May/June 2015

POINTING TO SAFER AVIATION

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# Delivering the Goods

## Teen Build Pays Off for Everyone

## Everybody Needs Good Neighbours

## Improving Dual-Flight Training Through Accountability


SEE BACK COVER

CIVIL AVIATION AUTHORITY OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

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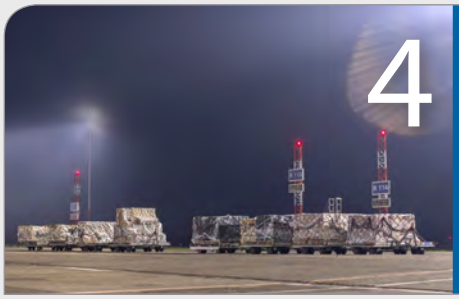

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Cover: Delivering the Goods, see story on page 4. Photo: shutterstock.com/tratong




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# **New Rules** for RPAS

Last month, Associate Transport Minister Craig Foss announced an update to Civil Aviation Rules regulating Remotely Piloted Aircraft Systems (RPAS), also known as drones. The updated rules, coming into effect on 1 August 2015, will better manage safety risks of RPAS, which are currently regulated under Part 101 – rules designed for model aircraft.

While Part 101 has been updated, it will still apply to RPAS posing a low risk to the public, property and other airspace users.

The new Part 102 operator certification rules will regulate the use of RPAS when operated beyond the provisions of Part 101, such as at night or at public gatherings. Typically, these operations could pose a higher risk to the public and other airspace users, and so the Director needs to be assured that the operator has addressed all the safety risks associated with the operation. Those operating under a Part 102 certificate will still need to fly their aircraft to Part 101 limitations except where the operation's specification attached to the certificate specifically allows greater latitude.

Certification is not required for operations conducted under Part 101.

Operators seeking Part 102 certification must submit a safety case to the CAA to demonstrate how they will address the safety risks associated with their operation. There will be an Advisory Circular accompanying Part 102 giving guidance on how to apply for certification.

"From kiwifruit orchard mapping, to stock herding, to real estate aerial photography, and search and rescue, many of the activities we see in our skies today were difficult to imagine only a few years ago," says Steve Moore, CAA's General Manager of General Aviation.

"Many New Zealand businesses are already using RPAS. It's important for them, other airspace users, and the public, that those operations are conducted safely," he says.

One of the aims of Part 102 is to incorporate sufficient flexibility to cater for developing RPAS technology that may unlock economic and safety benefits.

There has been a growing number of incidents reported to the CAA over the last few years involving RPAS. In 2010 there was only one, in 2012 there were 12, and in 2014 there were 26.

While they didn't involve near misses with large aircraft, such incidents have occurred overseas. In 2014, a remotely piloted helicopter came within seven metres of an Airbus A320 landing at London's Heathrow Airport.

"The surge in popularity of RPAS has been a challenge for regulators around the world," adds Steve.

"It's critical we respond to the safety risk these new aircraft pose. But it's just as important that we don't rush to introduce regulations that could be ineffective or have unintended consequences.

"That's why we've taken a considered approach to developing rules that avoid an undue compliance burden, while managing current and future aviation safety risks."

The CAA consulted widely on the rule changes and received more than 80 submissions from a variety of individuals and organisations.

"Whether an operator is a weekend hobbyist, or a professional, all RPAS users need to know they must stick to the rules to ensure RPAS operations are safe," says Steve.

"The biggest challenge we face is ensuring that everyone who operates an RPA understands their obligations, as often this is the first time they've had to comply with Civil Aviation Rules."

To address this, the CAA is working with manufacturers and retailers to ensure they pass on the safety message when they sell an RPAS product.

Photo: istockphoto.com/smckenzie

We are also working with Airways New Zealand which is encouraging all operators to log their flights online at www.airshare.co.nz, a web site promoting safety in controlled airspace.

Operators who want to understand what their safety obligations are can find out at www.caa.govt.nz/rpas. We also recommend you subscribe to the CAA's email notifications to keep up to date with any changes involving RPAS rules at www.caa.govt.nz/subscribe. ■

# **Delivering** the Goods

Most people would be unaware of an audit in March of two New Zealand freight forwarders by officials of the US Transportation Security Administration. But the success of those audits is a reflection of how well certificated cargo agents are doing in supporting our multi-billion dollar export market.

Freight forwarders have always had to meet security standards, but after 11 September 2001, those requirements became even more demanding.

In particular, freight forwarders in countries wanting to fly product to, or through, the United States had to meet stringent post-9/11 criteria, or face time-consuming and costly US-imposed security measures.

Separately, the International Civil Aviation Organization was mandating tighter security throughout the journey of air cargo, from producer to consumer.

So the National Cargo Security Programme (NCSP) was established.

A component of that was the implementation, in 2009, of Part 109. It aimed "to prevent, as far as possible, weapons, explosives or other articles or substances that could be used for committing an act of unlawful interference being loaded as cargo or mail onto international passenger aircraft."

One way Part 109 set out to achieve that was the certification and regulation of companies handling cargo that was to be transported by air.

The Regulated Air Cargo Agent (RACA) was born.

The CAA aviation security specialist who helped usher in the era of the RACA, Mark Stephen, says to become certificated, a freight forwarder had to meet certain NCSP requirements.

"They had to prove they were applying access controls to their facilities – meaning they had robust procedures about who could get in and around their stores – as well as security controls to cargo and mail. They had to show they were carrying out proper background checks on staff, and providing them with training on security awareness. And they had to show they had implemented an acceptable internal quality assurance programme – that is, the standards they set for their own processes to stick to."

In October 2010, two packages each containing plastic explosives and a detonator were found on separate US-bound cargo planes in Yemen. Compliance with the NCSP then became the standard Washington was looking for.

So far, New Zealand's RACAs have met that challenge.

"What that means," says CAA Manager of Security, Hugo Porter, "is that this country's export products don't have to be broken down from pallets to virtually individual boxes, to have explosive detection dogs go over them, screening, or explosive trace detection applied.

