

# VECTOR

*Pointing to Safer Aviation*

## Circuit Breakers

— How Well Do You Understand Them?

All About ADs

Cockpit Overload



Managing Editor, Cliff Jenks

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

CAA News Editors, Peter Singleton, Phillip Barclay.

Design, Gusto Design & Print Ltd.

Published by, Civil Aviation Authority of New Zealand, P O Box 31-441, Lower Hutt, NEW ZEALAND. Telephone +64-4-560 9400, Fax +64-4-569 2024, Managing Editor email: JenksC@caa.govt.nz, CAA News Editor email: SingletonP@caa.govt.nz. Published six times a year, in the last week of every odd month.

#### Publication Content

The views expressed in **Vector** (with the exception of "Occurrence Briefs") are those of the Editor or the named contributor. They are intended to stimulate discussion and do not necessarily reflect the policy of the Civil Aviation Authority. Nothing in **Vector** is to be taken as overriding any New Zealand Civil Aviation legislation, or any instructions issued or endorsed by the Civil Aviation Authority of New Zealand.

Reader comments and contributions are welcome and will normally be published, but the Editor reserves the right to edit or abridge them, and not to publish those that are judged not to contribute constructively towards safer aviation. Reader contributions and correspondence regarding the content of **Vector** should be addressed to: Vector Editor, PO Box 31-441, Lower Hutt.

#### Free Distribution

**Vector** is distributed automatically to all New Zealand Flight Crew, Air Traffic Controllers, Aircraft Maintenance Engineer licence holders, aircraft owners, most organisations holding an Aviation Document, and to certain other persons and organisations interested in promoting safer aviation. In the case of Flight Crew and Air Traffic Controllers, a current aviation medical certificate must be held, and a current New Zealand address given, to ensure magazine entitlement. **Vector** articles also appear on CAA's web site at <http://www.caa.govt.nz>.

#### Change of Address

Readers receiving **Vector** free of charge should notify the Civil Aviation Authority, [ParlakchiefE@caa.govt.nz](mailto:ParlakchiefE@caa.govt.nz), of any change of address; quoting your CAA Client Number (or licence number) will assist in administration. Paying subscribers should notify The Colour Guy.

#### Paid Subscriptions

**Vector** is available on subscription only from The Colour Guy, P O Box 30-464, Lower Hutt, freephone 0800 438 785, phone +64-4-570 0355, fax +64-4-570 1299. Address changes for paid subscriptions to The Colour Guy please.

#### Copyright

Reproduction in whole or in part of any item in **Vector**, other than material shown to be from other sources or named authors, is freely permitted, providing that it is intended solely for the purpose of promoting safer aviation, and providing that acknowledgment is given to **Vector**.

ISSN 1173-9614

November / December 2001

## CONTENTS



### Page 4 Circuit Breakers – How Well Do You Understand Them?

It is wise to think twice before resetting any circuit breaker in flight. We discuss the pros and cons of this.



### Page 8 All About ADs

What are ADs, why are they so important, and how are they notified? "All About ADs" answers these questions and more.



### Page 12 Cockpit Overload

Pilot stress, workload and performance are all very closely related. Find out how to reduce your chances of becoming stressed in flight.

#### Also Featuring:

- Page 3 150th Issue
- Page 3 Letters to the Editor
- Page 6 Overseas Pilots
- Page 7 See The Light
- Page 7 RTF Terminology Quiz
- Page 10 Human Factors Survey Feedback
- Page 11 Control Cable Cautions
- Page 11 New Zealand Golf Open
- Page 14 Occurrence Briefs
- Page 19 Summer-Flying Checklists poster

### Publications Purchase

**0800 GET RULES (0800 438 785)** – Civil Aviation Rules, Advisory Circulars, Airworthiness Directives, CAA Logbooks and similar Forms, Flight Instructor's Guide, Aircraft Icing Handbook.

**[www.caa.govt.nz](http://www.caa.govt.nz), CAA web site** – Civil Aviation Rules, Advisory Circulars, Airworthiness Directives, CAA application forms, CAA reporting forms. (Note that publications and forms on the web site are free of charge.)

**0800 500 045, Aviation Publishing** – AIP documents, including Planning Manual, IFG, VFG, SPFG. All maps and charts, including VTCs.

#### Cover photo:

Watch out for birds intent on making a home in your aircraft! Thanks to Ron Edmands and the Wellington Aero Club for their assistance with this photograph.

This issue is the 150th in a series that has gone through two name changes and many formats over a period of 29 years. *Flight Safety*, Vol 1 No 1 was published in November 1972. Its cover featured a pair of stylised hands providing protection for a light aircraft. This motif was to remain a trademark until December 1985, our 49th issue.

Our 50th saw a general redesign including, for the first time, colour photographs on the cover. The name changed to *New Zealand Flight Safety*, hardly major, but requiring re-registration as a 'new' publication.

Our 69th issue, in February 1992, saw the introduction of *New Zealand Flight Safety Supplement*. Published alongside the parent magazine, it was an attempt to get the message out more frequently, in a more timely fashion, and also save on postage (it folded into a standard letter size). It worked, but it was never very elegant.

With our 115th issue, in November 1996, we made a major change in the name, to *Vector*. Controversial within CAA corridors at the time, we believe the change has benefited us by raising our profile; the



name trips easily off the tongue. (Many old-stagers called the earlier magazine "Safety Digest", a name it had never worn; perhaps they confused us with our

Australian counterpart at the time.)

Despite the name change, we continued with the 'supplement' formula, but it still caused comment that some issues of *Vector* were 24-page full-colour, while 8-page two-colour look-alikes of the same name also appeared. In the same envelope were two other publications, *Occurrence Briefs*, and *CAA Review*.

In mid 1999, our 139th issue heralded the latest look, with the three titles being amalgamated into the one publication. It was still called *Vector*, although the *CAA News* took front stage at the back, so to speak (a layout that caused surprisingly little comment).

So here we are at our 150th – and so far no mention of our content? That's largely because, despite the different faces, at heart we have never changed from our basic philosophy. This is to give good advice, in a manner that is easily understood.

That's easy to say. It takes a lot of effort to do it. But we never lose sight of it. We hope you agree we achieve it most of the time. Above all, we hope you are safer for having read *Vector*. ■



## Letters to the Editor

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

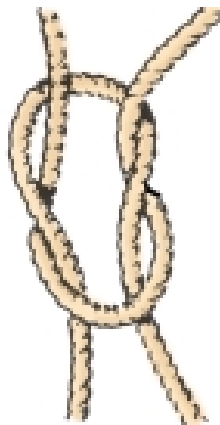
### Tiedown Techniques

I refer to the September/October edition of *Vector*. As always, the magazine is a pleasure to read, being well written and informative.

However, I'm very concerned at the advice given on tying knots in your excellent article "Tiedown Techniques".



A Bowline



A Square Knot

The Square Knot shown on page 6 (more commonly known as the Reef Knot) should not be used for anything other than tying one's shoelaces. It is a particularly unreliable knot when tied in nylon or synthetic ropes or if placed under load. It can generally be undone with a bit of a shake. I have enclosed a rather old article from *Sea Spray* October 1978 (which confirms what most of my other references on the subject say). In short, don't use it – especially not to secure something as valuable as your aeroplane!

I would encourage you to recommend to your readers that they take great care with the knots they use to secure their aeroplane, or all your other advice could be wasted. Knots to recommend are the Bowline (simple, easy and strong), the Figure Eight (very strong and now often used by climbers in place of the Bowline) but less easy to tie, or even the Round

Turn and Two Half Hitches (simple, easy and strong).

I trust this is of assistance to you and your readers.

