he also made a mental note not to raise the collective during the run-on. This saved lives," Tom said. ■

Airways Helping to **Prevent CFIT**

Airways Corporation has a new tool to help prevent Controlled Flight Into Terrain (CFIT) accidents.

The Minimum Safe Altitude Warning system (MSAW) is a safety net that alerts controllers to the possibility of CFIT. It uses transponder Mode C information from the aircraft and the information held in the air traffic management (ATM) system to warn air traffic controllers if aircraft will, or are predicted to, come into conflict with terrain.

Even though terrain avoidance is not usually an air traffic controller's responsibility, Airways Corporation understands the importance of the safety net MSAW provides and has committed to providing this service.

So far the system has proven its worth.

Lorraine Vincent, Chief Controller at the Rotorua Tower says there were about three alerts in the system's first eight weeks.

"This is a great system. The alerts took some crews by surprise, but when we talked to them afterwards they said it was intuitive and timely. They were pleased there was another safety net out there," Lorraine says.

"MSAW has also increased our situational awareness in the tower, even when the aircraft has called 'visual'. Whenever an alert is heard everybody turns around just to double check they have the aircraft in sight."

How it Works

MSAW is a part of the ATM system used in New Zealand – SkyLine. The system can produce terrain alerts for all flights with Mode C capability, but is primarily provided to IFR flights receiving a radar control service.

Very basically, MSAW uses information from a terrain database, the ATM system, and the aircraft's transponder to 'look ahead' and predict where the aircraft will be either 15 or 40 seconds in the future. If the aircraft is predicted to infringe, or has actually infringed, a terrain clearance surface, a warning alerts the controller, who passes it on to the pilot. The controller sees a visual warning and hears "terrain alert".

It is important that pilots understand that MSAW does not lessen their terrain and obstacle-avoidance responsibilities, and therefore must remain vigilant.

What You Will Hear

The alerts given are advice only, unless being vectored as ATC are then responsible for terrain clearance. If the system generates an alert, the controller will say "terrain alert, check your altitude immediately, QNH is XXXX". Or if you are under radar vectoring you will hear "terrain alert, *(level instructions)*, QNH is YYYY, *(heading instructions)*".

You are most likely to hear a terrain warning from ATC when you are on approach, and talking to the tower controller.

There are only two situations when alerts will be ignored by ATC – when the pilot reports "visual", and if the controller in the tower can see the aircraft.

A pilot's call of visual is therefore very important to ATC.

Where it is Operating

MSAW monitoring is provided within the major terminal controlled airspaces, and for those instrument approaches within controlled airspace that have radar coverage to, or near to, ground level.

Wellington Runway 16 approach from Mt Victoria.

Alerts are suppressed for any aircraft outside controlled airspace, and can be suppressed for aircraft on visual manoeuvres/approaches or when vacating controlled airspace.

MSAW terrain alerts are provided within the following controlled airspace.

- Whenuapai Control Zone
- Auckland Control Zone and controlled airspace within 45 NM of Auckland aerodrome
- Hamilton, Tauranga and Rotorua Control Zones and controlled airspace within 45 NM of Putaruru
- Palmerston North and Ohakea Control Zones and controlled airspace within 45 NM of Ohakea aerodrome
- Wellington Control Zone and controlled airspace within 45 NM of Wellington aerodrome
- Woodbourne controlled airspace, 5000 feet and above
- Christchurch Control Zone and controlled airspace within 45 NM of Christchurch aerodrome

MSAW does depend on radar coverage, and although there is generally good cover for approaches at aerodromes where MSAW is operating, there are odd pockets where it is not.

Two Modes

MSAW has two *modes*. General terrain monitoring and instrument approach path monitoring.

General terrain monitoring

General terrain monitoring is provided in terminal areas where reliable Secondary Surveillance Radar (SSR) coverage to within 1000 feet of ground level is available. It monitors the actual and predicted path of aircraft for a look-ahead time of 40 seconds. It provides an alert if an aircraft infringes, or is predicted to infringe, set obstacle clearances.

General terrain monitoring is based on the system's general terrain database.

Approach path monitoring

Approach path monitoring is provided where there is reliable SSR coverage. It monitors the actual and predicted path of aircraft for a look-ahead time of 15 seconds, while aircraft are on the final approach leg of an instrument approach. It provides an alert if aircraft infringe or are predicted to infringe obstacle clearance surfaces. Approach path monitoring is done using 'boxes' around the final approach track, which extend from the lower level of the obstacle clearance surface, up to 5000 feet.

This level of monitoring starts when the aircraft is within 90° of the inbound track and stops at 2 NM from the runway.

Because this system is forward-looking and calculates future position from current data, there is an issue with the way some non-precision approaches are flown. If the approach is flown so that minimum descent altitude (MDA) is reached at the soonest possible point, and not as a constant rate of descent (stabilised approach), then the aircraft's predicted position could infringe the 'box' floor and set off an alert. This is particularly likely when the aircraft is at or near segment obstacle clearance altitude (OCA) and / or MDA and a slight, or increased, rate of descent is detected by the system. It is important, when flying this type of approach, to maintain your MDA exactly. ■

Hear Today Gone Tomorrow

Hearing loss: the silent pandemic

Aircraft taxiing, taking off, landing, and in flight can cause hearing damage to both aircrew and ground staff, which will not typically become apparent until 10 to 15 years after exposure. Because there are no immediate symptoms, people may not realise they are damaging their hearing. But 10 to 15 years later, it's too late.

Earplugs

Earplugs are produced to conform to the class system and range from class 1 to 5 (see sidebar). They are practical to wear with safety glasses or a hardhat on. Earplugs should be inserted with clean hands.