"Those security measures could well delay the movement of goods offshore, and put a lot more work in the bucket of the airlines, who carry the ultimate responsibility for security of cargo – and passenger safety. That would also have an impact on airlines' operating costs. Eventually that cost would have to be passed back along the supply chain, to the cargo agent, the shipper, and the producer."

Hugo says that, originally, New Zealand was one of only about 12 countries given the right to keep its air cargo in pallets.

Today that exclusive group has grown to about 30 countries worldwide. But to remain in that happy club, every two years, New Zealand RACAs have to demonstrate, anew, to US Transportation Security Administration (TSA) officials, that they continue to comply with the NCSP.


Photo: shutterstock.com/OliverSved

Hugo says after their first visit, in 2012, the TSA officials were very happy.

"They said that although New Zealand was operating in a low-terror threat environment, the NCSP principles applied were those consistent with security measures the officials would have expected from a medium-threat level environment."

Hugo says the TSA has yet to formally sign-off the inspection report and letter from its latest visit, but officials have told him, they've found no issues 'whatsoever'.

"The RACAs the TSA visited did a great job," he says. "I didn't instruct them on what they should do, or give them any direct information. They just showed what they do, business as usual.

"They understand the importance of 'New Zealand Inc' and their role in sustaining it."

Because the two Regulated Air Cargo Agents were able to impress the TSA with their 'workaday' routines, all New Zealand RACAs are assumed by the TSA to have the same high standards.

Hugo Porter says given the methodical way RACAs are certificated and regularly audited, that is a fair assumption.

Mark Stephen says there are 65 RACAs out of an approximate 240 cargo agents in New Zealand.

"The advantage RACAs have is that they may have an association with what are referred to as 'known customers' – exporters who guarantee they pack their goods in a tamper-resistant way.

"The known customers are happy that once those goods leave their hands, the movement of the product will be smooth, free of issues, and quick. The shorter time frame is particularly important for exporters of perishables.

"The airlines like dealing with RACAs too, because the agents are also accredited by the International Air Transport Association (IATA) and that means the airlines are guaranteed payment.

Mark says the CAA has built a very good relationship with the RACAs.

"Over time, we've seen an improvement in their internal quality assurance programmes, which has possibly been the steepest of their learning curves in becoming certificated.

"But it's that type of improvement that reassures the US that New Zealand is doing the job."

Rosemarie Dawson, the head of the Customs Brokers and Freight Forwarders Federation, says her members know that becoming a RACA is about adopting best practice.

"They take pride in making sure the journey of product from producer to consumer is efficient and secure, and in delivering that assurance to their customers.

"Becoming a Regulated Air Cargo Agent is also a critical step for any freight forwarder who is keen on improving total quality management – that is, every member of staff committing to high standards in the company's operation.

"And the members are delighted the Regulated Air Cargo Agent programme has proved to be so successful in ensuring the security of the supply chain for New Zealand exporters." ■

# Owning an Aircraft on 1 July

The Annual Registration Fee and Participation Levy are invoiced on 1 July to the registered aircraft owner on that day. However, there can be some confusion about who must pay these, especially if the aircraft is sold around this time.

The fee and levy are charged under the *Civil Aviation (Safety) Levies Amendment Order 2012* and are invoiced to the registered owner of an aircraft. They are calculated based on the maximum certified takeoff weight of the aircraft.

The registered owner of the aircraft as at 1 July 2015 must pay the fee and levy regardless of the state of airworthiness, or a pending sale of the aircraft.

The Civil Aviation Act 1990 defines the "owner" of an aircraft to be the person lawfully entitled to possession of the aircraft for 28 days or longer. That means if you lease the aircraft for 28 days or longer, you are deemed to be the owner.

The invoice is due on 20 July 2015 and once issued cannot be transferred to anyone else. If this invoice is not paid, the aircraft may be deregistered, but the fee and levy are still collectable. If the aircraft is deregistered the Airworthiness Certificate, or Flight Permit, is revoked and the aircraft cannot be legally flown.

## Change of Ownership

Buyers and sellers can come to an arrangement themselves about who pays the fee and levy. Both the buyer and seller complete the change of possession form – there is guidance about this on the CAA web site, www.caa.govt.nz, "Aircraft – Change of Possession".

### Buying or Leasing

If you plan on buying or leasing an aircraft after 1 July, you should make sure that the fee and levy have been paid by the previous owner. Otherwise, the aircraft could be deregistered, or you may find that you will end up paying for the outstanding invoice.

### Selling

If you are selling before 1 July, and want the new owner to be liable for the fee and levy, a change of possession application using form 24047/03 and the application fee, must be received and actioned by the CAA before 1 July 2015. If the aircraft is still in your name on 1 July, you are liable for the invoice, even though you may have sold the aircraft. If you sell your aircraft on 2 July you are still liable for the invoice and will need to negotiate with the new owner if you want them to pay the levy and fee.

## Deregistering the Aircraft

If the aircraft is not likely to fly in the near future, or is not airworthy, you can deregister it so you won't have to pay the fee and levy. Before deregistering, however, you should consider the costs to re-register the aircraft in the future.

A deregistration request must be received and actioned by the CAA before 1 July, using form 24047/05, otherwise the fee and levy must still be paid.

The fee and levy contribute towards the maintenance of the Aircraft Register and safety services provided by the CAA. That includes: safety investigation and analysis, review and publishing of airworthiness directives, safety promotion such as *Vector* magazine, safety seminars, the CAA web site, and other safety activities.

It is also your responsibility to promptly notify the CAA of any address or contact detail changes. If you have any queries about the fee and levy, email: Aircraft.Registrar@caa.govt.nz. ■


# **Teen Build** Pays Off for Everyone

Teenagers building an aircraft, under the supervision of some wise old hands, are learning far more than how to build an aircraft.

Everybody wins really.

The technology students get to work on something concrete, that requires them to be absolutely precise, giving them skills they might never have otherwise developed.