Tim Dennis, Auckland  
October 2001

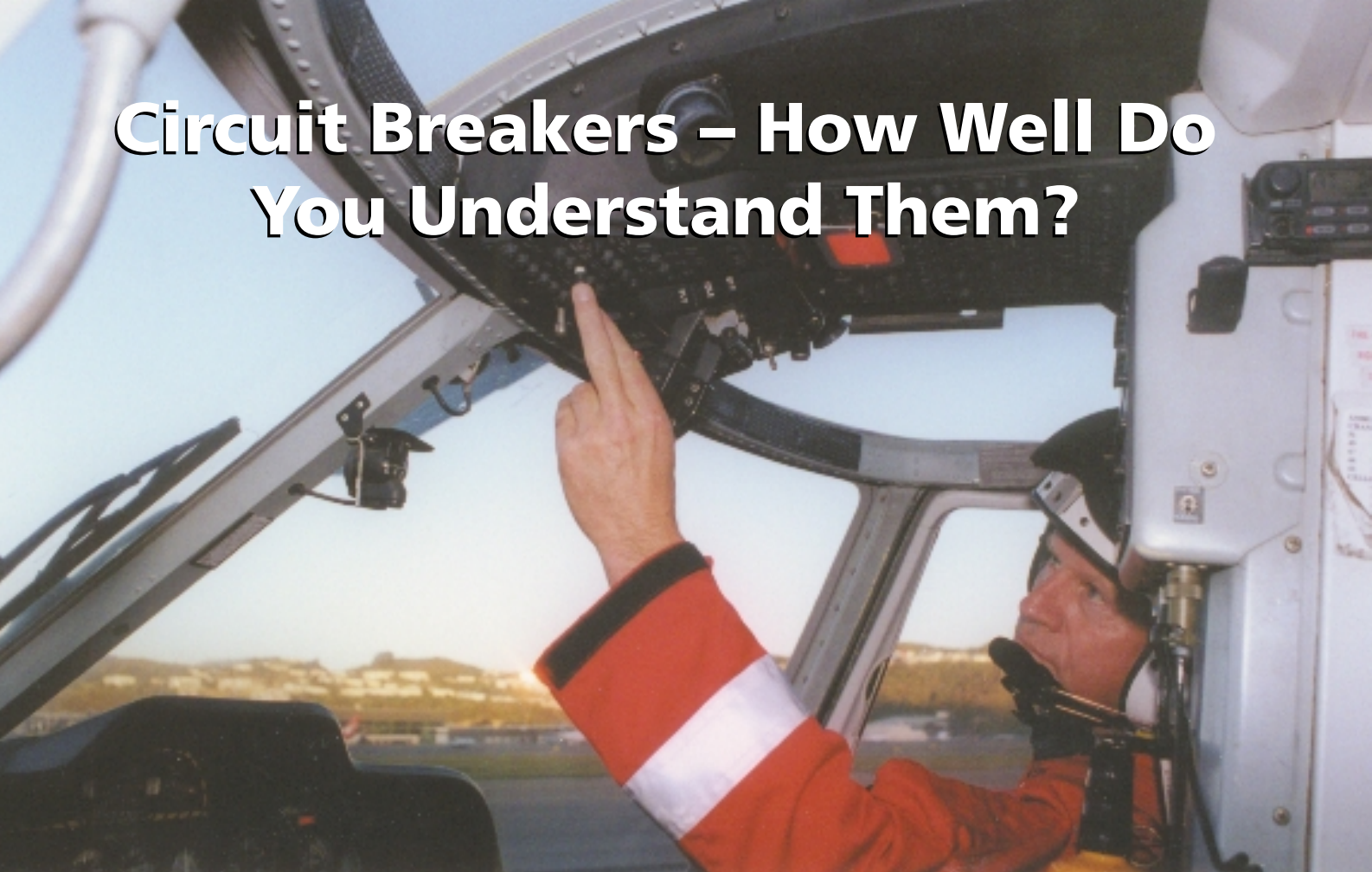
#### Vector Comment

Thank you for that information. The reference to the Bowline and the Reef Knot came directly from a US FAA Advisory Circular on the subject. Further research has confirmed your point that a Reef Knot is not really suitable in this context.

As we said in the article, a tiedown rope holds no better than the knot you tie, so using the right knot is very important. The whole subject of knots can be quite complex, and we feel that it warrants further elaboration. We plan to cover suitable knots for tying down aircraft in more detail in a future article. ■



# Circuit Breakers – How Well Do You Understand Them?



*This article is based mainly on material taken from Transport Canada's **Aviation Safety Letter**, Issue 1/2001 with reference to relevant FAA publications, FAA AC No 25-16 and FAA Flight Standards Information Bulletin for Airworthiness FSAW 00-08A Resetting Tripped Circuit Breakers.*

**C**ircuit breakers! They stare at you from panels at your knees, overhead, behind you or perhaps on the console between you and your crewmate. Occasionally, they trip. Just what do these humble yet hardworking devices do? What does it mean when they pop? And, just as importantly, what don't they do?

Circuit breakers probably don't get the attention they deserve. However, several recent high-profile aircraft accidents have reminded us that assumptions, misunderstandings or neglect of critical components, even small ones like circuit breakers, can have tragic consequences. The problem is even more acute as aircraft become increasingly dependent on highly integrated electronic systems for navigation, stability and control. Fly-by-wire aircraft are obviously totally dependent on electricity for safe operations.

## Circuit Protection Devices

A Circuit Protection Device (CPD) is used to protect electrical/electronic circuit components from an over-voltage or over-current condition, by automatically interrupting the current flow. The most common types of CPD's used in aircraft are the circuit breaker and the fuse.

They are designed to interrupt the flow of electrical current when specific conditions of time and current are reached. Those conditions generate heat, and circuit breakers are designed to trip (open the circuit) before this heat damages either wiring

or connectors. A specification might be for a breaker to trip under a massive short jolt (eg, 10 times the rated load of the circuit breaker for between .5 to 1.4 seconds) or a longer, less intense overload (eg, twice the rated amperage for 3–130 seconds, depending on the type of circuit breaker). If the designed overload conditions are not exceeded, the circuit breaker will not trip.

The very tolerances that must be built into a circuit breaker to prevent nuisance tripping, such as the high transient current that flows when a motor or component is started, mean some glitches may not trip the breaker.

Ticking faults occur when tiny bolts of electricity intermittently arc from an exposed wire conductor. On wires covered with aromatic polyimide (often commercially known as Kapton), installed in many aircraft built since 1970, this can burn the thin insulation, converting it into carbon, which is an excellent conductor – a nasty case of the insulator becoming the conductor! This can, in turn, lead to very short bursts (micro-seconds) of violent arcing where localised temperatures can reach well in excess of 1000°C, capable of igniting nearby flammable material.

***“It is wise to think twice before resetting any circuit breaker in flight.”***

Short, violent bursts of arc-tracking will not necessarily trip breakers, which are comparatively slow-acting devices. Special arc-fault circuit interruption devices, still a few years away from widespread use in aviation, are needed to deal with this type of situation. If your aircraft has aromatic polyimide wire, there are very good reasons not to be in a rush to reset any tripped circuit breaker – the results could be catastrophic.

Circuit breakers are not intended to protect the electrical

equipment, which may have its own built-in protection or mitigation system, but are intended to protect the wiring and connectors, which would otherwise have no such protection.

Aging, vibration, excessive bending, improper installation, heat, moisture, friction, wind blast, and chemicals, such as de-icing fluid, toilet fluid, hydraulic fluid, oil and fuel, can damage the insulation on the wire, if not the conductor itself and any connectors. In addition to disabling the circuit and any associated component, this could also create a fire hazard, possibly in an area where it could be impossible to use extinguishers and that could easily threaten the safety of the flight.

With any in-flight fire, especially one in an inaccessible location or close to critical components, an immediate landing becomes a very high priority. Because such an option may not always be readily available (eg, in mountainous, arctic or oceanic areas) adequate circuit protection and a good knowledge of what it can and cannot do is essential.



## To Reset or Not to Reset?

Circuit breakers are thermal-mechanical in nature. Bimetallic elements, with one metal expanding more under heat than the other, pop the breaker open. This also enables them to be reset, albeit only after they have cooled down. There are, however, good reasons why it may not be advisable to do so, as we will soon see.

On many light aircraft, the circuit breakers are mounted along the bottom of the instrument panel. Many are flush fit and cannot be manually tripped or pulled. On larger aircraft, they are usually grouped in panels placed around the cockpit in locations where they would not be displacing vital instruments, switches or controls, and most can be manually tripped or pulled. Having them within sight and reach, although a necessity, is both a blessing and a curse. A blessing because they can be seen and, if need be, reset. A curse, because it is tempting to use them for a purpose they were never intended (eg, as a switch) and to reset them when they should not be reset.

The electro-mechanical construction of a circuit breaker was not designed for use as a switch and using it for this purpose causes premature wear and the risk of failure. When a circuit breaker fails, it will take down a system that may be needed for the safe operation of the aircraft or it will leave a circuit that should be de-energised on-line. Both alternatives are unattractive, and both are capable of inflicting catastrophic consequences.

It is wise to think twice before resetting any circuit breaker in flight. It is telling you that something is wrong – that there has been a serious electrical event. This danger signal must be interpreted with extreme caution. Resetting a circuit breaker tripped by an unknown cause should normally be a maintenance function conducted on the ground. The old rule of thumb to automatically try one reset is no longer considered prudent.

Generally resetting a tripped circuit breaker is met with no

adverse results. However, the opposite is sometimes true. Smoke, burned wires, electrical odours, arcing, and loss of related aircraft systems have been reported as a result of resetting tripped circuit breakers.

Safety-conscious airlines are now telling their crews not to reset any breakers unless they are essential for the safe completion of the flight, and to then do so only once. Wherever possible, this should be done only after consulting the relevant

resources (eg, the quick reference handbook, the minimum equipment list (MEL), the aircraft flight manual, the company operations manual, and/or maintenance personnel). In most cases it is advisable to delay the reset until the service is needed. For instance, there is no need to reset a landing gear circuit breaker that trips after takeoff until you are committed to land.

## Policy

If your organisation doesn't have a comprehensive policy on circuit breakers, now is the time for flight operations and engineering/maintenance personnel to develop one. This would include logging any circuit breaker anomalies to give maintenance personnel a much more accurate picture of the nature of the problem. Even if you have a policy, don't assume that everyone is aware of it, understands it and is using it. Better to find out now than to learn about it after a tragic event. Being at altitude with a deteriorating situation on your hands is no time to develop a good policy.

Circuit breakers: a willing friend, ready to save you from harm's way, provided you understand and respect their limitations.

*This paragraph from FAA FSAW 00-08A **Resetting Tripped Circuit Breakers** is probably a result of the TWA Flight 800 investigation involving the fatal 1996 explosion of the centre-wing tank on a B747-100.*

### **CB Associated with Fuel Pump Circuit or Fuel Quantity Indicating System (FQIS)**

Special caution is appropriate where fuel pumps and/or FQIS (fuel quantity indicating system) are involved, because of the possibility that arcing might lead to ignition of fuel or fuel vapours. The FAA has issued airworthiness directives (AD) affecting certain aeroplane makes and models that: (1) prohibit the resetting of fuel boost pump CBs in-flight; and, (2) prohibit resetting a fuel boost pump CB while the aeroplane is on the ground, without first identifying the source of the electrical fault. Because of similar arcing potential, resetting FQIS CBs should be likewise restricted.

*Chafed wiring associated with a fuel system has occurred in a New Zealand aircraft (fortunately without any major consequences) and is referred to in our article "All About ADs" in this issue. ■*

# Overseas Pilots



Recently, a group of overseas pilots hired several light aircraft from a North-Island-based flight-training organisation to go on a sightseeing trip to the South Island. During the course of this trip, the aircraft were involved in a number of serious incidents, most of which related to their pilots' poor airmanship and lack of understanding of local procedures.

At one unattended aerodrome in particular, only two radio calls in total were made prior to joining the circuit pattern, even though there were four aircraft in the group and they were joining from four different directions. One aircraft joined the circuit from the opposite direction to that stated in his call, while another called joining on a "left base" but subsequently joined on a right base. They seemed to have little awareness of the three aircraft already established in the circuit and joined in a very haphazard fashion. One of the local aircraft was forced to do a go-around and another to vacate the circuit to escape the chaos that was being created by the visitors.

