September / October 2010

POINTING TO SAFER AVIATION

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In the Deep End

Pass the Salt

Boosting the BK117

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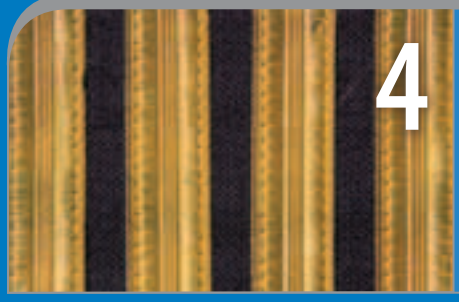

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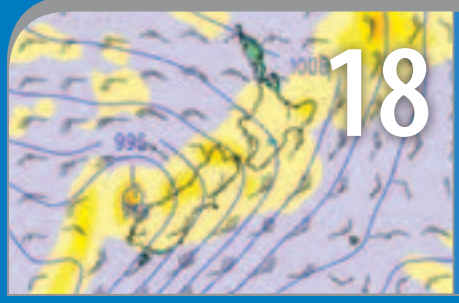

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A myriad of web sites and web cams can help you build a big picture of what the weather's doing. But watch out for fish hooks. There is no substitute for a Metflight GA briefing.

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Artex AD Update

At least 30 more ELTs have been sent for repair since an Airworthiness Directive notifying faulty Artex ELT G-switches was issued in late June 2010.

CAA Airworthiness Engineer Ron Doggett says there is now a shortage of replacement G-switches, which Artex is working to rectify.

"We have also seen a marked increase in the number of CA005D defect reports being submitted for ELT failures. Thank you for your efforts and please keep sending these reports in. To assist the defect analysis, it would be helpful if you could include the date the ELT was installed and the number of flight hours since then."

The CAA is working with Artex, the New Zealand repair organisation Fieldair, and the Federal Aviation Administration (FAA) to resolve the problem. New Zealand is the first country to have reported the G-switch fault, but there are over 200,000 of the ELTs in service worldwide.

The G-switch is a metal ball within a tube. Under sudden deceleration, the ball travels along the tube against the spring and activates the switch.

Fretting has now been found between the ball mass (brass substrate plated with nickel, with a gold film on the outside) and the brass switch barrel. A black powder has also been found in opened G-switches. This prevents electrical contact between the ball and the end cap when the ELT is activated. Furthermore, the powder eventually jams the ball in the barrel so that it cannot move.

Artex has analysed the composition of the powder. Preliminary reports indicate that it consists of oxides of copper, tin, gold and iron, but the oxidation process in the switch is not yet understood.

Artex is developing a corrective action plan for the FAA that will probably result in G-switch replacement. An accelerated life cycle test programme is about to begin for a replacement switch. Once a replacement is selected, the modification to the ELT has to be designed and tested, and approved by the FAA. Any fix is likely to take at least three months. Airworthiness Directive DCA/RAD/54 will be revised once corrective actions become available, and this will terminate the repetitive inspection requirement of the AD.

Learn more:

See *Vector* July / August 2010 (available on the CAA website www.caa.govt.nz, "Publications"). See also AD DCA/RAD/54 under "Airworthiness Directives – Components – Avionics". ■

A G-switch barrel that has been opened to show the fretting. The ball normally sits between the thick and thin black bands towards the right-hand end.

The other parts of the G-switch. The layer of black powder is evident on the ball. The black spot in the centre of the end cap on the left is fretting.

In the Deep End

Advice for New Captains

The transition from first officer to captain is a steep learning curve.

Every new captain is adept at dealing with the type of technical emergencies that were thrown at them during their training, and many could almost build the aircraft from scratch after being drilled on systems knowledge – but this is only half the job. Two of the most difficult skills a new captain must learn are making command decisions, and managing a team.

Command Judgment and Decision Making

As the captain, you are ultimately responsible for every decision that affects the operation of your aircraft. Civil Aviation Rules and company SOPs make many decisions black and white. However, from time to time, situations with multiple complex options can arise.

When faced with grey decisions – don't rush. Give yourself time, and gather as much information as you can by talking to other people: your first officer, maintenance watch, or air traffic control. Don't make decisions by yourself if you don't have to. You are not expected to be the fount of all knowledge. If in doubt, choose the safest option.

CAA Airline Inspector, and former Air New Zealand Chief Pilot, Training Manager, and Manager Flight Operations, Colin Glasgow, says any grey area decision is a great time to engage your first officer.

"The decision, although owned by the captain, must be consensual. Discussion and analysis will almost inevitably lead you to a proper decision. Contrary to popular belief, very few flying decisions have to be made immediately. Good captains operate way ahead of the aircraft."

Wayne Martin is a 737-800 captain for Pacific Blue, and is currently working towards a PhD in Human Factors. Wayne explains that aviation decision making falls into three categories. Analytical Decision Making is a deliberate and structured process used when you have plenty of time available. Naturalistic Decision Making is where pilots make decisions intuitively, based on previous experience. Lastly, Recognition Primed Decisions involve taking a predetermined course of action if a certain set of conditions are encountered. Carrying out a missed approach is a good example.

"New captains sometimes fall short on Naturalistic Decision Making skills, simply because they lack the range of previous experiences that would allow them to recognise a situation and enact the correct solution instinctively. Scenario discussions or even personal reflection on what you would do in various situations, are an excellent way of developing cognitive pre-plans for managing tough decisions," says Wayne.

Allan Brown, Line Operations Manager for Mount Cook Airlines, recommends tackling grey decisions slowly.

"It pays to take a breath and consider all options, even if you return to your first thought. Put safety, and the comfort of your passengers first, before commercial considerations. Take input from your crew and your own experience. Ask yourself if the safety of the flight could be compromised – If something negative occurs, will you and the airline be able to defend your actions? Due to the harsh terrain and

Photo: ©istock.com/mluzen

weather conditions in New Zealand, particularly turbulence and icing, the safety of a flight can be jeopardised quickly, so one needs to consider all contingencies."

Pressure

Some company staff can put pressure on captains to stay on time, avoid cancelling flights, or extend their shifts. After all, airlines are in the business of making money. Provided safety is your top priority, you will be able to withstand these pressures. Here are some tips from very experienced captains:

In January 2009, Captain Chesley 'Sully' Sullenberger, successfully landed US Airways Flight 1549 onto the Hudson River, New York, after a double engine failure. In his book *Highest Duty,* Sully says a captain's highest duty and obligation is always to safety.

"We have the power of the parking brake. The plane will not move until we feel we can operate the aircraft safely."

In the late 1980s, Sully opened a fortune cookie that said, 'A delay is better than a disaster'. He taped it inside the cover of his Jeppesen chart folder and has kept it there ever since.

"Integrity means doing the right thing even when it's not convenient... even if that means delaying or cancelling a flight… inconveniencing 183 people who want to get home, including the pilot. By delaying a flight, I am ensuring that they will get home."

Current Air New Zealand A320 captain, instructor, and Training Manager Human Factors, James Dalziell, says an on-time departure is a bonus.

"Departing safely is the priority. Safety comes first and efficiency next. Mistakes happen when you rush. Go when you are ready."

This sentiment is echoed by Peter Underwood, CAA Manager Airline Flight Operations, and former Air New Zealand 747 Training Captain.

"I once heard an old captain tell a flight dispatcher who was trying to hurry him into making a decision, 'I only have two speeds, and the other one is slower'."

So take your time, gather information from others, and make a reasoned, safe, decision. Allan Brown says it is a captain's responsibility to refuse a flight if you believe there are issues which could affect flight safety.

"The captain's decision is final, there should be no dialogue or debate [with operations], but you do need a legal basis to refuse a flight. When making decisions, one philosophy I use is – would I want my family onboard?"

Standards are the Key

It can be daunting for a new captain to fly with first officers who are older and/or more experienced than they are. Many experienced captains say this was the most difficult thing about starting out. They were self-conscious about it, or felt they lacked credibility in the role.

James Dalziell got his first command at 24.

"It was a challenge flying with older first officers. Just because you have a command, doesn't mean you are a better pilot than the person to your right. First officers can be better handling pilots than you are. Just be consistent and maintain the highest possible standards."

Remember, you have been trained in the role and have demonstrated your ability to make the right command decisions for the safety of the flight.

Colin Glasgow advises you to have confidence in your technical training.

"Use SOPs, and your fears will prove unfounded."

Continued over ❯❯

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Managing a Team

As a captain, you are part of a team. It is essential to develop a good working relationship with your crew, because teamwork may be the difference between life and death in an emergency.

Captain Sullenberger knows this well.

"[First Officer] Jeff [Skiles] and I had found ourselves in a crucible – a cacophony of automated warnings, synthetic voices, repetitive chimes, radio calls, traffic alerts and ground proximity warnings. Through it all, we had to maintain control of the airplane, analyse the situation, take step-by-step action, and make critical decisions without being distracted or panicking. It sounded as if our world was ending, and yet our crew coordination was beautiful."