They're led by vastly experienced elders, who are imbuing them, not just with engineering expertise and a love and respect for aviation, but with some valuable life lessons.

And those elders are, in the words of one, "getting even more of a kick out of the thing than the young ones."

The students are from Mercury Bay Area School (MBAS) in Whitianga, and are the second group from the school to undertake the construction of an aeroplane.

Their mentors are three aviation-loving engineers, a trio of pilots with more than 80 years' flying between them, and a car enthusiast. Most of them have built their own aircraft or have helped other people build theirs.

The plane is a kitset VANS RV-12. It comes with all metal parts pre-punched and a complete set of plans. The only things not included are fluids and paint.

The MBAS teen build programme began in 2012, after one of the mentors, Jim Evans, approached the school, saying he would bring the kit into the country, if they could find the young people interested enough to help build it.

"I wanted to get young people interested in aviation," Jim says. "If you look at the age of current recreational flyers, they are mostly 60 years old, or older."

That 20-month project culminated in the maiden flight of ZK-MBA (for Mercury Bay Area) on 8 November 2013, piloted by a second mentor, Alan Coubray.

The aircraft was bought by the local aero club for members to hire, and is registered as a microlight.

The current project is being financed by Auckland flier, Allan Kearney, for his own use.

"I trust Jim implicitly in leading the teenagers in this build," Allan says.

"I've visited the team at Whitianga and Jim's control of the project is complete. His standards are really high and nothing slips past him. I have no concerns that it's teenagers putting my aircraft together."

Seventeen-year-old Rian Wheeler, one of seven students involved in the current project, laughs and says, "I think it's great that Allan trusts us!"

Each Wednesday at midday, four boys and three girls arrive at Jim's workshop on the edge of the Mercury Bay Aero Club grounds. They work until 5 pm.

The fuselage is now standing on its landing gear, and the team has most recently been working on the fin and rudder.

*Continued over* »

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A number of the students turn up even during the school holidays, despite some strict government from their mentors.

"We explain to them," says Alan, "that it is critical to get everything just right.

"We make sure that whatever part is called for by the plans, is exactly the part they've got in their hands; that one of the other kids has double-checked it's the right part; and that it's being handled in exactly the way it should be, according to the plans.

"They learn that one day the aircraft will fly with someone on board, and Jim instills in them that there is nothing half-cocked about it – what they are doing has to be perfect. They can't make assumptions, they can't just say 'oh, near enough is good enough'."

One of the first disciplines the team must learn is how to use the imperial measurement system favoured by the Americans.

"It's really hard!" says 16-year old Oliver Hunt. "I'm still having trouble with feet and inches."

The teens – a demographic not generally known for their patient attention to detail – are learning, not just about how critical it is to be accurate in their work, but also about some work ethics.

"Jim is very old school," says Alan. "The first teen to drill a hole in the bench has to buy lunch for everyone. So they learn to use an old piece of wood to drill a hole."

He indicates the spotless workshop. "You can see how clean the work area is. Every time we leave the workshop it's no different, every week, it looks like that.

"A lot of these kids go home and throw everything on the ground and Mum picks up after them.

"But we're not their mothers; the mentors don't do the cleaning up. The students do the cleaning up, and we insist on having it the way we want it."

That's not to say the mentors are all 'do this, do that'.

Their teacher, Karlos Bosson, says there was quite a transformation in the elders, during the first build.

"It was fascinating. They realised the students were not going to take orders that well. The mentors needed to approach them more like guides, than sergeants-major.

"The interesting thing is they won the students' respect more when they began tackling the teaching a bit differently."

Jim Evans admits to the change.

"We've learned to be more tolerant. The young ones do think differently from us oldies, and we accept that.

"But we still don't let them have cellphones in the workshop!"

> *"I mean, how many 17-year olds can say they've helped build a plane!"*

So how do the teens manage with such inflexibility from what Jim calls "us old farts".

Rian Wheeler says it isn't difficult.

"They *are* pretty tough. But they have to be. This plane is going to fly one day with people in it. In the end we really respect these guys, so it's not that hard to follow the rules."

Oliver Hunt says it helps that the mentors are "genuinely funny".

"You don't have to try hard to have a really good time with them. And that probably makes it easier to accept what they are telling you to do."

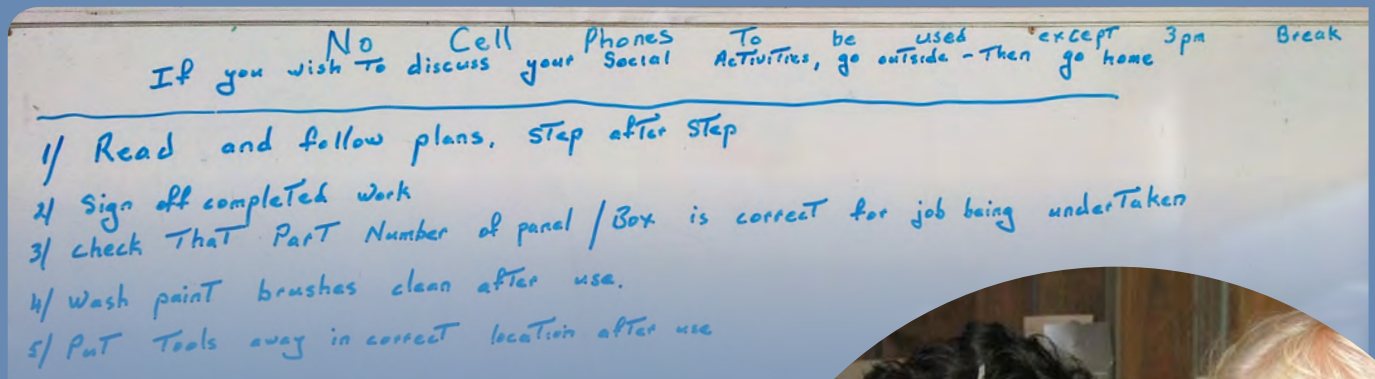
Alan says the young people, too, change during the build.