Upon leaving the aerodrome the following day, the pilot of the lead aircraft decided that he would take off on a sealed runway that was NOTAMed closed due to a defensive driving course being held on it. The local operator called the pilot several times as he was taxiing out, advising him that the runway was closed, but received no reply. The pilot continued for the seal despite a parallel grass vector being available. He lined the aircraft up, ignoring calls from other aircraft that the runway was closed, and he took off over the top of the cars, narrowly missing one of them in the process.

By this point, (after several more radio calls) it had dawned on the pilot of the next aircraft that the runway was indeed closed for a very good reason and that the grass was the better option. The pilot unfortunately, however, lined up in front of another aircraft on short final for the grass causing it to go around. To make matters worse, the visiting aircraft did not become airborne until late into its takeoff roll and struggled to clear the trees at the end of the vector. This brought into question the issue of whether or not a performance calculation was done; maybe the grass wasn't the better option after all.

This series of incidents highlights the need for flight training organisations to be especially thorough when checking out overseas pilots (or any pilot for that matter) before hiring them an aircraft. Many organisations put overseas pilots, especially those for whom English is a second language, through a stringent BFR and general knowledge process before being signed off. But some are not quite so thorough, and aircraft are occasionally being hired to pilots who do not have the competence, or knowledge of local procedures, to fly safely.

It is important that the checkout process places special emphasis on the following areas in addition to what is normally covered in the standard BFR:

- Joining procedures, including RTF calls for both controlled and uncontrolled aerodromes, with particular emphasis on the importance of accurate position reporting. This briefing needs to include an assessment of whether or not the pilot's standard of English is sufficient for the type of RTF environment they will be exposed to – be prepared to say no if they are not up to scratch, or to put some limitations on the areas they can fly to.
- Airspace structure and function.
- VFR meteorological minima, magnetic track cruising levels, and the use of transponders.
- Familiarisation with the VFG/IFG, charts, and AIP Supplements.
- Ordering weather and NOTAM briefings and their interpretation (particularly any localised weather patterns).
- The use of flight planning and FISCOM systems.
- Localised terrain, weather, and route considerations for each leg of the proposed flight.
- The desirability of ringing ahead and talking to local operators to find out details of any specific procedures or just to get some 'good local advice' – this could include talking to aerodrome control tower staff.
- Ensuring that they have a sound understanding of the aircraft type you are about to hire them, paying particular attention to its fuel system and consumption rates. An explanation of the legal minimum fuel requirements under Part 91 (or any additional company or club requirements) should also be covered.
- Emphasising that a good standard of lookout (visual and listening) and situational awareness needs to be maintained at all times, due to being in an unfamiliar environment.

Allowing sufficient time to adequately cover the above points, in addition to what is normally covered in a standard BFR, is vital before letting an overseas pilot loose in one of your aircraft. Skimming over any one of these areas may mean not only that the safety of other pilots is put at risk (not to mention the frustration caused to ATC or local operators), but also that your organisation will be implicated in any resulting incidents. Worse still, you could end up with a bent aircraft. ■



# See The Light!

**A** NORDO aircraft recently joined at a controlled provincial airport. The pilot had phoned ahead and obtained ATC approval and joining instructions, and he was advised to watch for signal lights from the Control Tower for his landing clearance.

On arrival at the airfield, he saw what he believed to be a green light from Tower, which he acknowledged by rocking the wings. The pilot then joined on a base leg, but shortly thereafter sighted a Saab 340 on final and a red light from the Tower. He immediately re-circuited, after which he received a 'real' green from the Tower while in the downwind. It was not until on base leg that he realised that he had incorrectly identified a reflection from a car window in the airport car park shining through the green tinted windows of the Tower as being his landing clearance on the previous approach.

This incident highlights the fact that many pilots are now unfamiliar with light signals used by ATS (see the accompanying table for a refresher). Few NORDO aircraft operate regularly within control zones, and radio failures are thankfully rare, though they do occur.

It is for this reason that pilots should be prepared for the possibility of a NORDO join at a controlled aerodrome – you just never know when you might be forced to do one. Actions in the event of a communications failure are contained in

the EMERGENCY section in the back of the VFG. These include:

- avoiding controlled airspace if possible,
- following any assigned clearance or planned route if forced to remain within controlled airspace,
- squawking 7600 if the transponder is still operative,
- turning on all aircraft lights, and
- looking out for other aircraft and for signals from ATS.

If you are unfamiliar with what aerodrome control signal lights look like while in flight, then talk to your friendly local Tower and ask them to demonstrate the lights to you. Airways Corporation has advised that Tower staff will be happy to do so (workload permitting) provided

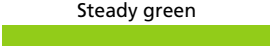
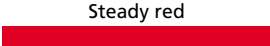


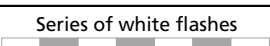
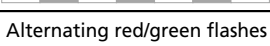


it has been pre-arranged in a way that no possible confusion could result with other aircraft.

## Comms Failure – How Likely?

CAA database records show 117 incidents over the last nine years that could have required a NORDO join. Of these:

- 28 were total electric failures or fires,
- 69 were straight comms failures (of these two were resolved with hand-held VHF radios and 16 with cellphones), and
- 20 were classified as 'other'.

**It does happen.  
It could happen to you! ■**

Colour and Type of Signal	To Aircraft in Flight	To Aircraft on the Aerodrome
 Steady green	Cleared to land	Cleared for take-off
 Steady red	Give way to other aircraft and continue circling	Stop
 Series of green flashes	Return for landing*	Cleared to taxi
 Series of red flashes	Aerodrome unsafe. Do not land	Taxi clear of landing area in use
 Series of white flashes	Land at this aerodrome and proceed to apron*	Return to starting point on aerodrome**
 Alternating red/green flashes	Danger – be on the alert	Danger – be on the alert
 Red pyrotechnic 	Notwithstanding any previous instructions do not land for the time being	

\* Clearance to land and taxi will be given in due course \*\* May also be used by AFIS

## AIP Supplement Cut-off Dates

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

Supplement Cycle	Supplement Cut-off Date	Supplement Effective Date
02/1	27 November 01	24 January 02
02/2	20 December 01	21 February 02

## RTF Terminology Quiz

How well do you understand various radio communication terms? It would appear that some pilots' knowledge is a little sketchy. Using and understanding the standard terms and phrases is important for efficient communications and to prevent misunderstandings.

Here is small quiz to test your knowledge (and act as refresher).

**What do the following RTF terms mean?**

- **ACKNOWLEDGE**
- **BREAK**
- **BREAK BREAK**
- **CORRECTION**
- **ROGER**
- **STANDBY**
- **WILCO**

Answers on page 13...

# All About ADs

## What are ADs?

Aircraft manufactured or imported into New Zealand must be of an airworthy design. During their service life, however, design, manufacturing or operational deficiencies may be found. If these deficiencies are critical to flight safety, the CAA issues Airworthiness Directives (ADs) to correct or prevent the reoccurrence of these unsafe conditions. ADs are legally binding documents. New Zealand-registered aircraft that are affected must comply with the ADs to ensure their on-going airworthiness. ADs are often the mandatory corrective actions resulting from the investigation of fatal accidents or very serious defects.

## Why are They Important?

ADs form an important part of the aviation safety net because they ensure that specific issues critical to the airworthiness of an aircraft are addressed in a proactive and timely manner. Global sharing of safety information between aviation bodies means that the knowledge and experience gained from incidents and accidents that occur in other countries can be disseminated in the form of ADs for the benefit of New Zealand operators. In this way, the corrective actions outlined by the ADs should ensure that the same incidents and accidents will not be repeated. Conversely, ADs that are issued by the New Zealand CAA are available to overseas aviation authorities so that New Zealand safety initiatives can be shared.

## Some Examples

A good example of the latter was an AD that was prompted by reports of chafed fuel boost pump wiring on a New Zealand-registered Fairchild Metroliner. This followed an incident where

the booster pump circuit breaker repeatedly tripped in flight. The chafed insulation caused arcing and could have provided an ignition source inside the fuel tank. The fuel tanks of six aircraft in the fleet were inspected by the operator's maintenance provider, and all were found to have some evidence of chafing to the boost pump wiring (in one case there were signs of arcing).

The CAA was alerted and an emergency AD (applicable to all New Zealand-registered Metroliners) promptly issued; this required the immediate inspection and removal of each boost pump to repair or replace any suspect wiring. The AD also required the pumps to be reinstalled in such a way that adequate clearance between the wiring and the fuel valves could be assured, and that they be inspected for chafing thereafter whenever the boost pumps were removed.

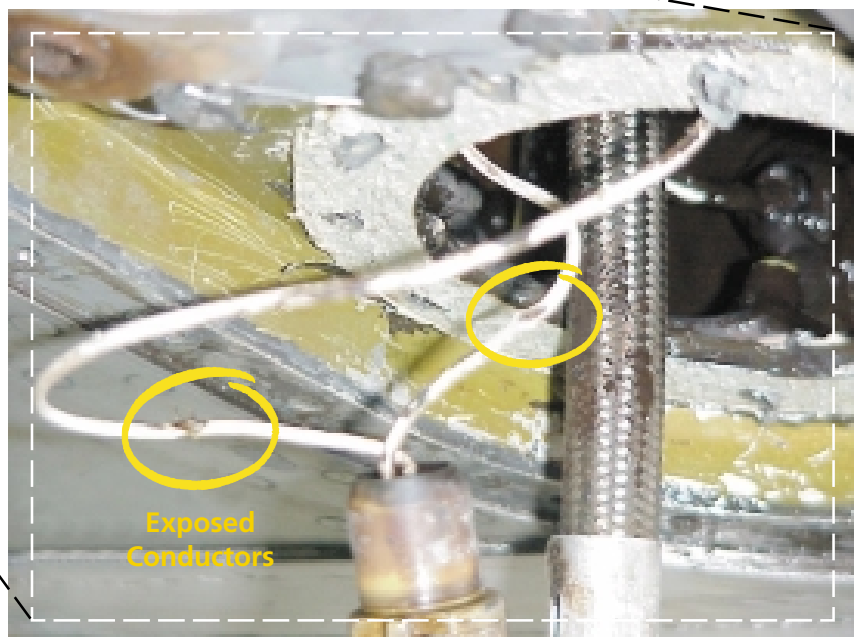
The Australian Civil Aviation Safety Authority quickly adopted this AD and ordered all Australian-registered Metroliners to undergo the same inspection. Some instances of chafed wiring were also found.