Earplugs will work properly, only if they are inserted correctly. Here are some brief instructions for foam earplugs:

1. For roll-down type earplugs, roll the entire earplug into the narrowest possible crease-free cylinder. For all other types of earplugs start at step 2.
2. Reach over your head with your opposite hand to pull your ear up and back, and insert the earplug well inside your ear canal with your other hand.
3. Stop inserting the earplug when your finger touches your ear. For roll-down earplugs, hold for 30-40 seconds until the earplug fully expands.
4. If properly fitted, the end of the earplugs should be just visible to someone looking at you front-on.
5. Acoustic check – cup your hands over your ears and release. There should not be a significant noise difference, if there is, repeat steps 1 to 3.

Earmuffs

Earmuffs are also produced to conform to the class system and offer the same hearing protection as earplugs. Some earmuffs can be clipped onto safety helmets, or have a band which goes around the back of the neck.

For earmuffs to work correctly, they must exert a slight clamping force to the head. Never place earmuffs on anything wider than your head, as over time this can reduce the clamping force.

> "Noise induced hearing loss costs the aviation community $2.6 million in ACC levies per year, on average," says John Wallaart, Programme Manager of ACC.

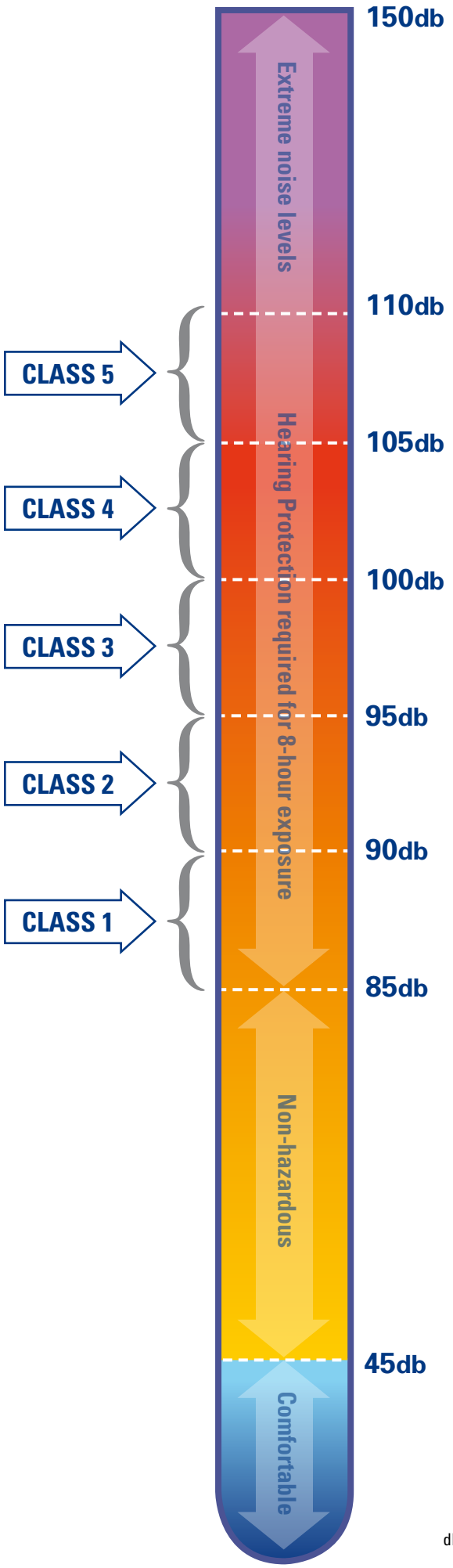
Hearing Protection Tips

- Always wear hearing protection when operating around aircraft.
- Provide your passengers with hearing protection.
- Use the appropriate class of hearing protection for the level of noise you are exposed to.
- Confirm that the hearing protection you intend to use meets the joint Australian/New Zealand AS / NZS1270 standard.
- Earmuff cushions and foam inserts should be replaced every six months. Earmuffs should be replaced annually.
- Reusable earplugs should be replaced at least every three months and disposable earplugs should only be used once and then discarded.
- Hearing protection will be effective only if it is worn correctly.

Hearing Protection Standard

All hearing protection in New Zealand should meet the joint Australian/New Zealand Standard AS/NZS1270, 2002: *Acoustics – Hearing Protectors*. This standard uses a class system, which provides a simple way of selecting hearing protection appropriate for the level of noise exposure.

To see what class of hearing protection you require, match your exposure level to the appropriate class level on the graph right. For more information on hearing protection standards, see the Department of Labour web site www.dol.govt.nz.



150 dB Jet Aircraft During Takeoff

110 dB Helicopter Cockpit

100 dB Single Engine Cockpit

94 dB Lawn Mower

85 dB Jet Cockpit

43 dB Fridge

dB noise level figures courtesy of Telex Communications.