"When they first come in, there's always lots of joking. It is fun all the way through really, the bantering between the kids and the mentors is really funny.

"They've got a great sense of humour, and they test us quite often, but they also learn when it's okay to be a bit foolish, and when to be serious.

Alan Coubray explains to some of 2015's Young Eagles how the first RV-12 came together.

From left: Tom Steel, Luc Wesson, Brodie Taylor, Ryan Wensel, Alan Coubray.





Engineering student Cody Bennett (left) and mentor Bob Walters work on the first RV-12 project.

Photo: Kyla McLean, *The Plane Project*

"So when they start, it's all frolicking, but after a while they realise it's a serious thing they are doing. So yeah, they take it on board and they take some ownership of it.

"They end up more mature in their thinking and their approach."

Karlos Bosson agrees. "You could see the cocky ones become a bit more humble and respectful; the quiet ones build in confidence, and the academic spin-offs, particularly in maths, have been amazing.

"Some of them went from being so shy, you couldn't get a word out of them, to being – and this was in their other classes as well – happy to offer their opinion and ideas, and to have a meaningful conversation with their teacher.

"The same thing is happening with the second group."

Rian Wheeler says that could be partially because the mentors actually consider suggestions from the group.

"They don't just dismiss what we have to say. It makes it feel worthwhile to offer our ideas."

Oliver Hunt, who is interested in both engineering and aviation, says until joining the RV-12 project, he would 'wing' things a bit in engineering class.

"If it didn't turn out right, I'd go 'oh well', but now I try to make things a little bit more perfect."

The project has certainly gone down well with the teen builders' peers. A waiting list grew to get on the current team, as other students saw the benefits of it.

"I've got friends who've seen what I'm doing and want to get involved," says Rian, "but there aren't enough spots for everyone."

Jim says he would love to hear from other retired engineers who might want to be involved.

"We could play golf, or bowls. How boring! We all have an engineering background and love passing on what we know to the next generation."

Alan Coubray says the shared emotion of mentors and students on the day MBA first flew was really something.

"To see the pride on those young faces was truly awesome," he says, clearly still moved by the memory.

CAA's Manager of Recreational Aviation, Rex Kenny, issued the flight permit for ZK-MBA.

"I'm very impressed by the teens' dedication to constructing a quality product and doing it with professionalism and enthusiasm.

"A project like this has a significant flow-on effect into other areas of education and life skills in general. Long may it continue!"

So has the project achieved what Jim set out to do – imbue more young people with a love of flying, and engineering?

"Well," he says, "from the first build, one student went into the air force, one to a helicopter maintenance company, one to Pacific Aerospace, and a fourth got a fitting and turning apprenticeship."

Rian Wheeler, who wants to go to AUT University next year to do mechanical engineering, says the most important things he's learning are the importance of being precise, and of going back to the books and manuals for guidance.

"It's great how everything fits together perfectly. It arrives in pieces in a box and then slowly comes together. It's great watching that happen, and being a part of it."

He says the project is giving him a head start for next year.

"I mean, how many 17-year olds can say they've helped build a plane!" ■

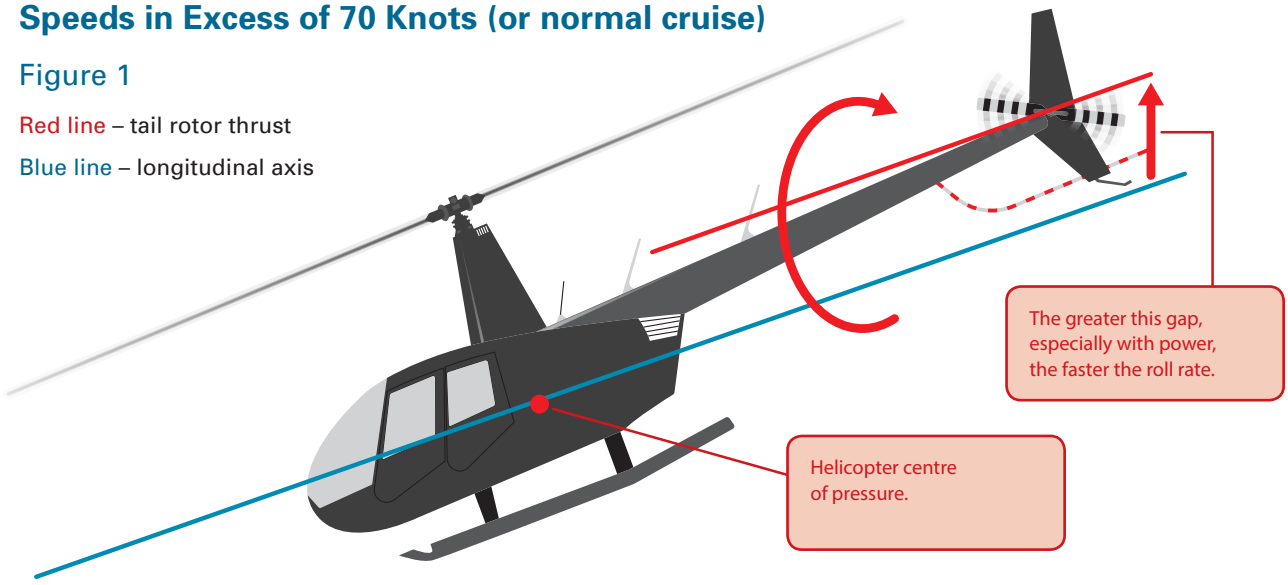
# Low G Effects – Fli

## Speeds in Excess of 70 Knots (or normal cruise)

Figure 1

Red line – tail rotor thrust

Blue line – longitudinal axis




The helicopter encounters a low G condition while in a normal nose down (tail high) cruise. The faster the speed, the higher the tail will be.

The tail rotor thrust (red line) is now above the longitudinal axis (blue line). This produces a rolling movement on the fuselage to the right.

The rotor disc does not follow the fuselage, as it is unloaded.