In a further example, an AD was prompted by the failure of a main landing gear drag link on another New Zealand-registered Metroliner; this resulted in a wheels-up landing following a training flight. Fleet inspections as a result of this occurrence revealed that other drag links were cracked, leading to the CAA issuing an AD to inspect all New Zealand-registered Metroliners.

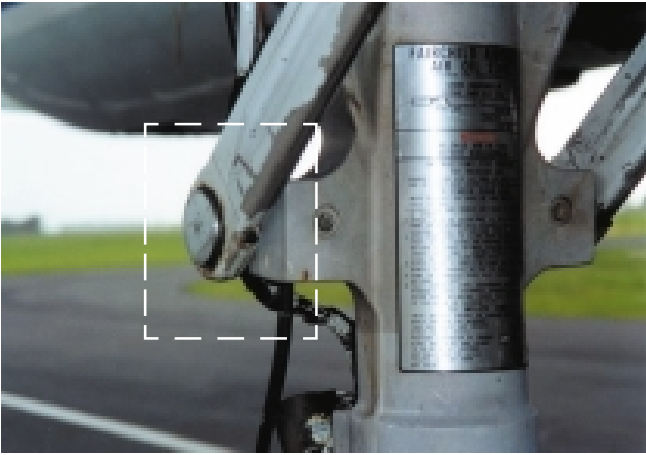
This AD action prompted the aircraft manufacturer to issue a Service Bulletin and the FAA an AD, relating to the on-going inspection of Metroliner undercarriage drag links, thus contributing towards the airworthiness of that aircraft type worldwide.



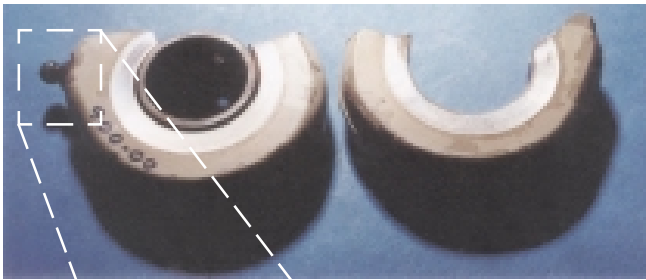
*Chafed fuel booster pump wiring found inside the fuel tank of a Fairchild Metroliner following an emergency AD inspection.*



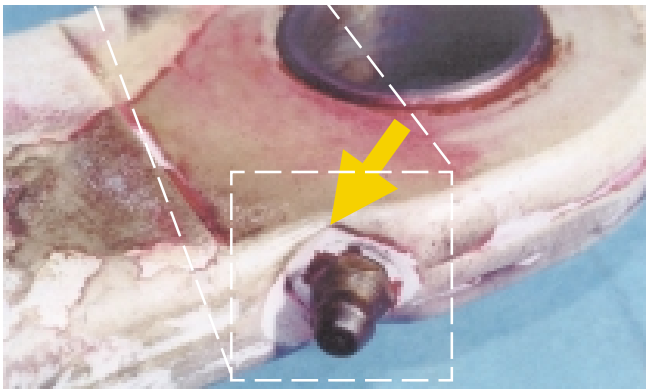




A Fairchild Metroliner undercarriage drag link.



Failed drag links.



The arrow indicates the position of a hairline crack (difficult to see here) that was found propagating from the milled area of a Fairchild Metroliner undercarriage draglink during an emergency AD inspection.

## How is an AD Generated?

An AD is generated when:

- The CAA receives ADs issued by foreign aviation authorities. These ADs are assessed by CAA airworthiness staff for their applicability to the New Zealand operating environment. An AD issued by an aviation authority responsible for a particular aircraft design (ie, a 'state of design' AD), usually results in the issue of a New Zealand AD. This AD may be modified to take into account the local operating environment.
- The CAA receives service information (such as Service Bulletins) issued by aircraft manufacturers. This information is assessed by CAA airworthiness staff in conjunction with the analysis of safety occurrence data. If the service information addresses a serious safety concern, and there is a history of related defects occurring in New Zealand, an AD may be issued following consultation with industry. The CAA has an international obligation to inform the 'state of design' that a New Zealand AD has been issued.

- The analysis of New Zealand safety occurrence data, or the investigation of a single safety occurrence, reveals a serious safety concern. Following consultation with industry, an AD may be issued. Again, the CAA has an international responsibility to inform the 'state of design' that a New Zealand AD has been issued.

## How are ADs Distributed?

The way in which an AD is distributed depends on its compliance period.

Emergency ADs are mailed out directly to all affected aircraft owners by the CAA, in addition to being posted on our web site, immediately following their release. They can be viewed on the web site by clicking on **Rules and More/Airworthiness Directives/Emergency ADs** and printed off if desired. (Note that you will automatically be sent an email notification message alerting you to all emergency ADs provided you have subscribed to our notification service, see below.)

ADs that have longer compliance criteria are collated and posted on our web site as an amendment package at the end of each month. This list can be found at **Rules and More/Airworthiness Directives** under the heading **Amendments**. ADs can also be viewed by category (eg, aeroplanes, engines, propellers, etc) and are listed alphabetically to make locating them more straightforward.

This amendment package is also available from The Colour Guy, a contractor who distributes much of the CAA's printed material. You can subscribe to this service for around \$15 per month (cost varies each month depending on the size of the amendment) by calling 0800 GET RULES (0800 438 785). Alternatively, you can call the same number to arrange to be sent a free copy of the title page for each month's AD package. This allows you to see if your aircraft is affected and decide whether or not to purchase the package.

## Notification Service

The CAA offers a free notification service that will automatically alert you, via email, to any changes in legislation (eg, ADs, Rules, forms). You can subscribe to this service by clicking on **Rules and More/Notification Service/Subscribe**, ticking the boxes that you require, entering your contact details, and then submitting your request. Every time there is a change to any one of the categories you have selected, an email notification will be generated that allows you to link directly to the **What's New** page on the CAA web site. The applicable link will appear somewhere near the top of the **What's New** list and will allow you to go directly to the change you are interested in.

## Compliance

As an aircraft owner, **you** are responsible for ensuring that you are aware of what ADs apply to your aircraft – it is not the responsibility of your maintenance provider or the aircraft operator (if you are leasing your aircraft out). You may arrange for them to receive the AD notification service and to carry out the necessary work on the aircraft, but you are ultimately responsible for ensuring that each applicable AD is complied with. The buck stops with you! ■

# Human Factors Survey Feedback

The CAA is in the process of reviewing the Human Factors (HF) component of aviation licences. Between mid July and mid August 2001, Aviation Services Ltd (ASL) conducted an initial survey to identify key HF aspects that needed to be included in the syllabuses. The survey was designed to allow industry participants the opportunity to have input into the process.

## Responses

Over 700 responses were received by the closing date, about half directly on the ASL website, and half on the forms distributed with the July issue of *Vector*. All age groups and licence category/ratings were proportionately represented (many thanks to the sole ATC respondent!). Interestingly, however, 56% of the flight crew respondents had flown less than 500 hours, while 29% had flown more than 5000 hours. Only 13% had flown between 500 and 5000 hours.

## Importance of HF

Most respondents (89%) felt that, with respect to flight safety, knowledge of HF was at least as important as other theory subjects, if not more so. Within that figure, the responses from engineers and professional pilots were in the 81% to 89% bracket, while PPLs and student pilots were, at 93%, stronger in their belief that the knowledge of HF was important.

## General Level of HF Knowledge

Most respondents (71%) felt that the general level of HF knowledge within the aviation industry was satisfactory. Another 18% felt it was not, while 10% were unsure. AME, ATPL, and flight instructors

tended to be pessimistic (a greater percentage of them felt that HF knowledge was not satisfactory), while PPL and student pilots tended to be more optimistic.

## Personal Level of HF Knowledge

Slightly less than half (44%) of respondents felt that their personal knowledge of HF was adequate for the level they were operating at, while a third (34%) felt that their own knowledge wasn't. AMEs, however, were markedly less confident, with 56% stating that their HF knowledge was not adequate. Flight instructors were also less confident, with 42% falling into the same category.

## Contents of HF Syllabuses

Respondents were also asked to state up to three HF topics that they considered should be included in HF courses or syllabuses. The responses showed a remarkable correlation with the current CPL human factors syllabus. This was not too surprising, as the CPL syllabus is quite broad and covers most of the topics normally found in HF texts.

While the survey responses need to be analysed in more detail by those working on the syllabuses, initial analysis has identified the following findings:

- The responses clearly show that the syllabuses must reflect different needs at different levels. That is not the present case. For instance, the existing PPL and ATPL syllabuses cover the same range of topics as the CPL syllabus. The difference is that PPL candidates are not expected to know the material to the same depth as ATPL candidates are for example.
- Not surprisingly, most (54%) PPLs and student pilots felt a need to concentrate on HF building block topics like "Basic Physiology and Effects of Flight" and "Flying and Health", with few mentioning topics relating to flight-deck management or communication skills.
- CPLs identified "Flying and Health," "Social Psychology," and "Flight Deck Management" matters as key issues.
- "Basic Aviation Psychology," "Social Psychology," and "Flight Deck Management" were of most importance to flight instructors. "Sleep and Fatigue" was of less concern.
- ATPLs strongly indicated (60% of them)

that topics from the "Social Psychology" and "Flight Deck Management" section were of high importance. On the other hand, they felt that stress management was less of an issue.