After hearing the cockpit voice recording for the first time. Sully told Jeff –

"I'm so proud of you. Within seconds of me calling for the checklist, you had it out, you found the right page, you had begun reading it. And you were right there with me, step-by-step, challenge and response, through all of those distractions. We did this together."

In the media, Sully had received most of the credit. He told Jeff –

"I don't care what anybody says… we were a team."

To make teamwork like this possible, you need to be a good leader, and have effective communication skills. All too often, new captains are given little guidance on how to foster team dynamics. There are things you can do to create the right environment. If you haven't flown with your first officer before, introduce yourself and try and to get a feel for their personality. Be open, honest, friendly, and approachable. Be polite, and show your first officer both empathy and respect. Let them know their opinion is valued. You will know from personal experience – the more you feel valued, the more you are willing to contribute to the team effort.

Peter Underwood says a captain should never be sarcastic or all knowing.

"Treat your first officer as the most valuable resource you have in the aircraft."

Colin Glasgow has similar advice.

"If you relate to your first officer as a professional equal, you will create an open, non-threatening relationship where the first officer can work without fear of surprises. Remember, you are working in a qualified crew. Genuinely involve your first officer in information sharing, analysis, decision making, and evaluation."

"It sounded as if our world was ending, and yet our crew coordination was beautiful.

Mount Cook's Allan Brown says it is important to set the tone for the day, right from the start.

"Take the lead by establishing rapport and good communication during flight planning. I try to create a positive environment, and treat first officers how I like to be treated myself. Remember that first officers are qualified professional pilots. They are an essential part of the team – no captain can fly without one. Treat them with respect, and be the captain only when you really need to be (which is rare)."

Be honest and open about your own limits, abilities, strengths and weaknesses. You are not infallible, so create an environment where your first officer feels free to speak up if for any reason they feel uncomfortable.

At the same time, remember the final decision rests with you, because you are ultimately responsible. Strive to maintain the highest standards yourself. Be firm where you see deviation from SOPs, and above all be a good role model.

As Allan Brown says –

"Be the best that you can be, if you want to get the best out of your first officer."

A Captain Like You

Think about all the captains you have flown with as a first officer. There will be some you respected, and some you didn't. Think about how each one handled the role, both the good and the bad, and try to emulate the former – until you develop your own command style.

Allan Brown says the captains that impressed him most when he was a first officer were those that sought his input.

"...whether they followed it or not. Captains who made good decisions and explained why they acted in such a manner were my all-time favourites."

To develop your command decisions, be critical of your decision making. You can learn a lot by seeking the advice of experienced captains as you settle into your new role. Discuss situations you have encountered with them.

You will not get respect because of the title, you will have to earn it in the way you perform your command duties, and in the way you relate to the people around you who support your operation.

Allan Brown sees the role as a privilege.

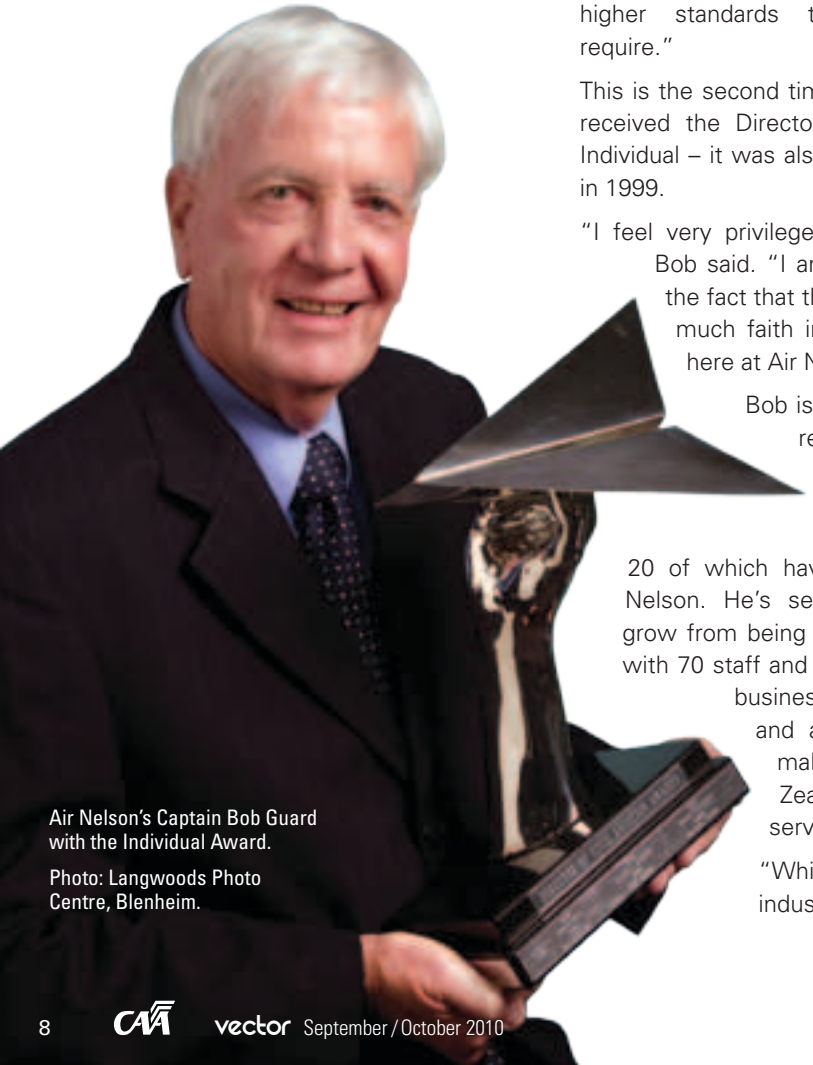
"Enjoy the job. The more you put in, the more you are able to take out of the role." ■

Mike Toogood of Skyline Aviation and his team, with the Organisation Award.

Photo: Tim Whittaker

2010 Director's Awards

Director of Civil Aviation, Steve Douglas, presented his Award for an Individual to Air Nelson's Captain Bob Guard during the Aviation Industry Conference Week in Palmerston North in July.



Air Nelson's Captain Bob Guard with the Individual Award.

Photo: Langwoods Photo Centre, Blenheim.

Steve Douglas said Bob was one of the most respected people in New Zealand aviation and was widely recognised in the industry for his 'safety first' attitude.

"Bob is always striving to ensure that his organisation doesn't just comply with the Rules, but sets and maintains higher standards than the Rules require."

This is the second time Bob Guard has received the Director's Award for an Individual – it was also awarded to him in 1999.

"I feel very privileged and humbled," Bob said. "I am blown away by the fact that the Director had so much faith in my contribution here at Air Nelson."

Bob is now preparing to retire after 37 years with the Air New Zealand group, the last 20 of which have been with Air Nelson. He's seen the company grow from being a family business with 70 staff and a small fleet, to a business with 500 staff and a 23-strong fleet, making it Air New Zealand's largest link service operation.

"While I leave the industry with some sadness, I am pleased with this recognition. It's a great way to finish."

Organisation Award

The Director presented Hawke's Bay-based specialist aeromedical provider Skyline Aviation with his Award for an Organisation.

Skyline Aviation Managing Director Mike Toogood said the award was a tremendous accolade.

"We're very pleasantly surprised, but certainly, it is recognition for our team and culture here, and for the effort we put into running our operation," Mike says of the company that he started in 1988.

Steve Douglas commended Skyline Aviation for demonstrating a consistent understanding of operator responsibility, being an outstanding Air Operator Certificate holder, and operating to robust risk management and risk mitigation procedures.

AIA Award for LAME

A new AIA award was presented at this year's conference. Peter Lacy received the Commitment to Service award for his many years of service as a Licensed Aircraft Maintenance Engineer (LAME). Peter's licence was first issued in 1956. Director Steve Douglas also presented Peter with the first of the new format CAA AME Licences. ■

New Authority Members

Three new members joined the Authority (or board) of the CAA in June 2010, replacing outgoing Deputy Chairman Errol Millar, and members Darryll Park, and Ross Crawford.

Peter Griffiths, Anita Mazzoleni and John Bartlett have been appointed. The membership of current board member Susan Hughes QC has been extended, and Rick Bettle continues as Chair.

Peter Griffiths

Peter Griffiths is the new Authority Deputy Chairman. He has strong links to the energy industry, both in New Zealand and overseas, and recently retired as Managing Director of BP Oil New Zealand Ltd after a 21-year career. His previous roles include General Manager BP Papua New Guinea and Commercial Manager for BP New Zealand's Fuel and LPG interests, as well as Terminal Operations Manager. He has served on a number of company boards, including Liquigas Ltd, Bitumix Ltd, New Zealand Refining Co, and was Chairman of BP South West Pacific Ltd.

Peter is currently a board member of New Zealand Oil and Gas, Wanganui Gas Ltd, and Greenstone Energy Ltd. He is also part-owner of New Zealand Diving and Salvage Ltd. He has been interested in aviation and aircraft since childhood. His father was in the Air Force, and his son is currently training to be a pilot. He says he is very much looking forward to being part of the Authority.