The mast bump occurs when the critical angle is reached. The hub contacts the mast causing a massive failure, most often due to the pilot applying left cyclic.

Helicopters with the two-bladed semi-rigid rotor system are susceptible to mast bumping when subject to negative or low G forces. It's critical that pilots fly to avoid this condition, and that they act immediately if they inadvertently encounter it.

Mast bumping is a term used to describe an impact between the rotor hub and the main rotor shaft (mast) that can cause severe damage, even detachment. It affects the two-bladed semi-rigid system.

Mast bumping is generally caused by incorrect control inputs when the helicopter is subject to negative or low G forces.

Much has been written on the topic, and it hasn't been without controversy, although those contributing to the discussion are doing so in a genuine effort to save lives.

In an effort to clarify the situation, CAA Aviation Examiner, Andy McKay, has prepared a paper to provide further education on the subject. He also invited Robinson to comment.

Here's Andy's paper:

"I want to map the relationship between speed, low G, and a low G roll on a two-bladed helicopter – specifically the Robinson.

"Low G is any loading below 1 G force (1 G is the level of gravitational pull we experience in normal conditions). Below 1 G we start to feel weightless, and above 1 G we feel more weight pressure. This is sometimes referred to as an increase or decrease in loading."

Andy takes a look at Robinson's advisory material.

**Robinson Safety Notice SN-32**

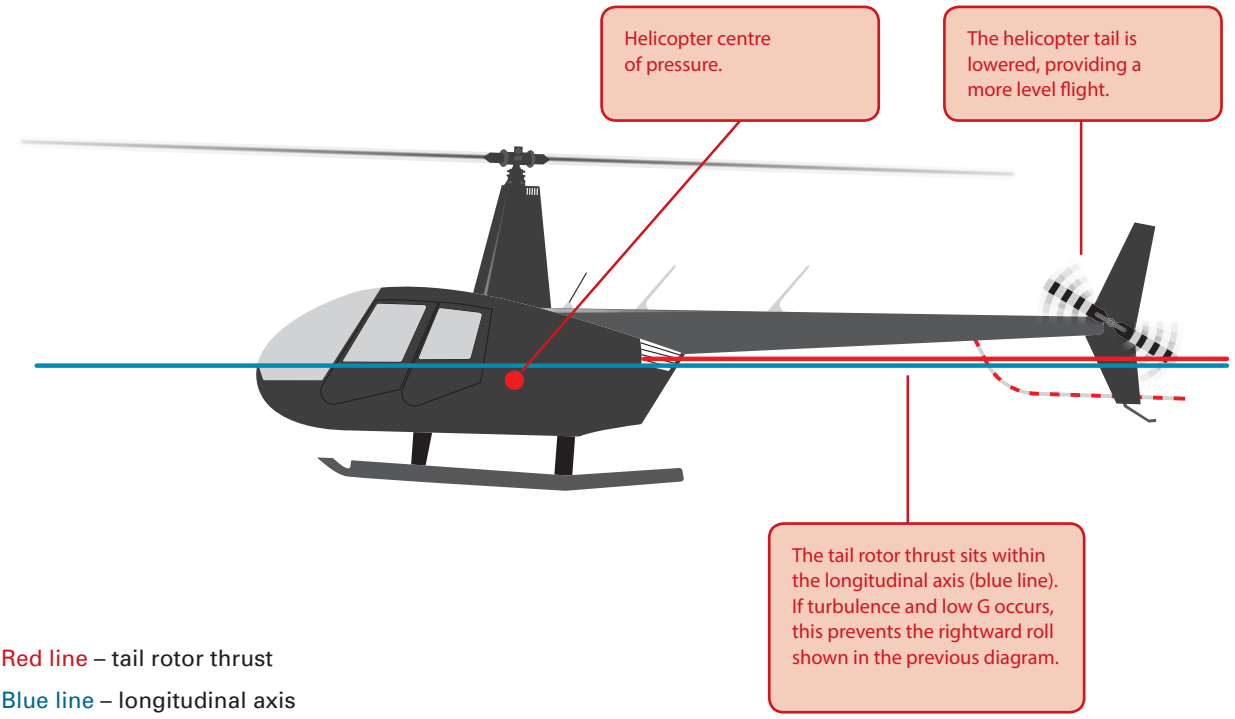
*A pilot's improper application of control inputs in response to high winds or turbulence can increase the likelihood of a mast bumping accident. The following procedures are recommended:*

1. *If turbulence is expected, reduce power and use a slower than normal cruise speed. Mast bumping is less likely at lower airspeeds.*
2. *If significant turbulence is encountered, reduce airspeed to 60 – 70 knots.*

# ght into Turbulence

## Speed Reduced to 60 – 70 Knots

Figure 2




Red line – tail rotor thrust

Blue line – longitudinal axis

3. *Tighten seat belt and firmly rest right forearm on right leg to prevent unintentional control inputs.*
4. *Do not over-control. Allow the aircraft to go with the turbulence, then restore level flight with smooth, gentle control inputs. Momentary airspeed, heading, altitude, and RPM excursions are to be expected.*
5. *Avoid flying on the downwind side of hills, ridges, or tall buildings where the turbulence will likely be most severe.*

*The helicopter is more susceptible to turbulence at light weight. Use caution when flying solo or lightly loaded.*

Andy continues:

To recover from a low G condition, Robinson recommends that pilots first apply gentle aft cyclic (to recover from the low G condition). Second, apply lateral cyclic (to recover from the right roll). If mast bumping has occurred or is suspected, land immediately. This should become second nature with training.

So why does Robinson recommend slowing down in significant turbulence?

Simply put, it's to avoid a low G induced right roll that could lead to mast bumping. Additionally, it reduces aerodynamic shock loading.

The effects of shock loading damage are often unique to each helicopter and rotor head. For example, Hughes 500 heads have a tendency to break strap packs in significant turbulence.

What constitutes 'significant' turbulence may differ from pilot to pilot. If you think the turbulence is significant, then slow down.