- AMEs felt that more emphasis should be placed on "Judgement", "Sleep and Fatigue" and less on basic physiology or health.
- Several topics currently in the syllabuses were emphasised by respondents as being important. Many noted, for instance, the importance of understanding situational awareness. AMEs and ATPLs both highlighted the importance of communication skills. Flight instructors, and to a lesser degree PPLs, identified decision-making as an important topic in its own right. Some items that are not currently in the syllabuses were also identified. Two very worthwhile areas suggested by a number of respondents were risk assessment and leadership.
- Finally, "Airmanship" was suggested a number of times. Any experienced aviator will confirm the primacy of airmanship for safe flying, but the term will need to be more clearly defined if it is to be of significant help in a syllabus. Whether airmanship and HF are discrete subjects or not, or how much they overlap, will no doubt be the subject of vigorous debate in the months to come!

## Conclusion

This article briefly outlines some of the major issues identified in the ASL Human Factors Survey. The data gathered will greatly help to improve the CAA Human Factors syllabuses so, on behalf of the team working on them, thank you to all those who provided input. Particular thanks go to those who indicated that they were willing to be of further assistance. The high number who did so meant that it was quite impractical to contact you all.

It is hoped that new draft syllabuses will be forwarded to the CAA by the end of this year. The information we have gathered should ensure that the syllabuses will be a huge improvement over what is in place at the moment. ■

*Our thanks go to ASL for sponsoring the first part of this joint CAA/ASL project. It is an important initiative, which will undoubtedly result in improved pilot human factors knowledge over the long term and ultimately improvements in flight safety.*

# Control Cable Cautions



Readers are encouraged to share their aviation experiences in order to alert others to potential pitfalls. We do not accept anonymous contributions. If you tell us who you are, we will not publish your name unless we have your permission.

*The following contribution from Pat Scotter relates to engineering and maintenance. The first item is of particular relevance to homebuilders.*

I would like to share two engineering experiences. Both involve aircraft control cables.

The first involves cables made up for a 'home-built' by a yacht outfitter.

The cables, which were fabricated using copper swaging sleeves, were brought to me to be proof-loaded, as the owner was anxious that this had not been done by the supplier.



The copper splice fittings on this 1/8 inch diameter stainless steel cable must withstand a proof load of 1056 lbs (479 kg) for a time of three minutes without failing.

To our surprise the cables all started to pull out of the swage fittings at about **one quarter** of the required test load.

It transpired that the fabricator had not only **not** proof-tested the cables, but also was not equipped to make the appropriate dimension check of completed swages.

The second experience involved a turnbuckle which had been in service for years.

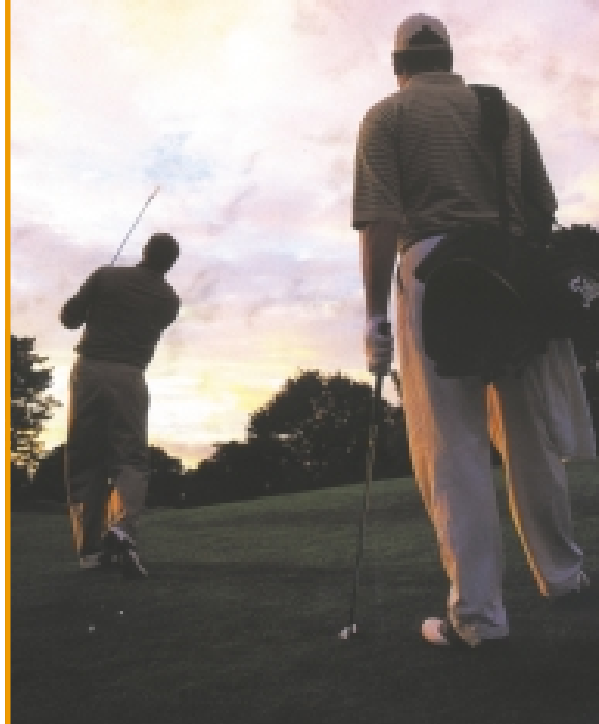
It was discovered by chance that this particular item had been incorrectly assembled using a cable eye-end fitting one thread size smaller than the turnbuckle barrel. The tips of the threads only were engaged. Likely disaster was only averted by good lockwiring. Had the unit been one of those which is locked by wire clips, not lockwire, it would certainly have pulled apart!

Something more to think of when carrying out a duplicate inspection? ■



A typical turnbuckle fitting.

## New Zealand Golf Open



A temporary restricted area (NZR693) will be designated at Paraparaumu over the duration of the NZ Golf Open, which is scheduled to take place 7 to 13 January 2002. NZR693 will have the same lateral dimensions as the Paraparaumu MBZ, but its vertical dimensions will extend beyond the MBZ to an upper limit of 2,500 ft amsl. A temporary aerodrome flight information service (AFIS) will act as the controlling authority for NZR693 during its hours of specified activity.

Pilots of aircraft intending to fly into or operate at Paraparaumu aerodrome should carefully study AIP *Supplement* 01/13 (effective 27 December 2001) as part of their pre-flight planning, due to the likelihood of high traffic volumes being present. It is anticipated that large numbers of twin-engine aircraft and helicopters might fly into the aerodrome. Because of the likely variety and intensity of traffic types, pilots will need to be particularly vigilant in their lookout and listening watch when within the vicinity of the aerodrome.

The *Supplement* details a considerable amount of important information: NZR693 dimensions; approved arrival, departure, and circuit procedures; operating limitations; parking constraints; aerodrome security arrangements; and more.

In the event that Tiger Woods does not attend, it is likely that the number of aircraft flying into Paraparaumu will be significantly less. If this proves to be the case, NZR693 will not be required and will not be activated. This eventuality will be advised by NOTAM. Normal unattended aerodrome procedures will then apply for Paraparaumu.

Make reading the *Supplement* an integral part of your pre-flight planning before flying into Paraparaumu during this event. ■



# Cockpit Overload

– How to reduce your chances of becoming stressed in flight –

*This article, written by Dr David Newman, has been reproduced courtesy of Flight Safety Australia and comes from their July–August 2000 issue. Dr Newman is an aviation medicine consultant and director of Flight Medicine Systems Pty Ltd.*

A solo student pilot is on a cross-country flight from Scone to Bankstown. The enroute weather begins to deteriorate, and the pilot contemplates an alternative route. At the same time, the normally reliable engine starts to run a little rough. This is quickly compounded by increasing uncertainty over the aircraft's exact location. Sweaty and with a racing heart, the pilot begins to feel increasingly unable to cope with a situation going from bad to worse. These symptoms are all manifestations of stress, caused by the demands of this serious, high-workload situation.

How the pilot manages his or her stress will likely determine whether the flight ends up the subject of a mildly interesting story told to his instructor after the flight, or riveting reading in the pages of the ATSB's (Australian Transport Safety Bureau) annual summary of aircraft accidents. Stress, workload and performance are all very closely related. The problem with stress is that it reduces our performance in situations of high cockpit workload – the time when we need our performance to be as good as it can be. And stress feeds stress – we feel more stressed as workload increases, and that reduces our performance. Because our performance has dropped we accomplish less tasks, which creates an apparent increase in workload, which in turn leads to increased levels of stress.

## Practice and Training

The stressed pilot, trying to juggle several time-critical things at once, starts to randomly shed tasks to allow his or her mind to focus on the tasks that seem more important. Increasing numbers of errors are made both in execution and judgement. This can extend to a point where the pilot may actually begin to see and hear less – messages received by the eyes and ears are simply not processed by the brain. The pilot becomes selectively blind and deaf. This phenomenon is known as increased attentional selectivity, and it has led to several instances of pilots being completely oblivious to visual and aural warnings of impending disaster.

So how do we reduce our susceptibility to stress? One way to do this is through practice and training. This improves our skill level, which frees up significant spare processing capacity. This in turn leads to lower overall workload, less chance of fundamental operator error, and an increased ability to deal with emergency situations.

By improving our skill level, we can convert certain tasks into motor programmes. A motor programme is a behavioural subroutine that requires minimal processing resources.



Changing gears in a car is a good example. First-time drivers have to expend significant mental energy to depress the clutch, select the appropriate gear, change the gear, release the clutch and depress the accelerator. Experienced drivers perform the same task without making a single conscious thought.

*“For some pilots, automation can also lead to stress due to a feeling that they are less in control of the aircraft.”*

In the absence of a motor programme, a task may be demanding all of an individual's available processing resources. Consider as an example a pilot with a brand-new instrument rating flying in IMC. In this situation the pilot may be using all available processing resources to control the aircraft and maintain the appropriate tracks, headings and altitudes. The pilot's performance may be pretty good, despite the high workload. What happens if the pilot now experiences some form of in-flight problem? What if the engine starts to run a little rough, or the electrics drop off line?

The pilot has no new resources to devote to this new problem. The aircraft problem must be sorted out, but in diverting some resources to this new problem the pilot may suffer a deterioration in instrument flying.

The development of motor programmes is not free of potential problems. Studies have shown that in high workload situations an inappropriate motor programme can be activated. This is especially true when the majority of mental resources are being directed to other activities.

As an example, consider the pilot with thousands of hours on a particular aircraft type who is converting to a new and different type. That pilot brings to the new cockpit all of the motor programmes and skills developed through experience in the old cockpit. If an emergency occurs in the new aircraft, a motor programme appropriate for the previous aircraft, but not appropriate for the new one, may be activated, with serious consequences.

Another factor that can reduce the incidence of stress is pre-flight planning. And that means more than just checking the weather

and NOTAMs and submitting a flight plan. Pre-flight preparation should include a consideration of possible problems that could occur on each flight and detailed strategies for handling those problems successfully. Do I have a contingency plan if the vacuum pump fails during an instrument approach? Which instruments will be affected? Am I capable of flying a partial panel approach? Do I have sufficient fuel to divert to an airport where a visual approach could be flown?