"The CAA is currently facing many challenges and I look forward to doing my best to help the Authority meet these."

Anita Mazzoleni

Anita Mazzoleni is an independent corporate finance adviser and company director. She is a solicitor and chartered accountant and has had a commercial career in industry and finance, particularly the evaluation and funding of infrastructure. Anita is the Chair of the Audit, Risk and Finance Committee for the CAA and Avsec.

She has previously held senior positions in the public and private sectors, including as General Counsel of Contact Energy Ltd and Director of Industrial Research Ltd. She is currently a Commissioner of the Commerce Commission, working primarily in the area of telecommunications regulation and competition enforcement, and is an independent director of companies owned by Ngati Whatua o Orakei.

"No Tamaki Makaurau ahau. Ko Adriatic raua ko Waitemata tooku moana. Ko Kras raua ko Rangitoto tooku maunga. Ko Ngati Pakeha tooku iwi.

Tena koutou e nga whanau o Kaiwhakamaru Rererangi korua ko Te Mana Rererangi Tuumatanui o Aotearoa. Heoi ano e koa ana taaku ngakau ki waenganui i a koutou."

John Bartlett

John Bartlett has aviation industry experience spanning 45 years, particularly in the area of strategy and development. He has been a flight examiner, worked in safety system development, and has also been a pilot for 30 years.

He has held senior executive positions in Ansett New Zealand, Virgin Group, the Civil Aviation Authority, and most recently CEO and Director of Pacific Blue Airlines.

He is currently Chief Executive of the Christchurch Symphony Orchestra and Southern Opera.

"Air commerce is an underpinning force in our economy – all of the other industries that drive growth would fail without it. The aviation safety system that is CAA's core business is world-leading and enables a vibrant and essential aviation industry. Aviation has always been characterised by change, but never more so than now. I am looking forward to working with my colleagues to ensure that the CAA remains at the forefront of a responsive and safe aviation system in New Zealand," John says. ■

New CAA Deputy Chairman Peter Griffiths (left), and members Anita Mazzoleni and John Bartlett.

Pass the **Salt**

If it's made of aluminium, it's susceptible to the corrosive powers of salt. In New Zealand's marine environment, miniscule aluminium-munching molecules are forming on your aircraft's exposed skin every day. Short of parking up in the Nevada desert, what can you do?

In June this year, an R44 helicopter pilot discovered a five-inch crack in the leading edge of the tail rotor during the pre-flight inspection. Metallurgy testing showed the tail rotor blade failed in part because of exposure to salty air.

The tail rotor blade was made of Aluminium 2024, the same kind of aluminium as almost all light aircraft. Although R44 rotor blade skins are particularly light and thin, the threat of salt corrosion in New Zealand is significant for all aircraft – particularly where they are exposed to abrasion that compromises the protective paint finish – think main rotor blades, fixed-wing leading edges, propeller blades, vertical stabiliser leading edges, flaps, cowls... To understand how salt affects aluminium; think of aluminium as a highly reactive metal – it is actually more reactive with oxygen than steel. We don't think of it as particularly reactive (or prone to rusting) because when it is cut, it reacts with oxygen in the air within seconds to form a natural oxide layer or protective skin.

But that protective layer is only about 10 nanometres thick (or about 1/10,000th of a human hair) and not impenetrable. Imagine a tail rotor blade that's done a bit of time. It's in good condition, with only a few minor stone nicks and some occasional patches of missing paint that exposes the oxide layer to the air (see figure A).

The aircraft spends the day flying in typical New Zealand coastal air, which contains tiny drops of seawater (that faint haze in the distance), and is then hangared overnight.

If you look carefully in the morning, you may see dried-out particles of salt that have stuck to the aircraft. These are especially noticeable on the propeller or windscreen, which may feel gritty or greasy. The gritty feeling is the fine crystals of salt. The greasy feeling is created when your aircraft has been hangared overnight in high humidity (dew point within a few degrees). The salt crystals start to suck water out of the air (just like the silica gel you get in the little sachets marked 'do not eat').

Now we have little droplets of concentrated corrosive salty water sitting on the thin oxide layer where the paint has worn away. While the aluminium's natural oxide layer resists atmospheric oxygen, it doesn't resist chemical attack from a salt-water solution. Once the oxide layer is breached, the salt starts tunnelling into the metal, creating little pits (see figure B).

These pits are so small, you may not even detect them when running your hand across the blade, and pictured next to them, a small nick from a stone would seem enormous. But because of the way salt eats aluminium, the bottoms of these pits are not smooth, but sharp and jagged. This cragginess means that when the aircraft is flown, the normal

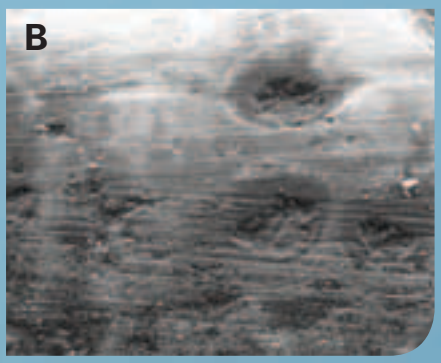


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Photo courtesy of Phillip Treweek

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operating stress is amplified by two to three times at certain points on the bottom of the pits – that causes cracks.

It is the sharpness of the damage, more than its depth, that influences how much the stress is concentrated. A crack is the sharpest possible type of pit. More sharpness, more stress concentration... so cracks breed more cracks.

Cracks can extend partially through the thickness of the aluminium skin (see figure C).

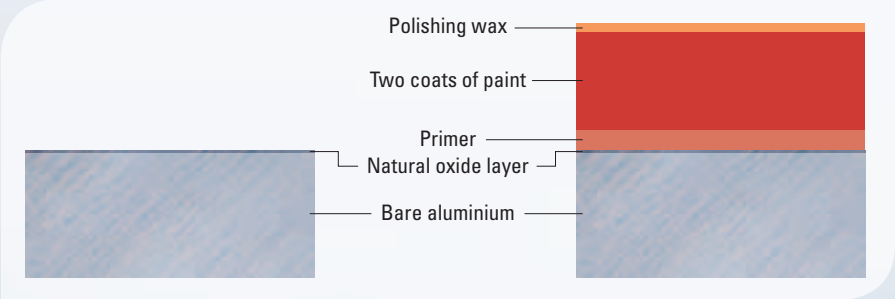
Note the initial pits were not all that deep relative to the skin, but they bred very deep cracks.

Eventually, they got all the way through (see figure D).

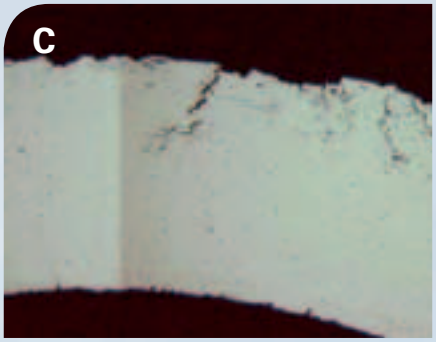
CAA Team Leader Continuing Airworthiness, Jack Stanton, says virtually all aircraft being flown in New Zealand are at risk of salt corrosion to some degree.

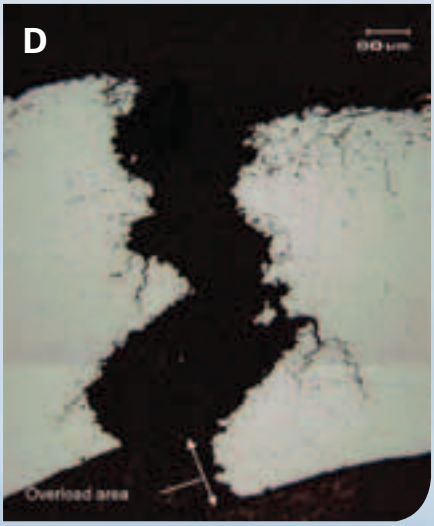
"Aircraft manufacturers in the American Mid-west or Continental Europe often struggle to comprehend why New Zealand operators report problems with corrosion. It's the combination of salt and moisture that does the damage. The idea is to stop the salt getting to the aluminium, and we can do that by regularly washing off the salt with fresh water and drying the aircraft, and also keeping up the protective coatings over the aluminium," Jack says.

"The RNZAF's P-3 Orions are particularly exposed to salt air-induced corrosion because of their long patrols at low altitude over the sea. That's why the RNZAF installed 'bird baths' at Whenuapai to wash aircraft as they taxi in from maritime patrol missions."



A painted and polished aircraft provides much better protection from the corrosive powers of salt.





Figures A-D courtesy of Quest Integrity.

Salt Defence

- Wash aircraft with fresh water regularly, then dry.
- Polish often.
- Keep up the paintwork – it's doing more than just looking pretty. ■

Photo courtesy of the NZDF

Dangerous Goods in Small Aircraft

Under what circumstances can you carry dangerous goods in a general aviation aircraft?

Anything that could pose a significant risk to the health of people, or the safety of the aircraft and property on board, is a dangerous good.