The G force doesn't need to be negative to have an adverse effect on a two-bladed helicopter.

Robinson typically flight test to a threshold of 0.5 G. One flight test showed that a pull up and push over in an R66 from 124 knots created a 0.478 G loading. The test pilot involved indicated that the subsequent recovery roll was at the limit of what he would have been comfortable with.

Low G demonstration is strictly prohibited now, but in the past, low G conditions were used to demonstrate what low G felt like, and roll recovery. It normally involved a gentle pushover using a power setting of 18 to 20 inches manifold pressure.

In these controlled low G conditions, the pilot could anticipate the required recovery. In normal flight, however, by the time negative G is experienced, and depending on the power applied, the roll rate is likely to be extremely high – and possibly unrecoverable.

*Continued over* ❯❯

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Photo courtesy of Robinson Helicopter Company

## Watch Out

When crossing a ridge or saddle at 70 knots or more in windy conditions, be careful not to let the nose drop excessively on the downside or leeward side, as this is a bad time to encounter low G. Remember, during any 'nap-of-the-earth' flying, especially in the mountains, in a two-bladed helicopter, always lead with collective while watching the nose and tail attitude.

However, even with low airspeed and less power in use (provided the tail rotor is still producing thrust), the helicopter can still roll if the tail rotor is significantly above the longitudinal centre of gravity – the roll rate will just be lower. Be especially careful when climbing up to a high saddle from a valley where turbulence was present. If you abort the crossing and turn downwind and downhill, allowing the nose to drop excessively in the process, the resulting loss of horizon and high tail attitude will put you at risk.

## Prevention

In significant turbulence, you will often feel a combined increase and decrease in loading as the helicopter reacts to disturbed air. Most of the time, the situation should correct itself without the need for any significant control input. However, during a prolonged decrease in loading, a low G condition may develop and you need to be prepared.

But rather than dealing with the symptoms, the best defence is conservative flying. Speed control is one means of achieving that.

With experience, you should learn to anticipate where turbulence is likely, and either slow down, or avoid it entirely.

Remember that the lighter the helicopter, the more susceptible it is to low G. Additionally, the higher the speed (ie, an R66 at 130 knots) the longer it takes to reduce to 60 – 70 knots. Additionally, the higher the speed and power setting, the higher the roll rate if low G is encountered.

Figure 1 illustrates a helicopter encountering low G conditions in excess of 70 knots. In contrast, figure 2 depicts a helicopter flying 60 – 70 knots.

The tail rotor's position relevant to the longitudinal centre of gravity is extremely important. Simply put, in a low G situation at speeds above normal cruise, the tail rotor thrust sits above the longitudinal centre of gravity. That may cause a roll to the right.

At speeds of 60 – 70 knots, the tail rotor thrust sits within the centre of gravity, reducing the chance of a right roll.

## Robinson's Comments

Timothy Tucker, Robinson's Chief Instructor, provided a response to Andy's submission. Here's a summary:

*We would like to emphasise there are three main reasons to slow down in turbulence:*

*1. At slower speeds the effect of the turbulence, hence the amount of low G, is greatly reduced.*

*2. Less power means less tail rotor thrust to roll the helicopter.*

*3. At slower speeds the location of the tail rotor relative to the aircraft's centre of gravity will reduce rolling tendencies.*

*Another point that needs to be emphasised is the importance of the weightless feeling as a key to recognition of the low G condition. In many instances, this weightless feeling will occur well before the right roll, making a recovery possible before the roll ever begins.*

*There seems to be a growing perception in New Zealand that lowering the collective is a preferable method and a more instinctive response to recover from a low G condition. This was quite evident to me in November last year when I conducted a one-day seminar in the North and South Island.*

*We think the most important focus should be on the weightless feeling caused by the low G condition, which can occur before the roll even starts and is when a recovery should be initiated.*

*Aft cyclic treats the cause, down collective treats the symptom. We also feel the cyclic is the first control pilots naturally use to effect a change in aircraft attitude.*

*Lowering the collective will cause a momentary pitching down of the nose, which could aggravate the roll.* ■

The November/December 2013 issue of *Vector* included an article by long-time pilot and instructor, Simon Spencer-Bower. A subsequent comment from a reader was published in the March/April 2014 issue.

In response to a number of accidents involving Robinson helicopters in the last few years, the CAA issued a consultation document in April 2015 exploring the need for changes in regulation. Consultation has since closed, but you can still view the document on the CAA web site, www.caa.govt.nz, "General Aviation".

This could result in changes to an Advisory Circular (AC). To be advised of any changes to rules or ACs, subscribe to our email notification service, www.caa.govt.nz/subscribe.

# **Proactive** Always Better Than Reactive

With the move by the CAA to base its initiatives on risk rather than compliance, it needs more information about what's happening 'out there'.

The huge increase in operations by Remotely Piloted Aircraft Systems – RPAS, or drones – has generated a tsunami of what the CAA calls "Aviation Related Concerns" (ARCs).

People can report an ARC if they are uneasy about the safety or security of some aspect of aviation practice in New Zealand.

The CAA receives about 400 reports a year.

But they're not part of the information the CAA receives under Part 12 *Accidents, Incidents, and Statistics*, or serious harm injuries reported under the Health and Safety in Employment Act 1992.

Roger Shepherd, CAA's Investigating Officer of ARCs.

"It might be a low-flying aircraft or someone talking on a cellphone during flight," says CAA's Investigating Officer of ARCs, Roger Shepherd. "Or it could be substandard maintenance on an aircraft or spray drift from helicopters."

To report an ARC, anyone can call 0508 4SAFETY (0508 472 338), or email isi@caa.govt.nz.

'Anyone' includes members of the public, an aviation participant, CAA personnel, or other government organisations.

While ARCs can be filed anonymously, that makes it very hard for Roger to investigate.

"People worry about the activity they're reporting ending up in prosecution, but very few cases go that way," says Roger.

They would only be the very serious ones, like the guy who flew his RPA in front of an approaching tow plane.