109 dB = 1.9 mins

106 dB = 3.8 mins

100 dB = 15 mins

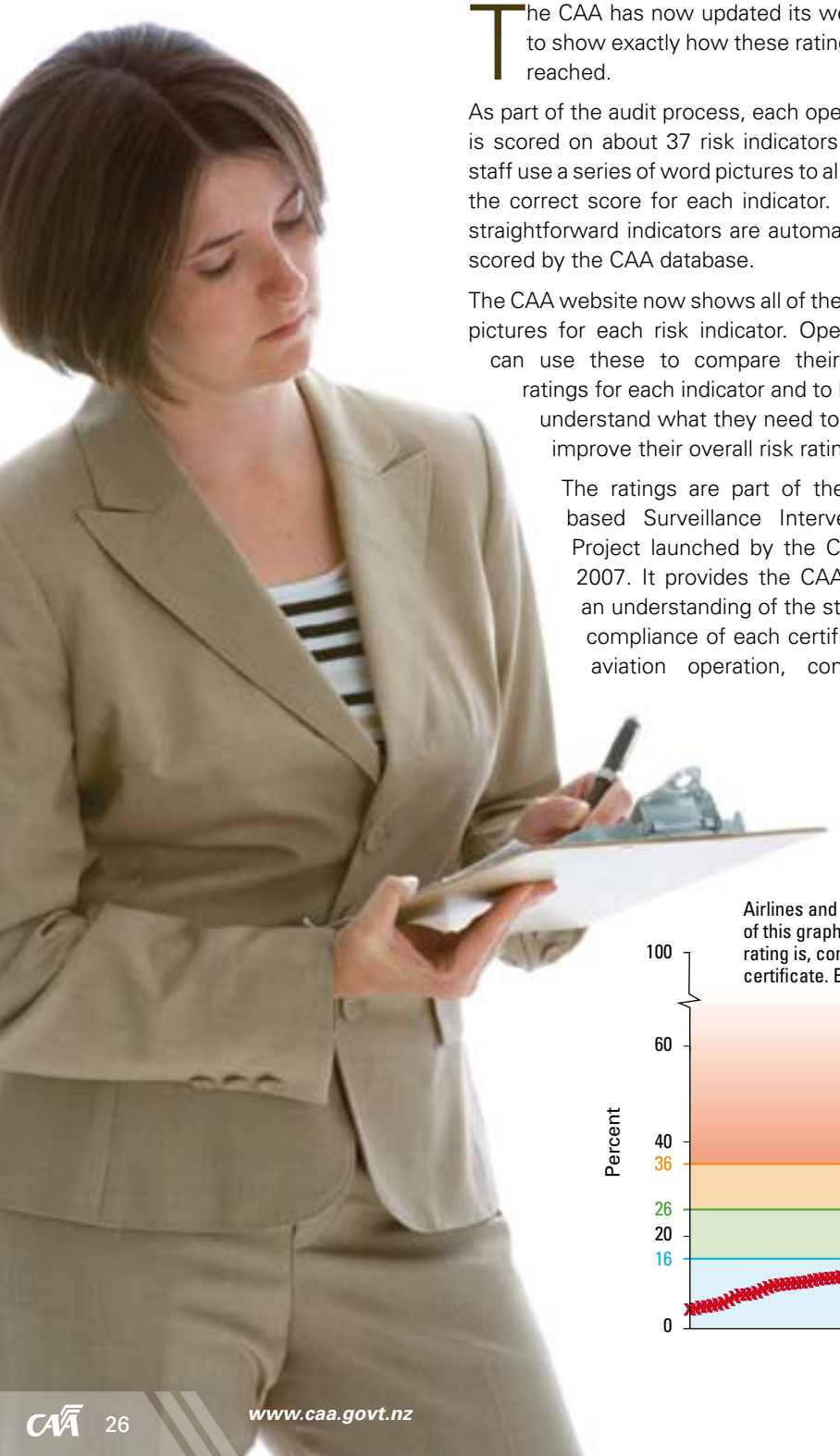
94 dB = 60 mins

91 dB = 120 mins

The time required to do damage equivalent to 8 hours of unprotected exposure at 85 dB.

Understanding **Risk Ratings**

Since February last year, the CAA has been assessing the level of risk that every certificated aviation operation poses to aviation safety. The ratings are either low, medium, moderate or high, and form an important part of CAA audit reports.



The CAA has now updated its website to show exactly how these ratings are reached.

As part of the audit process, each operation is scored on about 37 risk indicators. CAA staff use a series of word pictures to allocate the correct score for each indicator. Some straightforward indicators are automatically scored by the CAA database.

The CAA website now shows all of the word pictures for each risk indicator. Operators can use these to compare their own ratings for each indicator and to better understand what they need to do to improve their overall risk rating.

The ratings are part of the risk-based Surveillance Intervention Project launched by the CAA in 2007. It provides the CAA with an understanding of the state of compliance of each certificated aviation operation, compiled from every interaction it has with the CAA. This includes certification information, audit results, special inspection results, enforcement actions, financial status, and CAA analysis of safety trends.

Certificated operators have been receiving ratings at their scheduled audits since the middle of last year. A majority of the operators have now been rated and they will be beginning to see this rating presented on their routine audit reports.

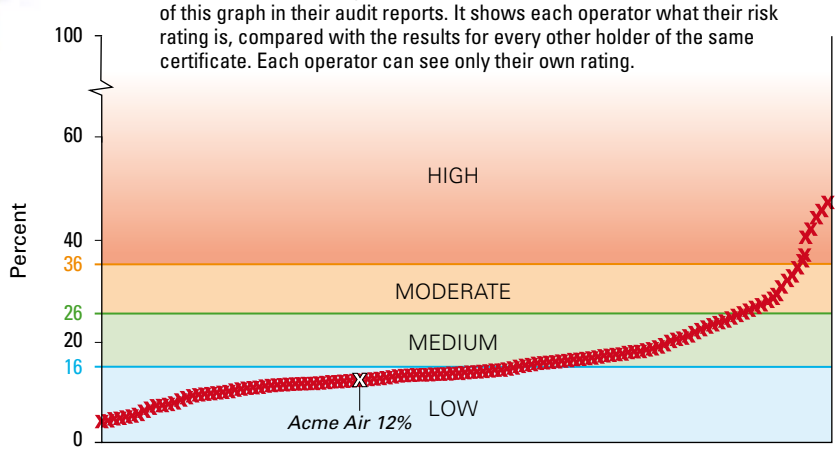
Manager Rotary Wing and Agricultural Operations John Fogden says there are considerable advantages for operations that receive a *low* risk rating.

"The risk rating can significantly influence when the operation will be next scheduled for audit. The CAA could decide not to audit an operation with a *low* risk rating again for up to two years, or we might decide that a less in-depth audit will suffice next time.

"Similarly, an operation that demonstrates a consistently *high* rating might find itself being audited again in six months, and to a deeper level," John says.

It is important to note that some operations will carry an inherently higher risk profile. In these cases a higher risk rating is not necessarily a negative reflection on the operation. However, CAA audit reports now include a graph showing where each operation sits in relation to the risk profile score for all other operations holding the same certificate. The graph is completely anonymous. Each operation can see only its own rating.

"Operators should take a keen interest in how well they are doing in relation to their peers. They would also be well advised to examine the indicators for which they have a high risk rating, and understand what they would have to be doing to lessen that risk," John says.