This includes oxygen cylinders, LPG cylinders, petrol, diesel, fuel for camping stoves, and ammunition.

Passengers may pack these without realising they are potentially hazardous. Always ask what passengers have packed before loading the aircraft.

Part 92 *Carriage of Dangerous Goods* sets out the requirements for the safe transport of dangerous goods by air, but rule 92.11(c) *Exceptions*, allows the carriage of dangerous goods on domestic VFR operations, in unpressurised aircraft not exceeding 5700 kg MCTOW, without full compliance with Part 92.

This does not mean you can just go for it.

Dangerous goods can be carried on a Part 135 operation only if they are for the recreational use of a passenger onboard the aircraft. On a Part 91 operation, they can be carried if they are for the recreational use of either the pilot or a passenger. Only passengers associated with the dangerous goods may be carried. So, if you are carrying two parties, you must choose either to leave beind the dangerous goods, or the party not associated with the dangerous goods.

International requirements forbid certain items to be carried on flights with passengers – such as LPG cylinders that have any gas remaining (empty cylinders are okay).

All items must be carried in containers that are specifically designed for that purpose, and should be packed, stowed, and secured to prevent leaks or damage. When loading oxygen cylinders for diving, make sure taps are tightened and hoses or regulators are disconnected. Butane or propane gas cylinders for camping stoves, lanterns, or burners, should be disconnected and must have a non-release valve. Those with a release valve or regulator cannot be carried. New, unopened cylinders are safest.

It is okay for single-use gas cylinders, or small quantities of dangerous goods, to be securely packed and protected by clothing. However, the pilot must know they are there, and understand the hazard. See Advisory Circular AC 92-2, *Carriage of Dangerous Goods on Domestic VFR Flights in Unpressurised Aircraft not Exceeding 5700 kg MCTOW*, on the CAA web site, www.caa.govt.nz.

Pilots must also have procedures in place should a dangerous goods emergency occur during flight, such as smoke or fumes in the cabin. The procedures might include:

- Landing as soon as possible.
- Using the smoke removal emergency procedures in the aircraft flight manual.
- Operating the air conditioning systems at maximum capacity to vent cabin air overboard. ■

Photo: Neville Dawson

Boosting the **BK117**

It's the most significant helicopter re-engineering project New Zealand has ever seen. If the rest of the world wants it, they've got to come here to get it.

The CAA has approved a Supplemental Type Certificate (STC), held by Airwork (NZ) Ltd. The STC allows the fitting of Honeywell LTS101-850B-2 engines to the Kawasaki BK117 B-2, to create what Airwork has christened the Kawasaki BK117-850D2.

The 850D2 project has been in the making for more than two years, and has been a joint effort between the engine manufacturer Honeywell, Airwork as the engineering company and STC holder, Flight Structures Ltd, as the design organisation, and the CAA.

An STC is an approval to modify an aircraft from its original design. The STC holder can elect to carry out the modification exclusively, or can supply the STC data to any other organisation worldwide to allow them to carry out the work. The STC holder is responsible to report any failures, produce continuing airworthiness instructions, respond to any relevant Airworthiness Directives, and to develop and maintain the STC data, including amendments to the aircraft's Flight Manual.

CAA STC project manager, Peter Gill, says that externally, the 850D2 appears to be the same helicopter.

"The maximum power available to the helicopter hasn't changed, because that is limited by the gearbox, which transmits power to the rotors. The advantage comes in when the aircraft is operating on one engine. The single-engine performance is significantly improved, which means it can be operated at a higher weight than was previously possible (when limited by single-engine performance)."

CAA Flight Operations Inspector, Ken Wells, says the improved performance at higher weights, altitudes and temperatures is particularly significant to emergency medical service operators, as the re-engined helicopter can meet class one performance standards at maximum all up weight under most New Zealand operating conditions.

"In practical terms, that means the aircraft can fly straight from the hangar into a hospital helipad, which may be elevated or in a congested area, with full fuel and equipment on board (at maximum all up weight) without contravening safety minimums."

The New Zealand STC is automatically accepted in Australia and some Pacific countries. Airwork is in the process of gaining approval from both the Federal Aviation Administration and the European Aviation Safety Agency. Those wider international approvals will depend in part on the quality of the CAA's work in approving the STC. International authorities would examine the CAA's approval processes and methods.

"The CAA has approved the certification plan for the STC, monitored the work, examined the flight testing (including using a CAA test audit), and completed a final review of the data. It's been interesting to see the first ever use of a computer-based performance predication programme as part of the methodology," Peter Gill says.

While there are only 10 BK117 B-2s eligible for the upgrade in New Zealand, there are about 400 models in use worldwide.

Airwork Business Development Manager, Wayne Christie, says this programme is good news for New Zealand aviation.

"We are proud that this significant world first STC upgrade programme was completed in New Zealand. It shows we can compete on the world stage. Honeywell chose to work with Airwork and the New Zealand CAA because of our expertise and proactive attitude." ■

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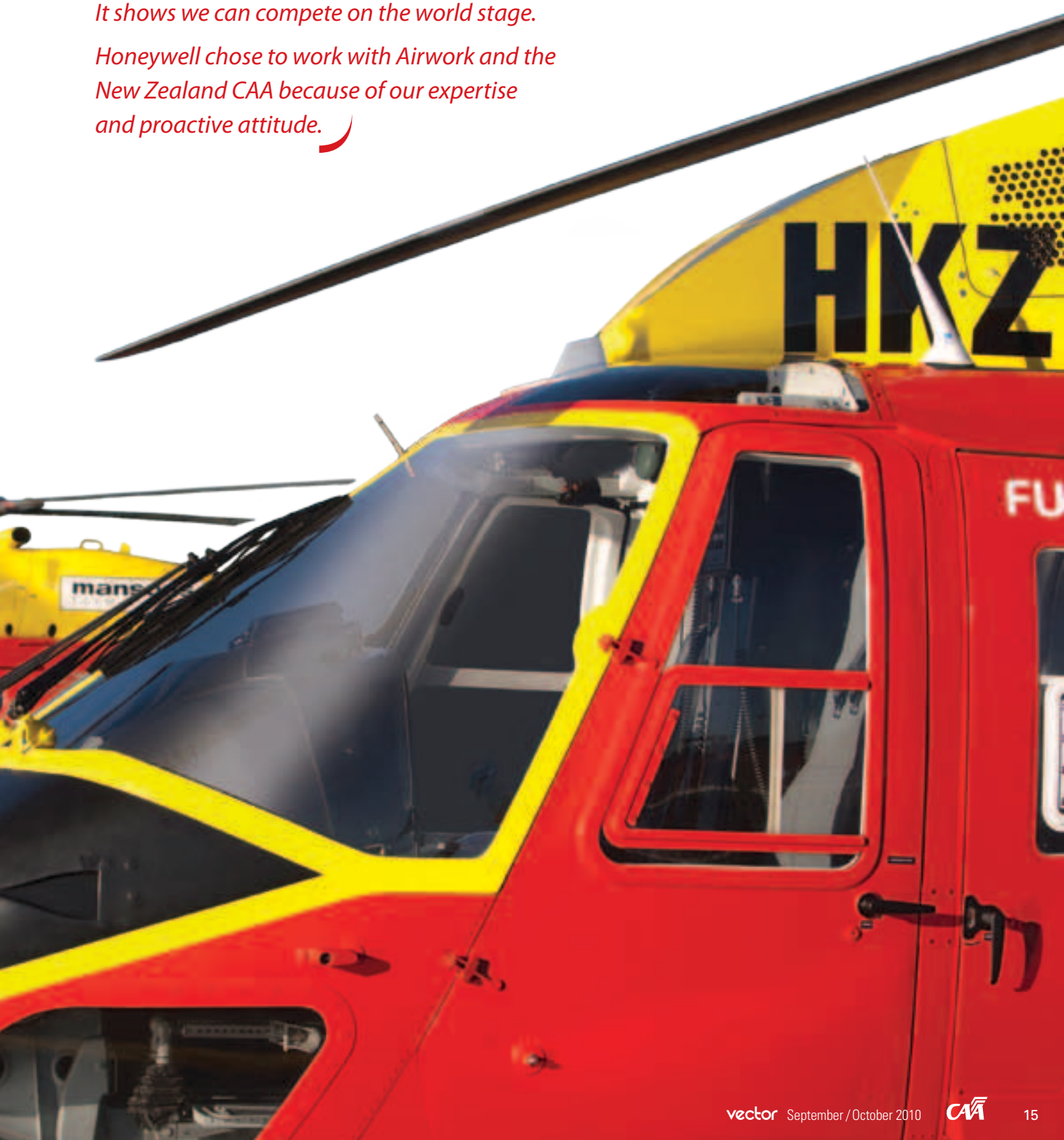


Full **Circle**

By reporting severe icing every time you encounter it, you are giving other pilots critical safety information, and improving the safety of every flight you personally make in the future. The benefits of making a Pilot Report come back to you, full circle.