Often, the CAA's response to an ARC is to talk with the person involved, about their possibly unsafe operation.

"Some require nothing more than a quick call or an email.

"Most people are really grateful for the information, and it's important the CAA hears both sides of the story," says Roger.

The ARCs pouring in about RPAS are allowing the CAA to understand how widespread drone-related problems are.

That information is vital as it tries to mitigate the risk of RPAS operations without quashing their commercial potential.

However, Roger says it's not just RPAS blunders the CAA needs to hear about.

"We really rely on everyone in aviation, and on the ground, to let us know if something they see concerns them.

"Every ARC is potentially a 'puzzle piece' that, when put together with other puzzle pieces, allows us to see, as much as possible, the whole safety picture.

"ARCs help the CAA to be proactive about risk, rather than reactive to catastrophe," he says.

"Given that people voicing their concerns potentially saves money, machines and lives, regular ARC reporting is a no-brainer really" ■

The Ministry of Transport's current review of the Civil Aviation Act 1990 may result in changes to some of the current CAA processes described in this article. Any amendments to the Act are unlikely to be in force before 2016.

# Everybody Needs **Go**

Sometimes, in areas of high traffic, aviators need to take a proactive approach to manage their noise 'footprint'. That calls for a conscious effort to minimise the burden on surrounding land owners.

Often aero clubs, aerodromes, and other working groups establish 'fly neighbourly' procedures to reduce the impact of their noise in sensitive areas.

By being proactive and engaging with the community, local aerodromes can help promote flying neighbourly, as proved by the Motueka Aerodrome Operations and Safety Committee.

Recently, Motueka aerodrome advocates met with local residents to discuss aerodrome operations. Residents raised concerns about "invasive and destructive" aircraft noise.

As a result, the Motueka Aerodrome Operations and Safety Committee revised their Memorandum of Understanding (MOU) to include neighbourly flying procedures.

The MOU is included in the Motueka Aerodrome Management Plan, which can be found on the Tasman District Council web site, www.tasman.govt.nz, search "MOU".

## Taieri Transit Lane Troubles

In 2014, Dunedin's Taieri VFR Transit Lane T957 was extended to reduce congestion and accommodate circuit traffic.

Unfortunately, following that change, some operators began to cut the corner of the control zone at East Taieri, without a clearance from Air Traffic Control (ATC).

Raymond Bremer, President of the Otago Aero Club, explains that a number of those airspace busts can be attributed to the rising terrain within the transit lane – which also creates problems for local residents.

"When travelling south, some people follow the T957 from Riccarton Road to Saddle Hill. However, on this route it's not possible to remain at 1100 ft and reach T956 without breaching minimum ground height.

"Additionally, if you're flying within T956 at 1500 ft along the ridge of Saddle Hill, there's only a few hundred feet between the aircraft and the ground. This is both illegal, and offensive to those on the ground with houses, farms, and livestock.

"In the interests of good neighbourly relations, I suggest that those wanting to remain within the transit lanes should track via the motorway or along the Chain Hills," says Raymond.

Roger Shepherd, CAA Investigating Officer, reminds pilots that ATC instructions, or airspace vertical limits depicted on a Visual Navigation Chart, are no excuse for breaching minimum height rules – there are few exceptions.

"There are literally ways around the problem. You can take another route, or for those with transponders, ask Dunedin ATC for a clearance," says Roger.

## Low Flying Zones (LFZs)

AIP ENR 5.3 s2 *Low Flying Zones* describes an LFZ, and lists the respective 'using agencies'. The using agency (usually a flight school or aero club) is responsible for LFZ oversight.

Rule 91.131 *Low flying zones* contains the requirements for operating in an LFZ. That includes the requirement for authorisation by the holder of a flight instructor rating and being briefed on operating procedures. That briefing would include any noise abatement procedures by the using agency.

LFZs are established (with the consent of affected landowners) when the Director approves a location in accordance with the provisions of rule 71.163 *Low flying zones*.

Photos: istockphoto.com/L-Hamilton, istockphoto.com/AndyGaylor, and istockphoto/speedkup

# od Neighbours

When entering an LFZ, maintain 500 feet agl until you cross the boundary. During LFZ operations, keep your flight path away from any livestock or buildings, and take extra care when climbing or descending. It's a good idea to keep high ground between your aircraft and any noise-sensitive areas, where possible. When vacating, you need to be 500 feet agl before reaching the boundary.

The use of an LFZ is a privilege, not a right. As the pilot, it's your responsibility to follow the operating procedures while keeping an open dialogue with the using agency.

By the same token, the using agency needs to communicate with affected landowners, and satisfy the Director that it has their continued consent. If land changes hands, the using agency must advise the CAA, and gain the consent of the new land owner.

## Reducing Noise Nuisance

Before flying, you need to be aware of any MOUs or procedures that could affect your planned flight. That comes down to local knowledge and prior planning.

Your departure path should keep you clear of noise-sensitive areas, but not at the expense of your safety.

It's worth emphasising that houses, particularly those in rural areas, shouldn't be used as reference points for training or other manoeuvres.

In residential areas, noise nuisance is often judged by the level of ambient background noise present at the time. If you need to operate near a populated area, try to avoid flying between late evening and early morning.

Marc Brogan, CAA Examiner of Flight Training and Flight Operations, says don't dismiss feedback from the public.

"If you receive feedback, in-house or otherwise, welcome it. Also, keep good records of any issues that occur."

### Fixed Wing

To reduce noise nuisance when departing, you should commence your takeoff from the runway threshold, reducing climb power as soon as safe and practicable.

### Helicopters

Martin Gambrill, CAA Flight Operations Inspector of Helicopters, says that helicopter noise levels vary depending on the size of the helicopter and design of the main and tail rotor systems.

"Piloting technique can greatly reduce noise footprints. Try to avoid high energy manoeuvres such as rapid roll rates and pitch change that will cause 'blade slap' – fly smoothly.

"Avoid prolonged hovering near noise sensitive areas and flying a steep takeoff profile to minimise noise exposure," says Martin.