Airlines and other air operator certificate holders now receive a version of this graph in their audit reports. It shows each operator what their risk rating is, compared with the results for every other holder of the same certificate. Each operator can see only their own rating.

Your 406 MHz Beacon **May Not Be Registered**

If you have sent in a 406 MHz beacon registration form by fax, and not received an acknowledgement, you need to confirm that your beacon is, in fact, registered.

Faxed registrations may not have been received by the Rescue Coordination Centre New Zealand because the registration form included with some beacons contains out-of-date contact details.

To check if your beacon is registered please call RCCNZ on 0–4–577 8042, or email 406registry@maritimenz.govt.nz.

406 MHz ELTs were required to be installed in New Zealand aircraft by 1 July 2008 (rule 91.529).

There is an exception to allow aircraft to be flown to have a 406 MHz beacon installed. Other exceptions include manned free balloons, and gliders or powered aircraft with no more than two seats, if operated within 10 NM of the departure aerodrome. Aircraft with one seat, gliders, and microlights can operate without a 406 MHz beacon if a 406 MHz personal locator beacon is carried.

To register a new beacon:

» Register online at www.beacons.org.nz;

» Email 406registry@maritimenz.govt.nz; or

» Fax: 0–4–577 8041

Your registration will be acknowledged.

SWITCH TO 406 DISTRESS BEACONS
www.beacons.org.nz

Operating Certificates
Valid Five Years

All operating certificates are valid for a maximum of five years. After five years every operator must, in theory, exit the aviation system and apply to re-enter as a new certificate holder.

CAA Manager Rotary Wing and Agricultural Operations John Fogden says this may not be well understood.

"I think many operators have thought it might have been a limited period in name only, and that the CAA would essentially roll over any new applications.

"But that is not the case. When an operation reaches the end of its five-year period, it must go through the complete certification process from scratch, as if it were a new operator. It is not just another CAA audit," John says.

Operating certificates are essentially an aviation organisation's ticket to enter the New Zealand civil aviation system. The CAA grants them only after applicants have met the standards of compliance with the Civil Aviation Rules. For an organisation, it means proving the operation is set up in such a way that all of the requirements of the Rules are inherent in the systems and processes of its everyday running. Once the CAA is assured these requirements are met, the individual or organisation becomes part of the New Zealand civil aviation system.

"The certificates have a finite life because the New Zealand aviation community, best practices and the regulatory environment can all change dramatically over five years," John says.

At re-certification, operators will find they go through a more rigorous review than they will have experienced during the previous four years.

"For example, the CAA introduced a new risk-based surveillance system in 2007. As part of that, a checklist is tailored, which lists every rule that applies to a particular operation. At its first audit after certification, an operation must prove it is complying with 100 percent of the rules on its checklist," John says.

"Operators coming up to their first re-certification now will be going through that process for the first time.

"If your operation is approaching the end of its certificate period, you should be in contact with the CAA well in advance of your re-certification deadline. The Rules stipulate that the complete and acceptable application package should be with the CAA 60 days before the expiry date specified on the existing certificate.

"I would expect operators to be in touch with the relevant CAA Unit well in advance of that to ensure they properly understand what re-certification is going to entail," John says. ■

Joining the **Circuit** at an **Uncontrolled** Aerodrome

Recent reports from flying schools, where pilots unfamiliar with the aerodrome have blundered through the circuit, have highlighted the need for a refresher on circuit etiquette.

The overhead join will always be a vital ingredient in maintaining aviation safety at unattended aerodromes, and on most occasions it will be the best way to join.

It takes very little extra time to join overhead, especially if you have planned for the most likely scenario. Then you simply need to confirm that the conditions are as you expected, and make good use of the opportunity an overhead join gives you to see other traffic.

The Overhead Join

The key to a successful circuit join is situational awareness. Get it and keep it. If you lose it, remove yourself from the circuit until you have it back.

Preparation

Be well organised and anticipate each step of the process. If you are planning to join an unfamiliar aerodrome circuit, then your preparation begins on the ground.

» Study the appropriate up-to-date charts and *AIP New Zealand, Vol 4* thoroughly.

» Note any prominent reference points, spot heights and terrain that will be in the vicinity of the aerodrome.

» Think about;
  – aerodrome elevation,
  – circuit direction,
  – radio frequencies,
  – runway length, surface and displaced thresholds,
  – windsock locations, and
  – obstacles on the approach.

» Start forming a mental picture of how you will locate and approach the aerodrome.

Read the aerodrome notes in the *AIP New Zealand, Vol 4*, they provide local knowledge and highlight any legal requirements or special procedures.

Continued over ››

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Approaching the Aerodrome

Get the *AIP New Zealand, Vol 4* out, open it to the landing plate and orientate it with respect to your heading. Review the runway layout and note the position of the windsocks.

Descend or climb to joining height and aim to position so that you arrive with the whole aerodrome suitably positioned on the left of the aircraft.

Make the appropriate joining call within five to ten miles of the aerodrome – ten miles is preferable. Keep this radio call brief to avoid unnecessary clutter – don't ask if there is any other traffic about.

Carry out your circuit joining checks.

Maintain a good lookout around the aircraft and a continuous listening watch on the radio. Both are critical to a safe overhead join.

Keep in mind there may be non-radio equipped (NORDO) aircraft joining or already established in the circuit.

If parachute operations are being carried out, remain clear or consider other options, such as a wider circuit or joining straight-in on long final.