Severe icing occurs when the rate of accumulation is so high that ice-protection equipment cannot control the hazard. Icing can cause aircraft to roll or pitch uncontrollably, stall at much higher speeds and lower angles of attack, or be unable to maintain altitude.

No aircraft is certificated to fly in severe icing. If you encounter it, climb or descend by at least 3000 feet to remove the aircraft from this dangerous phenomenon.

It is important to make a Pilot Report (PIREP) about severe icing to an ATS unit – even if you know someone else has already reported it, or if a SIGMET has already been issued. MetService Aviation Forecast Manager, Dr Matthew Ruglys, says icing and turbulence reports form a vital part of the forecast process.

"There may be a temptation not to report a phenomenon if there is already a SIGMET in force, but then forecasters would be deprived of a valuable check on the accuracy of their forecasts. The logged reports are also used in case studies and workshops for forecaster training."

Severe icing requires three things: high moisture content, significant upward motion, and temperatures falling between approximately -5 and -18 degrees C. MetService forecasters use a range of tools to identify potential areas of severe icing. Satellite and radar imagery show areas of vertical motion and large amounts of liquid water. Radiosonde soundings give a vertical profile of

Photo courtesy of Rob Neil and Vincent Aviation

No aircraft is certificated to fly in severe icing.

Your PIREP allows current SIGMETs to be updated and new ones issued. Future forecasts are more accurate.

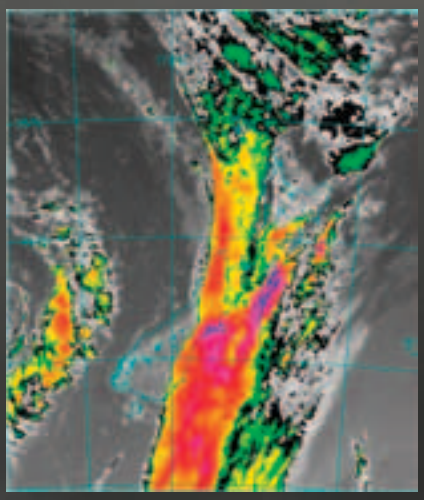
Pilot Reports

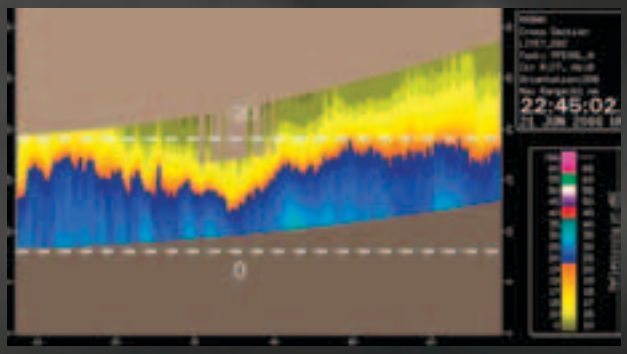
A PIREP is an abbreviated special air report (AIREP Special) and should be made whenever the following hazardous meteorological conditions are encountered: severe icing, severe turbulence, severe mountain wave, thunderstorms with or without hail, heavy dust/sandstorms, volcanic eruption, pre-eruption volcanic activity, or volcanic ash cloud.

temperature and moisture content in the atmosphere, and numerical weather prediction models can show where vertical motion and supercooled liquid water will be in the future. Reports of actual severe icing add another string to the forecaster's bow, and increase the accuracy of future forecasting.

Another very important reason to report severe icing is that it will help other pilots know if it is safe (and legal) to fly in that area. Your PIREP may trigger a SIGMET to be issued for reported severe icing. Rule 91.421 *Operating in Icing Conditions* says that you cannot fly an aircraft into known or forecast icing conditions unless the aircraft is certificated with ice protection equipment for those conditions (and no aircraft is certificated for severe icing conditions).

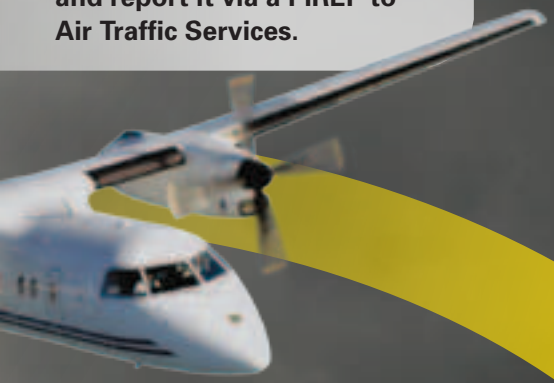
If severe icing is forecast anywhere along your intended route at your intended altitude, and an aircraft has made a PIREP confirming the presence of severe icing – you cannot go. Remember that if severe icing has been forecast, but there have been no PIREPs to confirm whether it actually exists, you still cannot go unless you receive first-hand information that the forecast is incorrect (rule 91.421(c)). ■





The satellite image (top) and radar cross-section (bottom) show conditions conducive to severe icing.

You encounter severe icing and report it via a PIREP to Air Traffic Services.



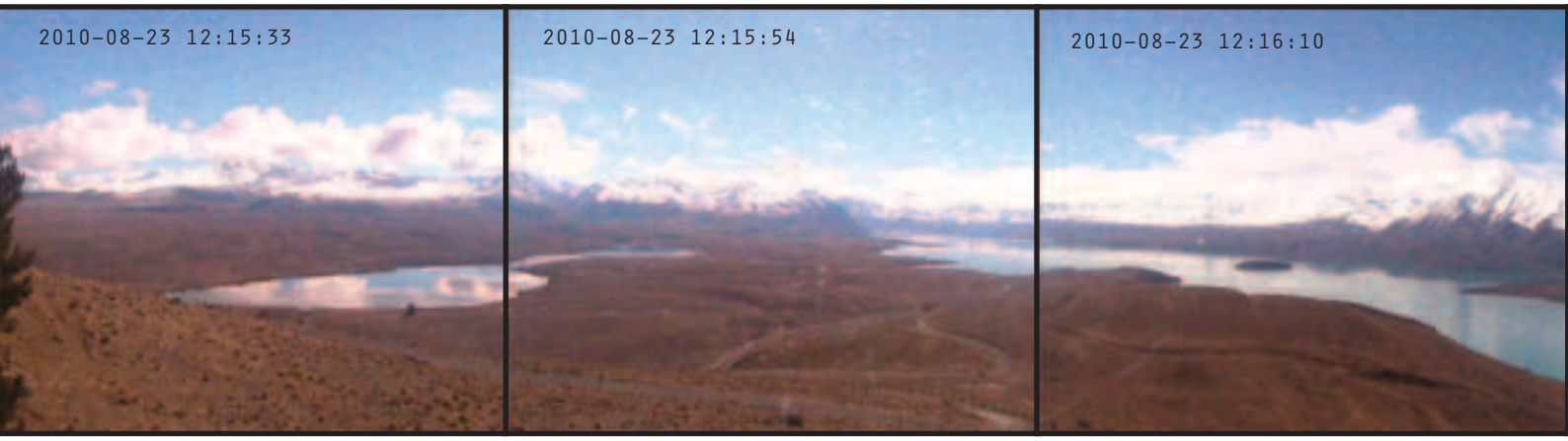
A PIREP should include;

- aircraft identification,
- aircraft position,
- time of report,
- flight level or altitude, and
- what is being experienced or observed.

Photo: David Baird Photography

Air Traffic Services pass your PIREP on to MetService and any other aircraft likely to be affected.

Photos: ©istock.com/zoomstudio (clouds), narvikk (aeroplane), MetService



West | North | North-East

www.Wx

Private VFR pilots should use every available resource to build a big picture of the weather – but watch out for the fish-hooks in web cams and unofficial weather sources.

There is no substitute for a MetFlight GA briefing.

The pre-flight meteorological information that Part 121, 125, and 135 operators (small, medium and large airlines) use, must come from a Part 174 *Aviation Meteorological Service Organisations – Certification* organisation. Currently, MetService is the only organisation certificated by the CAA to provide this. But as a private pilot (operating under Part 91 *General Operating and Flight Rules*), you can supplement your MetFlight GA briefing with information from additional sources. However, you must consider the pros and cons.

Weather information is all around you. Television, radio, the internet – web cams are also a popular source of recent visual weather information. Provided the information is current, all sources of weather information can be used to help you build the big picture.

You can begin this process several days before you intend to fly by seeking out other sources of weather information – in addition to what is available on the MetFlight GA web site. This will help you see the general trend.

By studying the weather four or five days out, you can get a feel for whether your flight will even be possible. If it's not looking good, you have time to come up with plans B, C, and D. They may be: moving your flight forward a day, delaying it a day, or taking the car instead.

A good source of longer range information are MetService's seven-day and three-day rain forecasts, available at www.metservice.com.

Long-range forecasts are also available on the MetVUW.com web site. This is run by Dr James McGregor, Senior Lecturer in Meteorology at Wellington's Victoria University. If you use this source, be aware that Victoria University does not hold a Part 174 certificate, so it cannot provide meteorological information specifically for aviation purposes. It is primarily run as a study and research platform, and its graphics should not be relied on to the same extent as a Part 174 certificate holder's forecasts.