By thinking things through before they happen, you free up spare processing capacity and greatly reduce the chances of finding out just how badly you perform at your stress threshold.

Just as high workload can have a negative impact on pilot performance, low workload can also lead to increased pilot error. While the modern automated flightdeck can reduce the possibility of a pilot becoming overloaded with excess tasks, it can also cause decreased arousal and reduced performance. There is an optimum level of workload that leads in turn to an optimum level of performance. What can you do to counter the potential problem of low workload on the automated flightdeck? The simple answer is to find something to do. The task need not be critical to the safe operation of the aircraft, just something that you can do to keep your workload in the optimum range.

For some pilots, automation can also lead to stress due to a feeling that they are less in control of the aircraft. Pilots who are not as skilled or familiar with modern flight deck systems may experience a higher workload than others as they attempt to manage and operate automated systems.

This in itself can create increased levels of stress and lead to selective-attention problems and errors. Those pilots can become so focused on the equipment that they no longer pay attention to the aircraft's flight path, for instance. The pilots may well be heads-down in the cockpit, saying, "I didn't know it could do that!" or "What's it doing now?" while the aircraft spirals down. This issue comes back to proper training and development of high skill levels in the use of equipment.

## Strategies

While long-term strategies for stress management – training, education, practice and experience – are the most effective in reducing the likelihood of a pilot suffering the deadly effects of stress, there are some things you can do in the short term to address the issue.

A few slow, deep breaths will help initially, followed by an objective appraisal of your situation. Task prioritisation is also important. What is the biggest problem you are facing now? This is where the adage "Aviate, Navigate, Communicate" comes in useful. Critical tasks must be performed first (like maintaining altitude) before less-critical tasks (like routine position reports).

Ask ATC for help – radar vectors may give you more opportunity to address more pressing aircraft problems. Try to keep calm and don't panic. In the end, you can only do so much – you need to ensure that you do the really important things first.

## Summary

Stress, workload and performance are all very closely related. If one of these factors changes the other two are likely to change as well. There is no substitute for skill in the flight environment, and practice is the key to improving skill levels. Stress and workload are part of flying. Being aware of them, and learning how to manage them, are important aspects of being a safe and skilled pilot. ■

## ATC Safety Seminar

– An insight from a controller's perspective –



**Date:** Wednesday 5 December 2001

**Time:** 18:00 hrs

**Venue:** Air Training Corps, hall Ardmore Airfield

**Cost:** Free

Call Clare Walton on 0–9–298 5055 (wk) or 021–115 7698 for further information.

## Answers to quiz on page 7

**ACKNOWLEDGE** – "Let me know that you have received and understood this message".

**BREAK** – "I hereby indicate separation between portions of the message". Normally used when there is no clear distinction between portions of the message.

**BREAK BREAK** – "I hereby indicate separation between messages transmitted to different aircraft in a very busy environment".

**CORRECTION** – "An error has been made in this transmission and the correct version is...".

**ROGER** – "I have received all of your last transmission". This term should not be used in reply to a question requiring a read-back or a direct answer in the affirmative or negative.

**STANDBY** – "Wait and I will call you". This means that you should maintain a listening watch until the controller or flight information officer calls you again.

**WILCO** – "I understand your message and will comply with it".

**How did you do? Refer to the COM section of the AIP Planning Manual for further information on RTF Communication Procedures.**

### Accident Notification

24-hour 7-day toll-free telephone

**0508 ACCIDENT**  
(0508 222 433)

CA Act requires notification  
"as soon as practicable".

### Aviation Safety Concerns

24-hour 7-day toll-free telephone

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

For all aviation-related safety concerns

# OCCURRENCE BRIEFS

Lessons For Safer Aviation

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

Individual Accident Reports (but not GA Defect Incidents) – as reported in *Occurrence Briefs* – are now accessible on the Internet at CAA's web site (<http://www.caa.govt.nz/>). These include all those that have been published in *Occurrence Briefs*, and some that have been released but not yet published. (Note that *Occurrence Briefs* and the web site are limited only to those accidents that have occurred since 1 January 1996.) This issue contains a number of accidents that have been withheld from publication until now due to insufficient information. Efforts have been made to source the missing information, but some data fields and synopses remain incomplete.

## Accidents

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

Some accidents are investigated by the Transport Accident Investigation Commission, and it is the CAA's responsibility to notify TAIC of all accidents. The reports which follow are the results of either CAA or TAIC investigations.

**ZK-HWY, Bell 206B, 3 Jan 96 at 1200, Glenure. 1 POB, injuries nil, damage substantial. Nature of flight, aerial application/dropping. Pilot CAA licence CPL (Helicopter), age 49 yrs, flying hours unknown.**

The pilot landed to restart the spreader bucket motor because it had stopped. He vacated the helicopter with engine running and rotors turning. The pilot applied collective friction, but did not throttle back to GROUND IDLE. Consequently, the helicopter turned over and suffered severe roll-over damage.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 96/9](#)

**ZK-WFS, Cessna 172M, 7 Jan 96 at 2000, Takaka Ad. 4 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Aeroplane), age 62 yrs, flying hours 10390 total, 2000 on type, 133 in last 90 days.**

The aircraft was attempting to land on the Takaka airstrip when a bull started to charge it. The pilot applied power to go around but the main wheels struck the bull. As a precaution, the pilot decided to divert to Nelson airport where a landing was safely accomplished.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 96/140](#)

**ZK-HFS, Robinson R22, 10 Jan 96 at 1945, 2NM S Kumaru Race Course. 1 POB, injuries nil, damage unknown. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 33 yrs, flying hours 209 total, 194 on type, 27 in last 90 days.**

While picking up moss with a slung load, the helicopter lost rotor rpm. The pilot jettisoned the load and attempted to recover the lost rotor rpm, but this was unsuccessful. The helicopter subsequently hit the ground.

Main sources of information: Accident details submitted by pilot.

[CAA Occurrence Ref 96/49](#)

**ZK-DJH, Anderson EA-1 Kingfisher, 13 Jan 96 at 1530, L Te Anau. 2 POB, injuries nil, damage unknown. Nature of flight, training solo. Pilot CAA licence PPL (Aeroplane), age 55 yrs, flying hours unknown.**

The amphibian was conducting circuits at a land aerodrome when it was asked to vacate to allow a glider launch. It subsequently landed on the lake with wheels still down.

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

[CAA Occurrence Ref 96/73](#)

**ZK-HCP, Robinson R22 Beta, 13 Jan 96 at 2020, Lochnagar. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Helicopter), age 51 yrs, flying hours unknown.**

The helicopter suffered a power loss, which resulted in a heavy landing.

Main sources of information: Unknown.

[CAA Occurrence Ref 96/72](#)

**ZK-HHJ, Hughes 269C, 19 Jan 96 at 1630, Haast. 1 POB, injuries nil, damage unknown. Nature of flight, other aerial work. Pilot CAA licence PPL (Helicopter), age 18 yrs, flying hours unknown.**

During takeoff from a riverbed, at about 10 to 15 feet agl, the helicopter spun through four to six turns to the right despite left pedal being applied. The pilot closed the throttle and straightened out. The helicopter tipped over on landing.

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

[CAA Occurrence Ref 96/178](#)



**ZK-WWW, Lake LA-4-200, 1 Feb 96 at 2030, Motuihe Is. 3 POB, injuries nil, damage substantial. Nature of flight, transport passenger A to B. Pilot CAA licence CPL (Aeroplane), age 39 yrs, flying hours unknown.**

While the aircraft was taxiing for takeoff on the western side of Motuihe Island, it hit two small waves, bounced about 12 feet into the air, descended steeply, and then came to a sudden stop on the surface of the water. The damaged aircraft hull started taking on water, but the pilot managed to taxi it to the shore in time to prevent it sinking.

Main sources of information: Accident details submitted by Police.

[CAA Occurrence Ref 96/227](#)

**ZK-EVJ, Piper PA-38-112, 3 Mar 96 at 1200, Kaitaia. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 20 yrs, flying hours 74 total, 70 on type, 54 in last 90 days.**

The aircraft suffered a propeller strike while taxiing with a seized nosewheel bearing over soft ground. The blades' leading edges were chipped at their ends, and one tip was slightly bent.

Main sources of information: Unknown.

[CAA Occurrence Ref 96/2775](#)

**ZK-DOL, Cessna 172M, 29 Apr 96 at 1600, Coromandel Ad. 2 POB, injuries nil, damage minor. Nature of flight, transport passenger A to B. Pilot CAA licence PPL (Aeroplane), age 30 yrs, flying hours 630 total, 200 on type, 100 in last 90 days.**

Due to adverse weather conditions in the area, a decision was made to do a precautionary landing at Coromandel aerodrome. Landing with a slight tail wind on wet grass, the aircraft failed to stop, and a low-speed encounter was made with a fence.

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

[CAA Occurrence Ref 96/1195](#)

**MX Quicksilver, 4 Aug 96 at 1900, Rarotonga. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age unknown, flying hours unknown.**

The aircraft experienced a power loss while climbing through 500 feet after takeoff. The pilot tried to return to the aerodrome but decided to ditch in the sea short of the runway, due to insufficient altitude.

Main sources of information: Accident details submitted by Cook Islands CAA.

[CAA Occurrence Ref 96/2112](#)

**ZK-DHD, NZ Aerospace FU24-950, 7 Sep 96 at 1600, Pourere Road. 1 POB, injuries nil, damage minor. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 50 yrs, flying hours 3000 total, 2650 on type, 58 in last 90 days.**

While landing uphill on a topdressing airstrip in sink, the aircraft hit the lip of a depression. The starboard undercarriage leg collapsed, and the bolts holding the undercarriage leg to the spar sheared off.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 96/2414](#)

**ZK-HZA, Hughes 269C, 21 Sep 96 at 1200, Rotorua. 1 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence type unknown, age 49 yrs, flying hours unknown.**

The helicopter tipped over during ground exercises, possibly due to a wind gust.