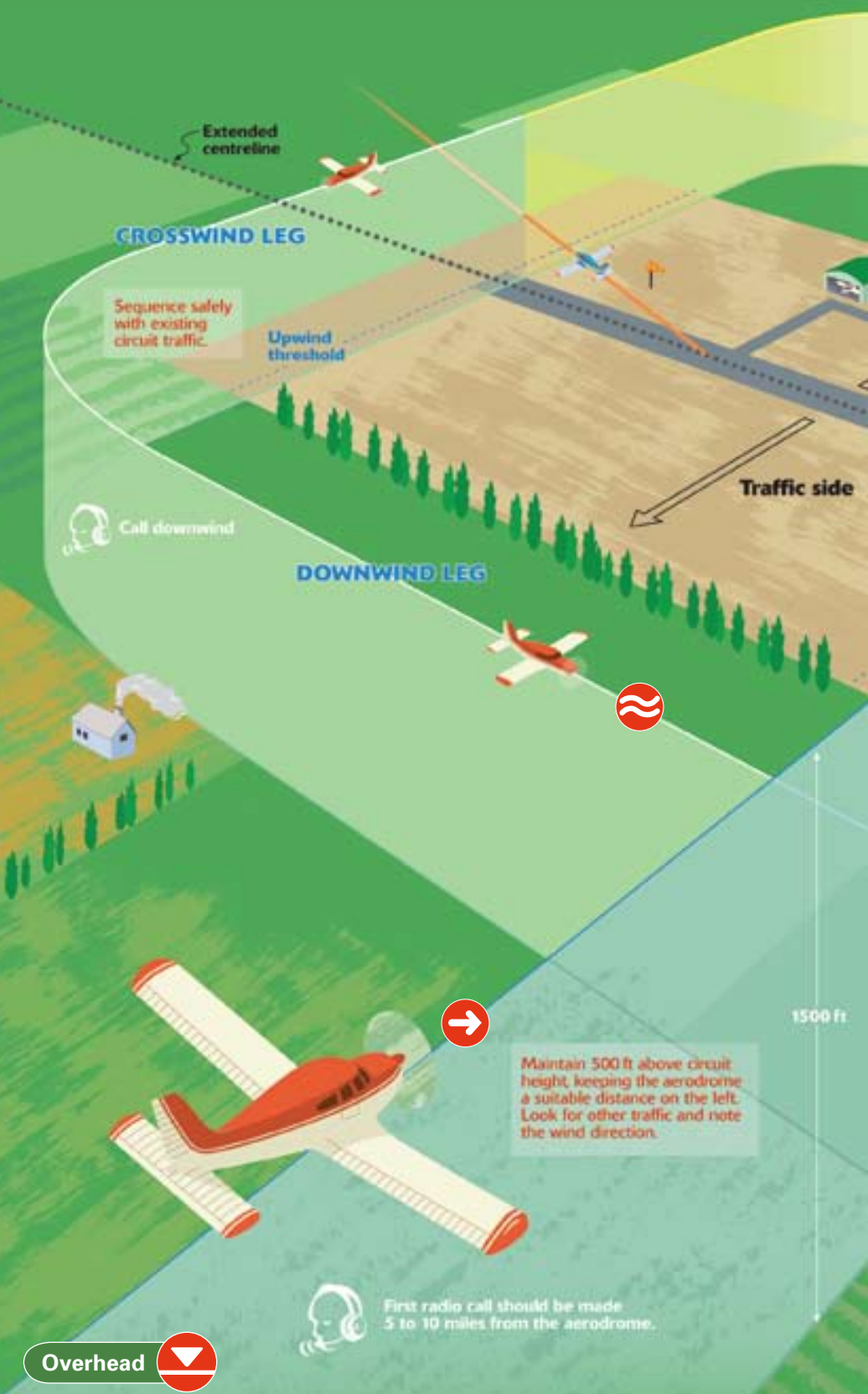
Formulate a picture of where other aircraft are and what their intentions might be. It can be helpful to make another radio call within several miles of the circuit – to let other aircraft know what you are doing.

Try to determine the prevailing wind direction by aircraft drift, smoke, dust, known circuit traffic and local wind reports. Don't let a preconception fool you though. You must identify the correct runway in use by sighting the windsocks. Do not descend until you are sure of the runway in use.

Extra care should be taken in light or nil wind conditions. These are the days when different pilots may choose different (possibly opposing) runways. Look and listen for traffic already established in a circuit.

Avoid high rates of descent, high angles of bank, and high airspeeds at all times during your join – others will be trying to see you too.