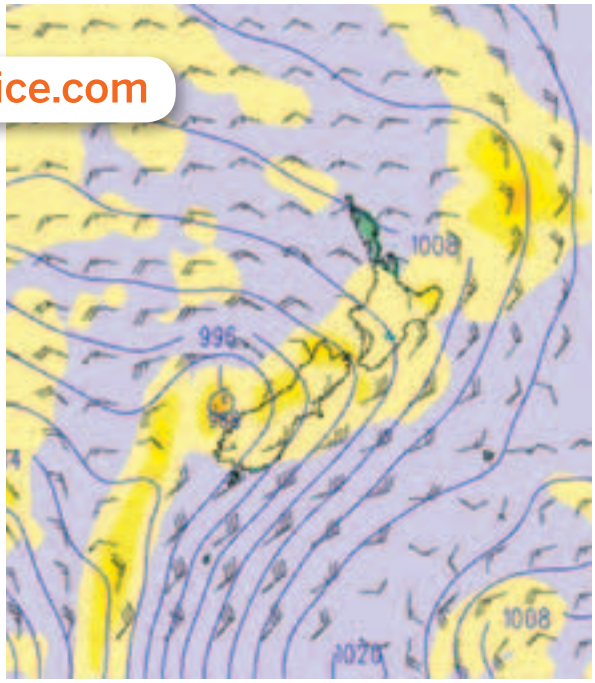
Dr McGregor says the data is obtained from the United States National Weather Service.

"These charts are updated approximately every six hours and provide forecasts up to 180 hours ahead of the time they were issued. Clearly reliability will decline with the length of the forecast. We wouldn't advise anyone to take the seven-day forecasts literally, but hope that these longer forecasts will provide some useful indication of how things might develop. They are not intended for use in making life or death decisions."

For flight-planning purposes, it is safest to use long range forecasts issued by MetService. It is important to analyse trends in the weather on the day of your flight, as well as a few days before. A good way of doing this is to compare the last six or so METARs for your destination, with what the TAF says will be happening, to see if any forecast changes are occurring earlier, later, or at the time they were forecast to occur. Looking at the MetService's weather maps for 0600, 1200, and 1800 that day will also show you the trend.

East | South-East | South

metservice.com



A MetService seven-day rain forecast chart.

On the day of your flight, area forecasts (ARFORs) from MetFlight GA will give you the upper level wind speed and direction for each area. By looking at these winds, you can find the best cruising level. To work out whether you can maintain VMC at that level, however, requires careful study of cloud base information available from MetFlight GA.

Web cameras can be a good source of additional information, but be careful. Always check how current the information is. Check the date and time stamp on web cam pictures, and don't use any source if you cannot verify when it was issued.

Also be wary of cameras that only point in one direction. It may look like a beautiful day, but there could be a big black front right behind the camera. Web sites with cameras pointing in several directions, or with cameras that you can manipulate yourself, are the best. Here is one good example.

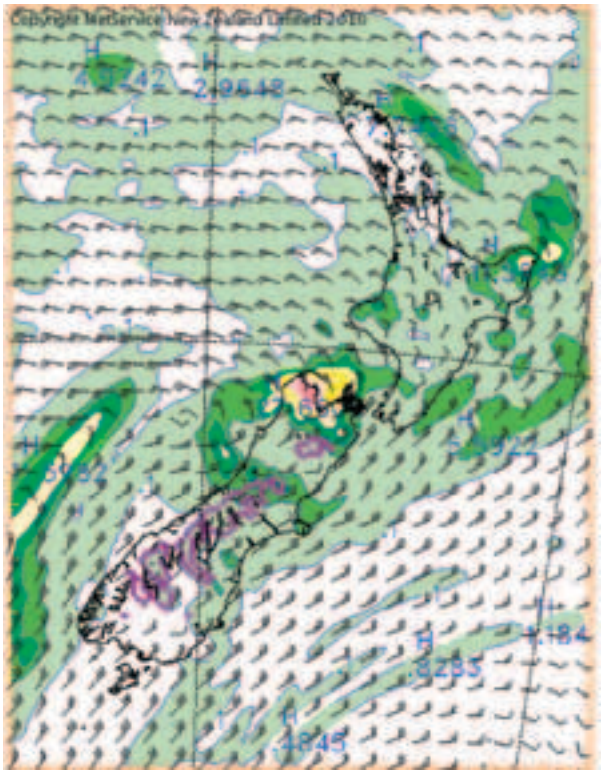
The Tekapo Tourism web site, www.tekapotourism.com, not only has multiple cameras each showing views in multiple directions, it also has an interactive live video camera, that allows you to select from 20 preset views and watch while the camera moves to that view.

Depth of field characteristics sometimes mean that mist, light rain, or low visibility, does not show up in the picture. Personally assess each web site on its merits – don't just rely on the recommendations of others.

Another way you can get additional weather information is to make phone calls to contacts along your intended route. While flying, you can ask Christchurch Information if they know of any aircraft along your intended route who you could contact to ask for a Pilot Report (PIREP). While you cannot put the onus on them, any information they can give will help your decision. ■

The web address for MetFlight GA is

http://metflight.metra.co.nz



A MetService three-day rain forecast chart.

Special Permission to Fly

If there's any doubt about an aircraft's airworthiness, it will probably need a Special Flight Permit to fly. This may follow a heavy landing, minor accident, or detected fault.

Richard Baldwin, CEO of regional airline air2there, says getting a Special Flight Permit is no drama.

"The paperwork doesn't take too long. You fill in a form (Form 24021/07, available on the CAA website, www.caa.govt.nz, "Forms") and attach any other information that could be useful in processing the Special Flight Permit, such as photos, and send it off to the CAA."

"To me, the key thing is: if you're in doubt about how safe it is to fly an aircraft or if you could be non-compliant with the rules, get a Special Flight Permit anyway. You're safe with it. If you fly without one, it could impact on your insurance," Richard says.

The more information you provide about why you need a Special Flight Permit, the quicker the application can be processed.

"For routine stuff (such as a ferry flight), the turnaround time is about 24 hours. Nobody's that pushed for time that they can't wait a day."

Issuing Special Flight Permits

On average, the CAA issues one Special Flight Permit each week. Once an application is received, it is considered by CAA's Aircraft Certification Unit (ACU). Depending on the reason for the application (such as repairs after an incident), the ACU may require an inspection by a Licensed Aircraft Maintenance Engineer to certify the aircraft is fit for flight. The ACU will decide whether to issue a Special Flight Permit in accordance with Rule 21.257 *Conditions for issue of special flight permit*. If safety cannot be assured, or if the damage cannot be completely assessed, the application may be declined.

Before applying for a Special Flight Permit, remember that most maintenance facilities do have road access. Trucks may be able to drive through the night and through bad weather – transporting your aircraft by road may be an option.

Photo courtesy of Colin Mead

Nobody's that pushed for time that they can't wait a day.

Special Flight Permits come with terms, conditions, and limitations. Generally, the limitations relate to reducing risk during the flight and include limiting those on board to only essential crew. There may also be technical limitations, such as not retracting the gear or not extending the flaps.

Special Flight Permits are valid for one specific flight only and for a specified time. This is usually a maximum of one month, to allow for the coordination of weather and crew.

Special Flight Permits are charged at the standard CAA per person hourly fee.

When is a Special Flight Permit Required?

Rule 91.101 *Aircraft airworthiness* requires your aircraft to have a current airworthiness certificate and to be in an airworthy condition before it can be flown. Airworthiness certificates are non-terminating, provided the aircraft remains in an airworthy condition, including conforming to its approved type design. This means that the aircraft and its systems are effectively 'as built', apart from normal service wear and approved modifications. For example, the retractable undercarriage retracts via the cockpit control, pitch trim works as described in the flight manual, etc.

This non-terminating airworthiness certificate is also dependant on all required maintenance being carried out. If it has not, your airworthiness certificate is no longer valid, and you require a Special Flight Permit to legally operate the aircraft.

Rule 21.257 *Conditions for issue of special flight permit,* lists the situations that could warrant Special Flight Permits – these include flight testing for some new aircraft, flying the aircraft to a maintenance base, or to a point of storage.

Rule 91.615 *Review of Airworthiness* (c) (2) was amended in December 2009. This amendment means that for other more routine Special Flight Permits (such as an overlooked maintenance requirement), an aircraft inspection may not be required. If you are applying solely to have an out-of-date airworthiness review completed, a Special Flight Permit is no longer required.

If you need a Special Flight Permit following an incident, you must also report this under Part 12 *Accidents, Incidents and Statistics.* ■

Meet **Ken Mathews**

The CAA has appointed Ken Mathews to the role of Manager Rotary Wing & Agricultural Operations. Ken joined the CAA in mid-September, most recently from his role as Deputy Chief Investigator of Accidents at the Transport Accident Investigation Commission (TAIC).

Ken is a Licensed Aircraft Maintenance Engineer and pilot with some 3500 hours on helicopters, and 3000 hours on aeroplanes. He holds an ATPL (H), CPL (A), and a D-category multi-engine instructor rating.