Main sources of information: Accident details submitted by NZRCC.

[CAA Occurrence Ref 96/2535](#)

**ZK-CDZ, NZ Aerospace FU24-950M, 21 Sep 96 at 1300, Puriri. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 38 yrs, flying hours unknown.**

The aircraft failed to get airborne due to a wind gust. The engine was operating normally at the time.

Main sources of information: Accident details submitted by pilot.

[CAA Occurrence Ref 96/2551](#)

**9V-SMA, Boeing 747-400, 7 Oct 96 at 1037, Christchurch. 361 POB, injuries 16 minor, damage minor. Nature of flight, transport passenger A to B. Pilot CAA licence not applicable, age unknown, flying hours unknown.**

The aircraft hit severe turbulence over the Southern Alps, injuring a number of cabin crew who were walking about the plane readying it for landing at the time. A small leading edge flap on one wing was badly damaged. A replacement was fitted and the damaged cabin panels repaired before the next sector.

Main sources of information: Christchurch newspaper report.

[CAA Occurrence Ref 97/3321](#)

**ZK-ROB, Quickie Aircraft Q2, 16 Nov 96 at 1200, Forest Field Ad. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 38 yrs, flying hours 356 total, 28 on type, 4 in last 90 days.**

Approaching the airstrip over trees, the pilot encountered wind shear and tried to correct. The aircraft hit the ground and slewed sideways into a fence, breaking the lower wing canard and tail spring.

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

[CAA Occurrence Ref 96/3069](#)

**ZK-NBU, Boeing 747-419, 19 Jan 97 at 1752, Los Angeles. 435 POB, injuries nil, damage unknown. Nature of flight, transport passengers A to B. Pilot CAA licence ATPL Aeroplane, age unknown, flying hours unknown.**

While taxiing along taxiway Charlie towards Charlie 6, as directed by Ground Control, the lefthand winglet contacted a parked Continental Airlines B747 on Gate 69A. At the time of the accident, the aircraft was travelling at a speed of 16 knots and on the taxiway centreline.

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

[CAA Occurrence Ref 97/324](#)

**ZK-HST, Aerospatiale AS 350BA, 5 Feb 97 at 1115, Cuvier Is. 2 POB, injuries nil, damage minor. Nature of flight, other aerial work. Pilot CAA licence CPL**

**(Helicopter), age 44 yrs, flying hours 7000 total, 1500 on type, 45 in last 90 days.**

The wind was gusting to 40 knots on shutdown. One main rotor blade was picked up and the other dropped onto the tail boom during a particularly strong gust.

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

[CAA Occurrence Ref 97/364](#)

**ZK-GNU, Glaser-Dirks DG-400, 21 Mar 97 at 1535, Mt Pauanui. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, private other. Pilot CAA licence nil, age 57 yrs, flying hours 5985 total, 200 on type, 100 in last 90 days.**

Following a series of high-speed passes, which were being videoed from a ridgeline, the pilot performed a slow pass. The pilot allowed the airspeed to become too low, and the glider stalled and spun. There was insufficient height to effect a complete recovery.

Main sources of information: Accident details submitted by Police and NZRCC.

[CAA Occurrence Ref 97/856](#)

**ZK-SDR, Titan Tornado II, 25 Mar 97 at 1300, 1NM NNW Ashley R. 2 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence type unknown, age 43 yrs, flying hours 1500 total, 5 on type, 4 in last 90 days.**

The aircraft experienced a total engine failure at 500 feet agl. The pilot carried out a forced landing into a rough paddock, breaking the nosewheel and righthand landing gear off in the process. The right wing tip and tail plane were also damaged.

Main sources of information: Unknown.

[CAA Occurrence Ref 97/891](#)

**ZK-HOB, Revolution Mini 500K, 3 Apr 97 at 1300, Whakatane. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence type unknown, age 46 yrs, flying hours unknown.**

The helicopter suffered a power failure while in the hover at approximately 20 feet and tipped over onto its side upon touching down. The cause of the power loss was thought to be the spark plugs not being replaced at the recommended interval.

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

[CAA Occurrence Ref 97/1188](#)

**ZK-FXH, Solar Wings Pegasus XL-R, 7 Apr 97 at 0915, Palmerston North. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence type unknown, age 57 yrs, flying hours 20 total, 20 on type, 20 in last 90 days.**

A wind gust overturned the aircraft while taxiing.

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

[CAA Occurrence Ref 97/1225](#)

**ZK-NSC, Cessna A152, 10 Jul 97 at 1020, North Shore Ad. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence type unknown, age 66 yrs, flying hours 29 total, 29 on type, 4 in last 90 days.**

The aircraft was taking off, when it drifted left off the runway onto the adjacent grass. While attempting to turn back onto the runway using rudder and wheel brakes, the aircraft tipped over onto its nose, damaging the propeller, nose structure, wing tip and tail.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 97/2069](#)

**ZK-GIP, Glasflugel Club Libelle 205, 3 Aug 97 at 1400, Kaikohe. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence type unknown, age unknown, flying hours 27 total, 1 on type, 1 in last 90 days.**

The glider stalled at around 600 feet agl during a winch-launch. Following recovery from the resultant wing drop, the aircraft landed heavily in a paddock alongside the runway. The aircraft ground looped, resulting in minor damage to the wing, aileron and cockpit area of the fuselage.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 97/2569](#)

**ZK-HEB, Robinson R22 Beta, 13 Sep 97 at 1200, Taumarunui. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Helicopter), age 31 yrs, flying hours 160 total, 160 on type, 10 in last 90 days.**

The aircraft became caught in downdraught as it flew along a gully and was forced down. A heavy landing ensued.

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

[CAA Occurrence Ref 97/2715](#)

**ZK-GIJ, Schleicher AS-K 13, 18 Oct 97 at 1500, Kaitoke. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age unknown, flying hours 414 total, 128 on type, 20 in last 90 days.**

While completing a low-level circuit in sinking air, the pilot turned onto base leg too late. This necessitated a low-level turn on to final approach at treetop level. One wing clipped undergrowth on the runway threshold, rotating the glider sideways. The glider hit the ground at an angle, bounced and rotated, narrowly avoiding the tow-plane parked on the side of the strip. The tail of the glider broke at its boom.

The pilot did not anticipate heavy sink in the circuit pattern due to the wind prevailing at the time, nor did he elect to land in the valley floor below the airfield where there were several safe options.

Main sources of information: CAA enquiries.

[CAA Occurrence Ref 97/3185](#)

**ZK-LDZ, Cessna A188B, 16 Nov 97 at 1420, Dunedin Ad. 1 POB, injuries nil, damage substantial. Nature of flight, transport passenger A to B. Pilot CAA licence type unknown, age unknown, flying hours 620 total, 13 on type, 101 in last 90 days.**

The aircraft spun through 270 degrees and left the runway upon landing, damaging the righthand landing gear leg and the outer wheel rim.

Main sources of information: Air Traffic Control.

[CAA Occurrence Ref 97/3348](#)

**ZK-SBK, Cessna 172P, 4 Jan 98 at 1500, Christchurch. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 59 yrs, flying hours 250 total, 62 on type, 15 in last 90 days.**

The pilot encountered a crosswind gust on landing, which resulted in a bounce and subsequent heavy landing. This damaged the nosegear axle, fork, and firewall surrounding the upper attachment bracket.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 98/65](#)

**ZK-HHS, Hughes 269C, 10 Jan 98 at 1905, Ngongotaha. 2 POB, injuries 1 fatal, 1 minor, aircraft destroyed. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 30 yrs, flying hours 1555 total, 1450 on type, 198 in last 90 days.**

The helicopter was patrolling an 11,000-volt (11kV) power line, which had been suffering from some unexplained power interruptions. During the patrol, the helicopter's main rotor blades struck one conductor of a three-conductor, 110kV transmission line, which crossed about six metres above the 11kV line being inspected. The primary cause of this accident was the failure by the pilot to detect another power line, which crossed above the line being inspected. Contributory factors were that: The pilot and the observer were not adequately trained. A number of briefings were omitted or inadequate. The lack of a formal system for the selection, direction and control of the aerial work undertaken by the contracting organisation. Environmental factors. The suitability of the available helicopter.

Main sources of information: CAA field investigation.

[CAA Occurrence Ref 98/8](#)

**ZK-JBE, Pegasus XL, 20 Sep 98 at 1130, Hokitika. 1 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence nil, age unknown, flying hours 32 total, 25 on type, 10 in last 90 days.**

The pilot lost directional control after touchdown, resulting in substantial damage to the aircraft.

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

[CAA Occurrence Ref 98/2581](#)

**ZK-GKJ, Glasflugel Hornet, 25 Oct 98 at 0930, Five Rivers. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age unknown, flying hours 42 total, 14 on type, 16 in last 90 days.**

The glider was forced to land out due to insufficient altitude. After touchdown, it was affected by a gust of wind, which caused the right wing to drop and the aircraft to groundloop.

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

[CAA Occurrence Ref 98/2934](#)

**ZK-JEV, Micro Aviation B22 Bantam, 4 Jan 99 at 1900, Hokitika. 1 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence nil, age unknown, flying hours 68 total, 68 on type, 16 in last 90 days.**

The microlight was on short finals into a private strip when it

encountered strong wind gusts. The pilot lost control, and the aircraft's left wing touched the ground, forcing it to skid sideways. The aircraft eventually ended up on its nose.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 98/3468](#)

**ZK-SRR, Quad City Challenger II, 9 Jan 99 at 1045, Ashburton. 1 POB, injuries unknown, damage substantial. Nature of flight, private other. Pilot CAA licence nil, age unknown, flying hours 495 total, 91 on type, 5 in last 90 days.**

The aircraft engine stopped at approximately 400 feet agl. The pilot carried out a forced landing into a paddock near the runway. Structural damage was incurred when the aircraft collided with a fence.

Main sources of information: Accident details submitted by pilot.