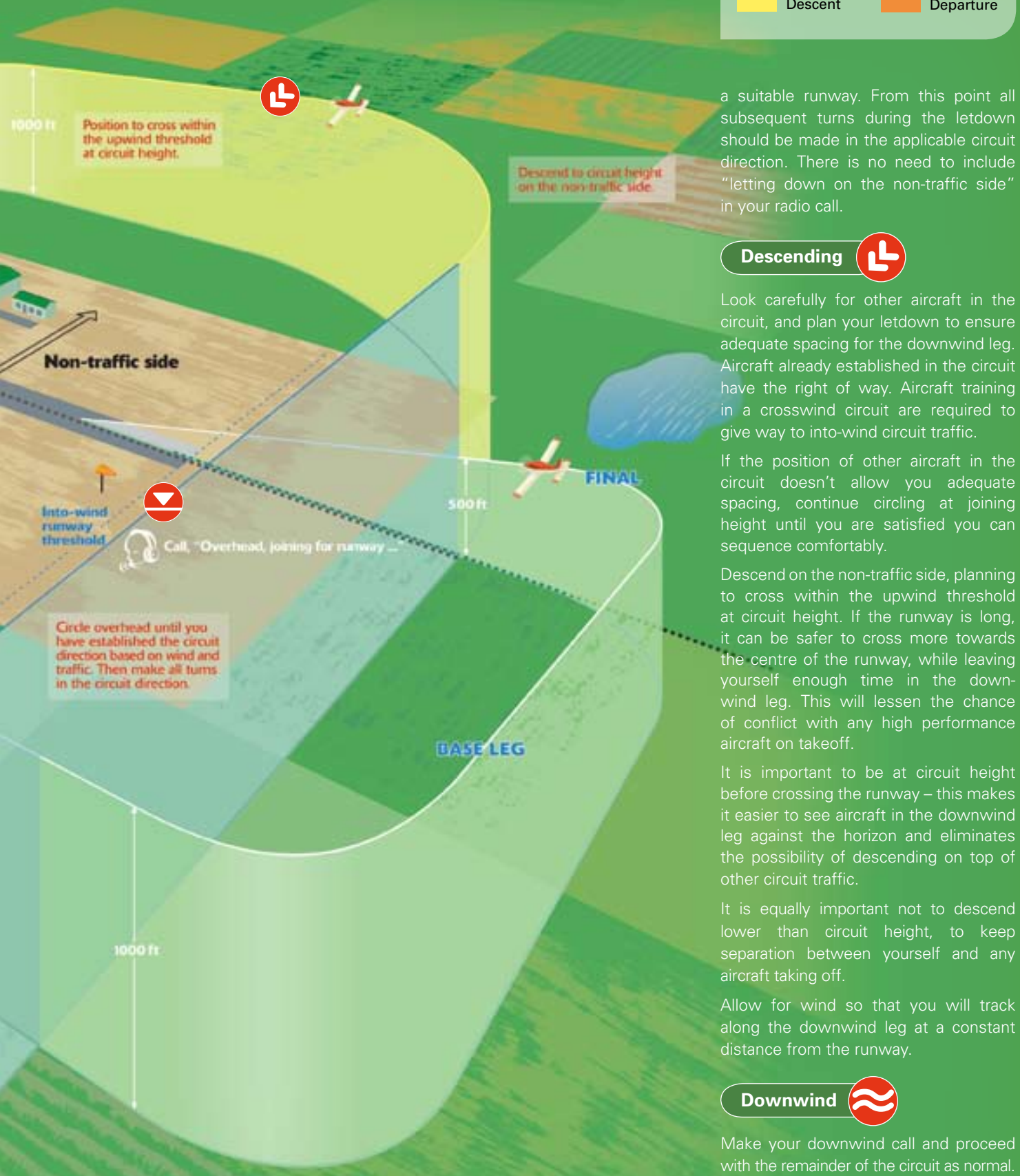
Helicopter pilots – you have a special responsibility. Your machines are highly manoeuvrable and don't require a runway, but they can be difficult to see. The practice, by some, of approaching and departing at any old angle can be confusing for other traffic and could set up a dangerous situation.



Overhead

Keep the aerodrome a suitable distance on your lefthand side. It is generally easier to see the aerodrome layout and windsocks by making lefthand orbits. Don't get too tight in the orbit, and position yourself so that only medium angles of bank are required. You can take plenty of time to identify the correct runway – several laps of the aerodrome may be required. Wind direction and speed can vary significantly from one end of a runway to the other

Overhead Join



– check all windsocks when deciding on the most into-wind runway.

Overhead joining height (or greater) must be maintained until the letdown begins.

Confirm that you have identified the runway you intend to use correctly from the *AIP New Zealand, Vol 4* plate and re-confirm the circuit direction.

The overhead radio call should be made when you have positively identified a suitable runway. From this point all subsequent turns during the letdown should be made in the applicable circuit direction. There is no need to include "letting down on the non-traffic side" in your radio call.

Descending

Look carefully for other aircraft in the circuit, and plan your letdown to ensure adequate spacing for the downwind leg. Aircraft already established in the circuit have the right of way. Aircraft training in a crosswind circuit are required to give way to into-wind circuit traffic.

If the position of other aircraft in the circuit doesn't allow you adequate spacing, continue circling at joining height until you are satisfied you can sequence comfortably.

Descend on the non-traffic side, planning to cross within the upwind threshold at circuit height. If the runway is long, it can be safer to cross more towards the centre of the runway, while leaving yourself enough time in the down-wind leg. This will lessen the chance of conflict with any high performance aircraft on takeoff.

It is important to be at circuit height before crossing the runway – this makes it easier to see aircraft in the downwind leg against the horizon and eliminates the possibility of descending on top of other circuit traffic.

It is equally important not to descend lower than circuit height, to keep separation between yourself and any aircraft taking off.

Allow for wind so that you will track along the downwind leg at a constant distance from the runway.

Downwind

Make your downwind call and proceed with the remainder of the circuit as normal.

There is always the potential for a mid-air collision between you and traffic already established in the circuit, so an active scan must be maintained at all times. Remember to scan both inside and outside the circuit pattern for traffic.

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Joining the Circuit Directly

If you are familiar with the aerodrome you will already know whether joining overhead is appropriate.

If it is not local practice to join overhead, you should have no problem in joining the circuit directly (i.e. via the downwind, base leg, or final approach) by observing the movement of other traffic.

Make use of your local knowledge and maintain a careful lookout and listening watch for other traffic to help you determine your position in the circuit sequence.

At an unattended aerodrome or where an Aerodrome Flight Information Service (AFIS) is being provided, you may elect to join directly – under certain conditions:

- the runway in use and aerodrome traffic are known; and
- if radio equipped, joining intentions are advised to the AFIS or to "aerodrome traffic"; and
- when sequenced to give priority to other aircraft already established in the circuit. If this is not possible, you must join via the overhead procedure; and
- when entering or flying within the circuit, all turns must be made in the direction appropriate to the runway in use.

Joining straight-in does not allow you to view all the windsocks, inspect the surface condition of the runway, note any ground movements or hazards, or assess any other unexpected situations. If you do choose to join this way, **expect the unexpected**. ■

Workshop for **Senior Persons** – Hokitika

The CAA is holding a further training workshop for Senior Persons responsible for Air Operations in organisations with Part 119 / 135 certification, Chief Pilots and Chief Flight Instructors from Part 137 and Part 141 organisations.

The two-day course aims to equip senior persons with the knowledge and tools they need.

Register via the CAA web site, see "Seminars and Courses". A registration fee of $100 will be charged to help cover costs.