Ken first gained his PPL at 17, after becoming fascinated with the aircraft used on the family farm.

Ken Mathews – Manager Rotary Wing & Agricultural Operations

"I'd always wanted to be a pilot, but I thought the Air Force's selection criteria were a bit high, so I applied to be an engineer," Ken says of his first career with the RNZAF at 18.

After five years learning engineering, Ken applied for his wings course – training on Harvards and flying Devons until the Air Force's need for helicopter pilots saw him move to the Sioux, and ultimately, the Iroquois. Ken left the Air Force in 1980, after 11 years, retiring as a Flight Lieutenant and Captain on the Iroquois.

Ken spent the next seven years overseas, flying for an international volunteer organisation, including a period as Chief Pilot in Papua New Guinea, managing a fleet of six aeroplanes and two helicopters. Ken then joined Lloyd Helicopter Group in the Northern Territory of Australia, where he flew for three years, including some work onto off-shore oil rigs, and onto ships as RAAF helicopter support. Returning to New Zealand, Ken joined TAIC, where he has headed at least 70 investigations over the past 17 years.

"I am looking forward to a change in direction, and I hope that I bring a background and experience that will allow me to contribute to safe aviation," Ken says. ■

Keeping Up

You might have started out on the abacus, but are you keeping up enough to manage the Playstation?

As Licensed Aircraft Maintenance Engineers (LAMEs), you have a responsibility to be constantly upskilling, studying, and training, to remain up-to-date.

"Without additional training, I would have struggled," says Andrew Lynn, Fieldair Engineering Manager (Aircraft), who has been in the field for nearly three decades. Fieldair staff currently work on the new breed of Diamond DA 40 and DA 42 aircraft. The Diamonds have a Garmin G1000 all-glass cockpit that gives flight instrumentation, navigation, weather, terrain, traffic, and engine data on fancy LCD displays – a far cry from the dials of the old control panel. The traditional mechanical gyroscopic flight instruments are replaced with the Garmin GRS77 Attitude and Heading Reference System.

"The avionics equipment that's being manufactured nowdays is very sophisticated, it is playstation-generation based," says Steve Price, Fieldair Quality and Assurance Manager. "For aircraft engineers, the composite materials and inspection techniques are changing rapidly and most of them are involved in this new technology day to day. The majority have had no formal training in these areas and rely on self-study and ongoing research."

FADEC Engines

Another facet of old versus new equipment is the increasing popularity of Full Authority Digital Engine (or Electronics) Control (FADEC) engines. These are the new computerised control versions of long-toothed engines, such as the Allison 250. FADEC consists of a digital computer, called an electronic engine controller or engine control unit, and its related accessories. It controls all aspects of the aircraft engine's performance.

Russell Goulden is Divisional Manager at Oceania Aviation Ltd and conducts training on FADEC-equipped rotorcraft and their engines. "Over the last couple of decades, FADEC engines have started coming into the country. Eventually engineers will have to get themselves trained or updated on these new engines, even if they have already have type ratings for the older non-FADEC models.

"Many manufacturers are moving more towards the FADEC fuel control systems due to more accurate and efficient fuel management, inbuilt redundancy protection, the ability to manage and report out-of-tolerance conditions, together with increased reliability and safety," Russell says.

AME Licence Ratings

If you are an engineer with a Group rating, you may have worked on only some of the engine or aircraft types that the group covers. How familiar are you with the other types you have the ratings for?

Rule 66.55 *Privileges and limitations,* and rule 43.53 *Performance of maintenance,* both require engineering licence holders to hold the appropriate rating and also be familiar with the aircraft or component they are working on. View them at www.caa.govt.nz, "Rules".

Engines and aircraft structures will continue to change and advance. As engineers, you must be personally motivated to keep up. Remember, most manufacturers run upgrade courses. See each manufacturer's web site for details. ■

Top two photos courtesy of Fieldair.

Photo: ©istock.com/Sturti

Air Law Examination Changes

By November 2010, the CPL and IR Air Law examinations will be increased in length, and many new questions will be added to the bank of possible choices.

Aviation Services Ltd (ASL), which administers aviation examinations in New Zealand, says the revised examinations will better reflect the Air Law syllabus.

"Air Law is a subject in which syllabus coverage needs to be rigorous and sufficient," says ASL General Manager, Bob Brownlie.

"We have been aware that some examinations have not kept pace with changes to the syllabus over recent years."

In May this year, the CAA and ASL reviewed the current examination structure, including how best to cover each syllabus, length of examinations, planning for ongoing question-bank development and syllabus changes, and how best to implement any changes.

In general, it has been agreed that the number of examinations will not be increased, examinations will not exceed 180 minutes, examinations should cover the syllabus well, and questions should be appropriate to the level of the syllabus.

"Work is starting on all Air Law examinations now, and the remaining examinations will be reviewed over the coming three years," Mr Brownlie said.

ASL will advise training organisations of the detail of the changes, including the length of the examinations and the number of questions, well in advance of the changes coming into effect. ■

GST Increase

The GST rate goes up to 15 percent, from the current 12.5 percent, on 1 October 2010.

All CAA fees, levies and charges (such as the cost of pilot and engineering licences, flight testing, aircraft registration, type certification, operator certification, and fees and charges at the per-person hourly rate) will reflect this increase.

The GST increase will also affect other transactions such as buying paper copies of Rules, Advisory Circulars and logbooks through 0800 GET RULES (0800 438 785).

The CAA will invoice all fees and charges for work done before 30 September at the current GST rate of 12.5 percent. All work that has been carried out by CAA staff before 30 September will be invoiced, even if an audit or spot check has not been completed. Work carried out from 1 October 2010 onwards will be invoiced at the GST rate of 15 percent.

If you are applying to the CAA for a licence, amendment, or registration of an aircraft, you should make payment at the 12.5 percent GST rate if the CAA is likely to receive your payment on or before 30 September 2010. If your payment is likely to reach the CAA after this date, you must pay GST at 15 percent or your application will be returned.

All forms on the CAA web site have been updated to reflect the new GST rates.

View them at www.caa.govt.nz, "Forms".

Special Category Deadline – **3 December 2010**

Fewer than half of the nearly 400 aircraft that are expected to transition to the new Special Category Airworthiness Certificates have so far made application.

Six sub-categories of the Special Category airworthiness certificate are now available – Experimental, Exhibition, Amateur-built, Primary, Light Sport Aircraft (LSA), and Limited.

The deadline for the transition is 3 December 2010.

To apply, complete CAA form 24021/06 *Application for a Special Category Airworthiness Certificate*, available on the CAA web site www.caa.govt.nz, "Forms". Detailed information is available under "Aircraft – Part 21 Changes – Aircraft Certification".

Your opportunity to ***make a difference***

Safety Education Adviser

The Civil Aviation Authority of New Zealand produces world-class safety education material and this is your opportunity to join the team that creates these high quality aviation safety resources.

You will be part of the Communications and Safety Education Unit, currently based in Petone, but in Wellington City from mid-January 2011. The team produces the magazine *Vector*, a variety of safety booklets, posters, and videos, as well as conducting safety seminars, and maintaining the CAA web site.

We currently have a vacancy for a Safety Education Adviser. This full-time role involves:

» writing and editing articles for *Vector* magazine, including researching and interviewing

» project managing the development and production of aviation safety material

» safety promotional activities.

The successful applicant will have outstanding writing skills, with an ability to translate complex technical information into engaging and informative articles that are easy to read. Good oral communication skills are also essential.

A passion for aviation safety is vital, and experience in flying, or instructing, would be highly desirable for the position.

You will be confident in dealing with people at all levels, and enjoy contributing to a very active and dynamic team.

You will be competent with computer software in a PC and Microsoft environment, and proficient in Microsoft Word.

In return for your skills and experience, we offer you competitive remuneration and the opportunity to influence and promote a safety culture within the aviation community.

Applications close on 15 October 2010 and should quote vacancy number CAA 10/10.

See the CAA web site, www.caa.govt.nz, for the position description and an application form. To apply for the position, please send the completed application form together with a covering letter and curriculum vitae to: Human Resources Unit, Recruitment 10/10, Civil Aviation Authority of New Zealand, PO Box 31-441, Lower Hutt 5040, or email: jobs@caa.govt.nz. For more information Tel: 0-4-560 9400. ■

How to Get Aviation Publications

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).

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).

Planning an Aviation Event?

If you are planning any aviation event, the details should be published in an *AIP Supplement* to warn pilots of the activity. For *Supplement* requests, email the CAA: aero@caa.govt.nz.

To allow for processing, the CAA needs to be notified **at least one week** before the Airways published cut-off date.

Applying to the CAA for an aviation event under Part 91 does not include applying for an *AIP Supplement* – the two applications must be made separately. For further information on aviation events, see AC91-1.