[CAA Occurrence Ref 99/21](#)

**ZK-FQY, Cessna 207, 13 Feb 99 at 1020, Queenstown. 7 POB, injuries nil, damage minor. Nature of flight, transport passenger A to B. Pilot CAA licence CPL (Aeroplane), age 33 yrs, flying hours 3400 total, 60 on type, 80 in last 90 days.**

The aircraft was found with damage to its belly skin and two longerons. It appeared to have caught a marker board while taxiing.

Main sources of information: Accident details submitted by operator.

[CAA Occurrence Ref 99/494](#)

**ZK-MMB, Jodel D.11, 28 May 00 at 1700, Lichfield. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 61 yrs, flying hours 700 total, 300 on type, 25 in last 90 days.**

The aircraft was taking off from a farm strip, when the engine lost power about 20 feet agl. The aircraft collided with the fence at the far end of the downhill strip, tearing the left wing off. The reason for the engine failure was not determined, although the pilot suspected either carburettor icing or mishandling of the fuel selector.

Main sources of information: Accident details submitted by pilot.

[CAA Occurrence Ref 00/2043](#)

**ZK-XNZ, De Havilland DH 104 Dove 1B, 19 Jun 00 at 1000, Clarence Ad. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 49 yrs, flying hours unknown.**

En route to Wigram, the pilot turned back because of lower-than-forecast cloud and poor visibility in rain. He made a precautionary landing at Clarence airfield, touching down towards the west. Realising there was insufficient distance available, the pilot applied power to go around, but the aircraft clipped a post and the top wire of the boundary fence. Unable to gain altitude, the pilot closed the throttles and landed in another paddock. The aircraft rolled through another fence, damaging the propellers and flaps in the process.

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

[CAA Occurrence Ref 00/2047](#)



# GA Defect Incidents

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

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

## Key to abbreviations:

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

## Aerospatiale AS 350 – Luggage door opens in flight

During cruise, the pilot observed a flickering door warning light. All the luggage compartment doors were checked at the next landing site. On the next flight, however, a loud bang was heard and a yaw to the left experienced. Having established that the engine was operating normally, it was noticed that the port baggage compartment door had opened fully with the leading edge bent aft. Fortunately, the door had not departed the helicopter. The pilot carefully reduced airspeed and landed, while maintaining a positive down airflow over the door.

The helicopter had just been overhauled, at which time all of the door seals had been replaced. The extra strain placed on the door by the new seals had caused problems with the door's security, allowing the door to spring open in flight.

There are various modifications available to improve the security of AS350/355 baggage compartment doors, including those contained in Eurocopter's Service Bulletin 52.00.25. Embodiment of one of these modifications is highly recommended by the CAA.

ATA 5230

CAA Occurrence Ref 00/4382

## Cessna 207A – Alternate air door jams

The pilot reported that the engine had suffered a partial power loss, with symptoms similar to those of running out of fuel. Fuel flow indications, however, were normal at the time of the power loss. The engine did not run roughly, but lacked power. The pilot was able to land safely.

Engineers checked the fuel system and power plant and found that the upper bearing supporting the alternate air door had collapsed, jamming the door in the closed position. New upper and lower bearings were fitted and the aircraft returned to service.

ATA 7160

CAA Occurrence Ref 01/1498

## De Havilland DH 82A Tiger Moth – Flying wire snaps

While the aircraft was being test flown after re-tensioning of the mainplane flying wires, one of the rear wires P/N H35064 snapped.

Investigations revealed that it failed in fatigue due to stress corrosion. Microscopic examination revealed that corrosion pits were evident on the surface of the wire. A wing had recently been replaced. At this time, the flying wires were removed and refitted. The flying wires were subsequently found to be very

loose and the aircraft would not fly correctly. Some adjustments were made, and the aircraft flown to a maintenance base so that a licensed engineer could properly tension the wires. The wire failed on the first test flight following the adjustments.

It is possible that high frequency vibrations resulting from the aircraft being flown with loose wires may have caused a crack to propagate from a small corrosion pit on the surface of the wire. This highlights the importance of regular cleaning of the wires and ensuring that all flying wires are always adjusted to the appropriate tension.

ATA 5720

CAA Occurrence Ref 01/617

## Kawasaki BK117 B2 – Excessive pitch link bearing play

A small vibration started during the flight. The vibration increased, so the pilot elected to return to the base hangar.

Further inspection revealed the problem to be excessive free play in the pitch links spherical bearings P/N 105-13141-01 caused by too much wear in the Teflon liner. Pilots had previously noted the wear and were assured by an engineer that they had just been checked and were within allowable limits. (Checking the condition of the pitch links was part of the normal pre-flight inspection, and both pilots who flew the aircraft confirmed that they carried out this check each morning.) The condition of the bearings was monitored, and remained constant for about seven hours until the pilot noticed the unusual vibration.

ATA 6710

CAA Occurrence Ref 01/649

## Piper PA-32-260 – Severe wing spar corrosion

During routine inspection with the fuel tank removed, corrosion was noted on the forward top edge of the main spar. Inspection of the inboard section of the wing was difficult because the forward wing-walk waffle plate, riveted to the lower side of the forward wing-walk skin, has a right-angle bend to stiffen the rear edge. This raised-edge butts up against the top-forward edge of the spar and makes thorough inspection of the area particularly difficult. The wing was removed from the aircraft and the forward wing-walk skin removed to facilitate the inspection. Severe exfoliation corrosion was found from the fuel tank bay to the wing splice area. A new spar section will be fitted. TTIS 2500 hours (34 years).

ATA 5710

CAA Occurrence Ref 99/2303

## Schweizer 269C – Engine bearings fail P/N LW11021

The HIO-360D1A engine was sent for a bulk strip after metal was found in its oil filter during scheduled maintenance. The overhaul facility engineers found that the centre and rear-main bearings, P/N LW11021, had failed.

The Lycoming representative has advised not to use this bearing part number while the problem is investigated, and that the promulgation of new parts is being considered.

ATA 8500

CAA Occurrence Ref 01/3006

# Summer-Flying Checklists

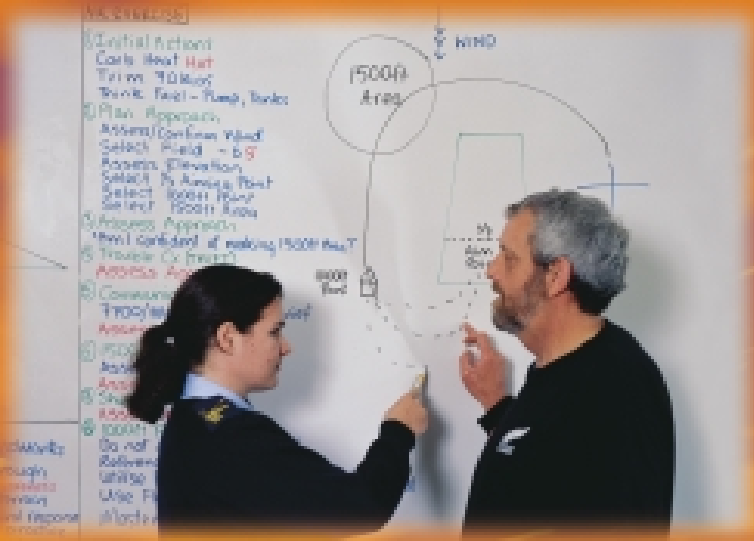
Ensure all items listed are checked before you start your summer flying activities.

## Ask Yourself

### Are you ready to fly?

#### Items for consideration after a break from flying

- Medical current?
- Fit to fly? (I'M SAFE)
- BFR current?
- Current on type?
- Emergency procedure skills current? (eg, FLWOP, low flying, basic-panel I/F)
- Special flying skills current? (eg, mountain flying, strip flying, crosswind technique)
- Flight planning skills current? (eg, weather/NOTAM interpretation, fuel requirements, performance and weight and balance calculations)
- VFG and AIP Supplements current?
- Topographical charts and VTCs current?



## Ask Yourself

### Is your aircraft ready to fly?

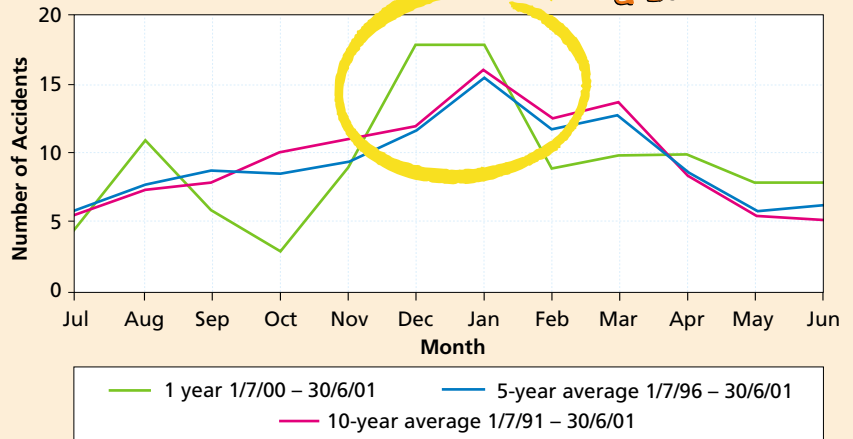
#### Items for consideration after a period of disuse

- Tech Log details up to date?
- Battery condition and charge?
- Landing gear – tyre condition/pressures and brake serviceability?
- Intake filters, ductings, and other openings – checked for bird nests?
- Fuel system – checked for contamination or stale fuel?
- Engine performance – carried out a full engine run to establish engine performance in accordance with manufacturer's specifications?
- Safety equipment checked and stowed? – (first aid and survival kits, lifejackets, pax briefing cards, ELT and fire extinguisher serviceability)

If you have any doubts about your aircraft's airworthiness, consult your engineer.

Number of Accidents by Month – All Aircraft  
(Includes Hang Gliders and Parachutes)

Don't become a statistic



Professionals always check!