October 13 – 14

Beachfront Hotel,
111 Revell St, Hokitika

Aviation Safety & Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)
info@caa.govt.nz

For all aviation-related safety and security concerns

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

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

Proposed Changes to **Flight Training**

The CAA is holding nationwide presentations on the draft Notice of Proposed Rule Making to Part 141 *Aviation Training Organisations – Certification.* A key proposal contained within the draft NPRM is that all flight training and some ground training will be required to be conducted under the authority of a Part 141 certificate.

The presentations do not signal the start of formal consultation, but are intended as a 'heads-up' as to what the draft NPRM contains.

Presentations have so far been given in Tauranga, Wellington and Hastings. All presentations start at 7pm.

Whangarei, Quantum Aviation	August 6
North Shore, Aero Club	August 7
Hokitika, Aero Club	August 11
Ashburton, Aero Club	August 12
Omaka, Aero Club	August 13
Wanaka, Wanaka Helicopters	August 20
Invercargill, Southern Wings	August 21
Palmerston North, Aero Club	August 27
New Plymouth, Aero Club	August 28

Planning an Aviation Event?

If you are planning an event, large or small, such as an airshow, air race, rally, or major competition, the details should be published in an *AIP Supplement* to warn pilots of the activity.

The published cut-off dates for the AIP are listed below, but you must advise the CAA ***at least one week*** before those dates, to allow for inquiries and processing. Note that, even if you have applied to the CAA for an aviation event authorisation, this does not automatically generate an *AIP Supplement* or airspace request.

Email the CAA, aero@caa.govt.nz. Further information on aviation events is in AC91–1.

Effective Date	***Cut-off Date With Graphic***	***Cut-off Date Without Graphic***
23 Oct 08	14 Aug 08	21 Aug 08
20 Nov 08	11 Sep 08	18 Sep 08
18 Dec 08	9 Oct 08	16 Oct 08

How to Get Aviation Publications

Rules, Advisory Circulars (ACs), Airworthiness Directives

All these are available free from the CAA web site. Printed copies can be purchased from 0800 GET RULES (0800 438 785).

AIP New Zealand

AIP New Zealand is available free on the internet, www.aip.net.nz. Printed copies of Vols 1 to 4 and all **aeronautical charts** can be purchased from Aeronautical Information Management (a division of Airways New Zealand) on 0800 500 045, or their web site, www.aipshop.co.nz.

Pilot and Aircraft Logbooks

These can be obtained from your training organisation, or 0800 GET RULES (0800 438 785).

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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 available on CAA's web site. Accident briefs on the web comprise those for accidents that have been investigated since 1 January 1996 and have been published in *Occurrence Briefs*, plus any that have been recently released on the web but not yet published. Defects on the web comprise most of those that have been investigated since 1 January 2002, including all that have been published in *Occurrence Briefs*.

ACCIDENTS

The pilot-in-command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form CA005 to the CAA Safety Investigation Unit.

Some accidents are investigated by the Transport Accident Investigation Commission (TAIC), 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-TRT, Titan Tornado I, 19 Mar 06 at 10:00, Ohaupo. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, flying hours 1500 total, 3 on type, 10 in last 90 days.

The microlight experienced an engine failure during takeoff. The undercarriage was destroyed.

CAA Occurrence Ref 06/887

ZK-GMX, Grob G103 Twin II, 4 Nov 07 at 9:05, Hastings. 2 POB, injuries nil, damage minor. Nature of flight, private. Pilot CAA licence nil.

On landing, the aircraft was displaced by a crosswind, resulting in a collision with the runway lights.

CAA Occurrence Ref 07/4048

ZK-FRX, Quicksilver MXL II, 25 Nov 07 at 17:00, Sissy Bay. 1 POB, injuries nil, damage substantial. Nature of flight, private. Pilot CAA licence nil.

The aircraft experienced strong headwinds of more than 50 kts. The pilot carried out a forced landing at Sissy Bay, near D'Urville Island. The aircraft wheels were damaged during the landing.

CAA Occurrence Ref 07/4226

ZK-SUN, Lockwood Aircam, 13 Jan 08 at 19:00, Waiheke Island. 1 POB, injuries 1 minor, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age 54 yrs.

The pilot came in to land for the second time without the instructor. The pilot was not used to the lighter weight of the aircraft and flared too early. The righthand strut caught the fence and cut the brake line. On braking, the aircraft veered left and hit the fence.

CAA Occurrence Ref 08/100

ZK-GEE, Schempp-Hirth Discus CS, 23 Jan 08 at 14:10, Naseby. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil.

The operator reported that the pilot of ZK-GEE lost height and stalled during landing at W. Eweburn Dam topdressing strip. The 10 kt tailwind caused the glider to stall from about 15 ft, impacting the ground. The aircraft received substantial damage to the right wing and fuselage.

CAA Occurrence Ref 08/340

ZK-ECU, Jodel D.11, 28 Jan 08 at 9:55, Paraparaumu Ad. 1 POB, injuries nil. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 65 yrs.

A gust of wind caused the tail to rise after landing, resulting in a propeller strike.

CAA Occurrence Ref 08/231

ZK-RMI, Quad City Challenger, 7 Feb 08 at 15:00, Port Waikato. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil.

The pilot reported that during landing the wheels fell off and the microlight went through a fence.

CAA Occurrence Ref 08/470

ZK-ELS, Cessna A152, 18 Mar 08 at 15:30, Omaka Ad. 2 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence PPL (Aeroplane), age 24 yrs, flying hours 128 total, 19 on type, 26 in last 90 days.

The aircraft had landed at Omaka but nosed over onto its back after touching down on cultivated ground alongside the grass vector. The original runway strip had been cultivated for re-grassing and was closed by NOTAM, as well as having distinctive white crosses on the surface. The current runway strip in use was well marked, and a NOTAM issued advising the strip had been moved laterally by 5 metres.

CAA Occurrence Ref 08/1100

GA DEFECTS

The reports and recommendations that follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rules, Part 12 *Accidents, Incidents, and Statistics*. They relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less. These and more reports are available on the CAA web site. Details of defects should normally be submitted on Form CA005 or 005D to the CAA Safety Investigation Unit.