CAA Cut-off Date	***Airways Cut-off Date***	***Effective Date***
4 Oct 2010	11 Oct 2010	16 Dec 2010
18 Oct 2010	25 Oct 2010	13 Jan 2011
15 Oct 2010	22 Nov 2010	10 Feb 2011

Aviation Safety Advisers

Aviation Safety Advisers are located around New Zealand to provide safety advice to the whole aviation community. You can contact them for information and advice.

Don Waters
(North Island)
Tel: 0–7–376 9342 Fax: 0–7–376 9350
Mobile: 027–485 2096
Email: watersd@caa.govt.nz

Murray Fowler
(South Island)
Tel: 0–3–349 8687 Fax: 0–3–349 5851
Mobile: 027–485 2098
Email: fowlerm@caa.govt.nz

John Keyzer
(Maintenance, North Island)
Tel: 0–9–267 8063 Fax: 0–9–267 8063
Mobile: 027–213 0507
Email: keyzerj@caa.govt.nz

Bob Jelley
(Maintenance, South Island)
Tel: 0–3–322 6388 Fax: 0–3–322 6379
Mobile: 027–285 2022
Email: jelleyb@caa.govt.nz

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".

Accident Briefs

More Accident Briefs can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".
Some accidents are investigated by the Transport Accident Investigation Commission, www.taic.org.nz.

ZK-JMD ICP Savannah

Date and Time:	7-Feb-09 at 17:30
Location:	Taieri
POB:	1
Injuries:	0
Damage:	Substantial
Nature of flight:	Private other
Age:	68 yrs
Flying Hours (Total):	320
Flying Hours (on Type):	10
Last 90 Days:	10

The pilot had recently modified the aircraft wings from the slatted type to the vortex-generator type in accordance with the manufacturer's recommendations. During the approach, the pilot sideslipped to lose height, and continued, believing he still had sufficient runway available to land. The aircraft was too fast on touchdown and ground-looped at the end of the runway, coming to rest in the perimeter fence.

CAA Occurrence Ref 09/317

ZK-CER Rans S6S Coyote II

Date and Time:	01-Oct-09 at 17:45
Location:	Omaka
POB:	1
Injuries:	0
Damage:	Substantial
Nature of flight:	Private other
Age:	61 yrs
Flying Hours (Total):	453
Flying Hours (on Type):	150
Last 90 Days:	8

The aircraft undercarriage clipped a post as it crossed the aerodrome boundary. The aircraft landed and ground-looped as it slowed.

CAA Occurrence Ref 09/3777

ZK-RGG AutoGyro Europe MT03 eagle

Date and Time:	24-Oct-09 at 16:13
Location:	Tauranga
POB:	2
Injuries:	0
Damage:	Substantial
Nature of flight:	Private other
Age:	59 yrs
Flying Hours (Total):	125
Flying Hours (on Type):	100
Last 90 Days:	6

The gyrocopter was returning from a cross country flight from Matamata. The pilot was cleared for a short approach onto grass 25 which had a 9 knot crosswind. As the gyrocopter vacated the grass vector, the crosswind lifted the machine and it rolled slowly over onto its side causing substantial damage. The pilot and passenger were uninjured.

CAA Occurrence Ref 09/4082

ZK-SWP Piper PA-22-160

Date and Time:	31-Oct-09 at 14:30
Location:	Motanau
POB:	2
Injuries (Minor):	1
Damage:	Substantial
Nature of flight:	Private other
Pilot Licence:	PPL (Aeroplane)
Age:	30 yrs
Flying Hours (Total):	88
Flying Hours (on Type):	30
Last 90 Days:	8

The pilot had taken off from the mown vector at the airstrip that morning. On returning that afternoon he noticed that the wind had picked up and changed and now favoured the more easterly facing vector. He decided to use this vector and in executing a main wheels only landing, the aircraft nosed over onto its back, possibly due to the length of the grass on that vector. The pilot also acknowleged that the landing technique he used was not the correct choice given the wind velocity at the time.

CAA Occurrence Ref 09/4170

ZK-GBA Glaser-Dirks DG-300 Elan

Date and Time:	13-Nov-09 at 14:00
Location:	Omarama
POB:	1
Injuries:	0
Damage:	Substantial
Nature of flight:	Private other
Flying Hours (Total):	717
Flying Hours (on Type):	392
Last 90 Days:	24

Glider was aerotowed up to Buscot Ridge (approximately 4.3 nautical miles northeast of Omarama Aerodrome) and released at 2000 feet AGL. The pilot spent 10 minutes attempting to find lift, and as height was lost, the glider was moved down the ridge, back towards the aerodrome. After further sink was experienced, water ballast was dumped and it was decided that the glide to the aerodrome was now too marginal. A local field was selected, which was rougher than expected. After the initial touchdown, the glider bounced then ground-looped. This resulted in damage to the undercarriage, tailboom and outer portion of wings. The pilot was uninjured.

CAA Occurrence Ref 09/4479

GA Defects

GA Defect Reports relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less.
More GA Defect Reports can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".

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

Robinson R22 Beta

Nut

Part Number:	MS 21042L4
ATA Chapter:	6220
TTIS hours:	3687

In November 2009, during a routine Part 43 maintenance inspection, an MS21042L4 nut fitted to an R22 M/R pitch change horn, was found to be cracked. This was on a blade assembled in NZ the month previously. This was reported to the CAA. In January 2010, during another routine inspection a second cracked nut on the opposing blade was also found by the same maintainer. The maintainer then checked his records and inspected an H369 on which he had installed the same type of nuts to a M/R drag damper. 7 out of 12 nuts were found to be cracked. The maintainer contacted the CAA Safety Investigation Unit (SIU) with details of the defect, the NZ Part 19F Supply Organisation, and dispatched the nuts to CAA for investigation. The CAA Certification Unit were advised by the SIU.

The NZ Part 19F Supply Organisation traced all of their release notes relating to the 'lot' of 1000 nuts sourced from Airfasco Industries USA. Approximately 400 nuts had been supplied since the nuts arrived in August 2009. This information was provided to the SIU. The SIU then contacted each of the recipients of the nuts with advice that the nuts appeared to be faulty and should be quarantined until further information was available. A report back to the SIU detailing the whereabouts of the nuts that had been installed was also requested.

Metallurgy testing revealed Hydrogen Embrittlement due to poor manufacturing and heat treatment process. Maintainers managed to trace the location of approximately 85-90 percent of the 400 nuts. Most of the affected maintainers chose to replace the nuts already installed to aircraft or components, where it was feasible. The FAA have been formally advised by the SIU via the SDR process. The CAA Certification Unit has been sent a copy of the Quest report and are now considering airworthiness action to formally remove the nuts from service.

The vast majority of the nuts have been located and most of the located nuts have been removed from service or quarantined. Some nuts still remain in service awaiting further direction from the CAA Certification Unit. It is likely that a small percentage of the nuts may not be able to be located.

CAA Occurrence Ref 10/145

Piper PA-31-350

Micro switch

Part Number:	1CH21-4
ATA Chapter:	3200

On departure, the landing gear was cycled normally and tested with two extensions and retractions, this followed previous rectification work on the landing gear system. Upon the second retraction, the gear unsafe light would not extinguish and gear handle would not centre. A strong smell of hydraulic fluid was also observed. The landing gear extended normally with three greens indicated and the aircraft landed at the departure aerodrome.

Maintenance investigation found that hydraulic fluid had discharged from the reservoir vent. The cabin air intake is adjacent to the hydraulic reservoir vent, hence the smell in the cabin. The reservoir level was checked and found full, the hydraulic system was checked and retractions carried out. The nose-gear up micro switch was found to be operating intermittently. Due to the micro switch being out of adjustment, the landing gear cycle was unable to be completed and no gear-up indication was made. The hydraulic power pack does not shut off until the cycle is complete. It is likely that continued operation of the power pack caused the hydraulic fluid to overheat and vent overboard. The micro switch was adjusted and retraction checks carried out were satisfactory.

CAA Occurrence Ref 09/4407

Piper PA-31-350

Reservoir fluid level

ATA Chapter:	3200

The undercarriage failed to extend on normal gear down selection while on approach. Both main gear showed down and locked but nose gear trailed on slip stream. Several attempts made, emergency undercarriage selected and hand pumped to three green and locked position. The aircraft was flown back to home base with the undercarriage down.

Maintenance investigation found no sign of hydraulic fluid on the aircraft exterior. The aircraft was jacked and a manual check carried out of the down locks and undercarriage. The hydraulic reservoir level was found at 1/2" from the bottom of the reservoir. The fluid level was replenished, and multiple undercarriage tests carried out, with respect to 2A19 Vol. 2 PA31-350 service manual, 6-158 from table VI low hydraulic fluid. Both hydraulic pump system filters were removed and inspected.

During investigation it was found that the hydraulic service rig had been left connected to the aircraft while not in use for a period of time. This allowed the majority of the hydraulic fluid in the aircraft reservoir to drain back into the rig. An internal company review of the servicing procedure for the hydraulic reservoir is being carried out.

CAA Occurrence Ref 09/4367

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Fax: 0–4–569 2024,
Email: rose.wood@caa.govt.nz.

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