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

Key to abbreviations:

AD = Airworthiness Directive
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

Piper PA-31-350
Hartzell CSU

On application of full power, the RH propeller went into full feather. An engine check found the propeller uncontrollable. The CSU was removed and found stiff to rotate one way, free the other. A bulkstrip revealed that the CSU had gears with missing teeth and other worn components. The CSU was overhauled. TSO 801 hours, TTIS 4203 hours.

ATA 6120 CAA Occurrence Ref 06/4948

Piper PA-31-350
Piper PA-31-350 Drag Links

During the landing roll the nose landing gear green light went out and the red gear unsafe light illuminated. The aircraft was stopped on the runway and an inspection of the nose landing gear was made. The idler link had moved forward, bending the idler link stop forward, and allowing the nose landing gear downlock micro switch to extend and become trapped behind the idler link. This caused the unsafe indication during the landing. Investigation revealed there had been earlier landing gear indication defects reported and a number of maintenance actions carried out. Most of these actions focused on the landing gear indicating system. The aircraft was jacked and a detailed examination of the NLG carried out. A number of bolts and bushes were replaced to eliminate any excess play in the system. A check of the NLG system found it could not be rigged as detailed in the MM. Further investigation using the special tool illustrated in the MM Figure 7-35 determined that the drag link over centre measurement exceeded the limits in the MM. The drag links were removed and repaired by J and R Aerospace of Melbourne. The repair consisted of machining the mating faces of the three parts of the drag links and retaining a shin on the small link to bring the over centre travel of the links to within the limits specified in the MM. The parts were refitted, retraction tests carried out, and a satisfactory flight test completed.

ATA 3220 CAA Occurrence Ref 06/2086

Piper PA-31-350
Piper PA31-350T Spinner backplate P/N 43933-04

While the aircraft was in descent to the airport the pilot noticed the lefthand spinner wobbling, and a slight vibration was felt in the aircraft. A normal approach and landing was made. Investigation revealed that the spinner backplate had cracked through, allowing the spinner to stretch, forming cracks around the spinner mounting screws. The crack in the backplate had been identified at the last scheduled inspection, but the repair work undertaken was inadequate. It had been intended that the spinner backplate would be replaced at the next scheduled inspection, when the replacement parts would be available. TTIS 21175.4 hours.

ATA 6110 CAA Occurrence Ref 06/2508

Piper PA-34-200T
Piper PA-34-200T Undercarriage motor

The landing gear failed to extend after being selected down. The emergency gear system was utilised and a normal landing carried out. The investigation found that the insulation on the through-bolts used for securing the undercarriage motor were worn, allowing an intermittent short circuit to the motor. The recent disturbance of the motors during checking of the motor brushes most likely contributed to the fault. The insulation was replaced and the correct operation of the undercarriage confirmed by ground retraction tests.

ATA 3230 CAA Occurrence Ref 06/1642

Robinson R44
Engine Mounts

As part of an ongoing overseas investigation, both forward engine mount bolts were removed for inspection. Both showed signs of fretting and were found thread bound. The bolt length called up in the RHC maintenance manual is too long. This predisposes bolts to thread binding and insufficient clamp up force. New bolts were installed and washers added to prevent thread binding.

ATA 7120 CAA Occurrence Ref 07/427

Robinson R44 II
Robinson Helicopter Company Raven 2 Spag and Clutch shaft P/N C-188-3

After numerous reports of premature clutch failures, the operator requested a special inspection. Clutch sprag was found to have 3 broken pawl segments. A total of 14 other premature failures are also noted on the CAA database for the R44 helicopter. Airworthiness Directive DCA/R44/23 has been published, reducing inspection intervals from 2200 hours to 500 hours. TTIS 900 hours.

ATA 6300 CAA Occurrence Ref 07/1614

Rockwell 114
Rockwell Downlock microswitch P/N S2088-4

During the approach the righthand landing gear was not indicating a down and locked position. The aircraft completed a low-level flypast to allow the state of the undercarriage to be assessed from the ground. The aircraft then landed safely. A wire to the righthand landing gear microswitch was found broken. The cable tie used for supporting the wiring was broken, allowing the wires to flail. The wiring appeared to be brittle, so a new wiring harness was installed along with a new microswitch. The condition of the wiring installed on the aircraft's other landing gear was checked.

ATA 3260 CAA Occurrence Ref 06/2430

Tecnam P2002-JF
Tecnam P2002JF Tube

During the landing roll the pilot reported having a flat tyre and taxied onto the grass to clear the runway, and shut down. Investigation established that the aircraft manufacturer had fitted the incorrect size tyre tubes; this occurred due to a 'mixed' batch problem. The wrong-size tube, in combination with a low tyre pressure, allows the tube to creep inside the tyre and eventually deflate suddenly. The CAA has issued a Continuing Airworthiness Notice about the problem, and the aircraft Flight Manual was amended on 3 August 2005 to increase the main tyre pressure to 23 psi and the nosewheel tyre pressure to 15 psi.

ATA 3241 CAA Occurrence Ref 07/34

Aviation Safety Coordinator Training Course

The number one function of any company is business success. Safety is critical to business success.

If your organisation provides commuter services, general aviation scenic operations, flight training, or sport aviation, you need an Aviation Safety Coordinator.

The CAA is running a **FREE** two-day course to train new aviation safety coordinators, and to refresh and re-inspire existing ones.

- you will get a comprehensive safety manual
- access to all of the latest CAA safety resources and support
- lunch is provided (accommodation, transport and other meals are not provided)

Where and When

Christchurch
Thursday 4 and Friday 5 September

Copthorne Hotel Commodore
449 Memorial Avenue,
Christchurch

Check the CAA web site, www.caa.govt.nz under Seminars and Courses for an enrolment form and further information.

Or contact Rose Wood,
Tel: 0–4–560 9487,
Fax: 0–4–569 2024,
Email: woodr@caa.govt.nz.

Christchurch