The *Fly Neighbourly Guide*, produced by the Helicopter Association International, also refers to blade slap, commenting that high tip-speed rotor designs flown at high airspeeds are the worst offenders.

It recommends minimum altitudes for helicopter pilots when flying over noise-sensitive areas:

» Light/small helicopters should fly at no less than 1000 ft agl

» Medium helicopters should fly at no less than 2000 ft agl

» Heavy/large helicopters should fly at no less than 4000 ft agl.

The guide also outlines how temperature affects noise.

Temperature has two effects on sound. One is the tendency of warm air to be more turbulent than cool air, and therefore, to disperse and decrease its nuisance effect.

Temperature also decreases with altitude. Lower temperatures lead to higher advancing blade tip speeds, which increase the magnitude of blade slap. ■

# Improving Dual-Flight Training Through Accountability

Following a spate of dual-flight training accidents, the CAA decided to look at what was going wrong. Bill MacGregor, CAA Principal Aviation Examiner, thought it was important to get the initial findings out there, although the final report is yet to be completed.

"We identified 27 areas of concern under the overarching theme of 'accountability'," says Bill. "There were four major subsets to that: supervision, training model, record keeping, and type ratings."

## Supervision

"It's important that supervision by the organisation of the instructor, and by the instructor of the student, is both direct and indirect," says Bill. "It's not a case of box-ticking. It must be transparent, documented and meaningful."

Bill says that in a group of instructors, each instructor should have a small number of students they're responsible for – there should be only one instructor responsible for each student's training programme.

The instructor should follow their student's progress closely and document that supervision, including debriefs with flight examiners following flight exams.

"Candidates often hear only what they want to hear in a debrief," says Bill. "So it's essential that the supervisor attends examiner debriefs. That really helps focus on which areas need improvement."

Supervision also includes taking real responsibility for the student's progress. As an instructor, you're responsible and accountable for the standard your student achieves. You must take ownership of your student and be sure that when they've completed their training, and you assess that they are competent to sit the test, that they actually are.

## Training Model

For any flight training to succeed, the flight training organisation must use a good instructional technique.

"Our investigations have shown cases where bad habits were taught to instructors and are now being passed on to students," says Bill.

"Or sometimes, even the basics aren't right. It might be obvious, but your organisation must have a sound course syllabus established, with all necessary course material, facilities, and equipment easily available. And of course, competent instructors."

Once a flight training programme is established, it should be reviewed regularly, and managed by the organisation.

"We encourage students to actively participate in their own progress. Students should be encouraged to take an active interest in 'where they are' against the syllabus. Therefore, the

Photo: istockphoto.com/liaj

course syllabus should be easy for all participants to view.

"That also makes it easier for instructors to actively manage student progress and intervene early when problems arise," says Bill.

The training model used must ensure that the syllabus is covered and that the results are correctly documented.

New instructors (C-Cats) should be given a dedicated student who they instruct through a complete course.

"This will help the instructor develop their instructing technique," says Bill. "They'll be able to focus on the student while seeing how course exercises tie together to build the end product. They'll also gain a greater understanding of the learning process in action.

"An important area to look at is students who are self-funding. Learning to fly is expensive and often students will take long breaks between lessons if they don't have enough money to regularly pay for lessons.

"When they come back after a long break, they may need some revision to get back to their pre-break level of competence," says Bill.

When a student is moving on to solo flights, they must be assigned specific objectives. Before the student is launched on solo navigation exercises, the instructor must ensure that the student holds the flight navigation exam credit, and that the map reading exercise is complete.

## Record Keeping

Logbooks should be supervised and correctly completed – remember they are a legal document and should be neatly maintained.

"We recommend a training session on logbooks, as that would go some way to improving the standard of presentation," says Bill.

"Often the 'Details of Flight' column is too vague, referring to 'circuit practice' rather than going into proper detail such as 'circuits, X-wind, flapless'."

Signatures in logbooks show legal accountability, so should only be signed if they are true. Flight test fails should also be recorded in both the logbook and training records.

"Some people try to dress up test failures as 'mock' tests. However there's no shame in failing a test flight – it's a learning opportunity. Record the test for what it was, and record remedial flights too," says Bill.

Training records should be supported by logbook entries: organisation records should show ground and flight training details, and logbook details should reflect training conducted.

## Type Rating

Minimum standards are just that – the minimum prescribed time for type should not be considered the maximum.

"A minimum is not a target," adds Bill. "Competence is. Once type rated, a pilot is entitled to exercise the privileges of pilot-in-command and we must ensure the pilot is competent to exercise those privileges."

Bill says that competence should be the driver, not flying time or cost.

"Trainers are accountable for the level of competence attained by the pilot being type rated. Would you be happy for your family to fly as passengers with that pilot after completing the type rating training you've delivered?"

## Who is Accountable for What?

### Overall Accountability

Has the organisation done its best? Is the CEO prepared to stand in front of a coroner and state that the organisation has done its best?

### Supervisor Accountability

Has the primary supervisor done their best for the new C-Cat? Can the primary supervisor say they effectively supervised and mentored the C-Cat through their direct supervision period, or did they just tick boxes?

### Instructor Accountability

Has the instructor done their best for their student? Have they delivered all the training required that the student needs to sit the test?

### Examiner Accountability

Has the examiner checked that the candidate is fully prepared for the test, with all syllabus items covered and signed for? Can the examiner say they've examined all the paperwork presented for the flight test? If the requirements haven't been met, will they refuse to proceed?

### Accountability Is Everyone's Business

Everyone with an active role in the flight training system has some accountability for the performance of that system. Are you playing your part? ■

# How to Teach **Met**

If your efforts to teach meteorology are met with glassy-eyed stares, look no further than the 2015 Flight Instructor Seminar.

The two-day Flight Instructor Seminars are targeted at new C-Category (Aeroplane/Helicopter), and microlight, flight instructors. However, you're welcome to register regardless of your experience level.

Greg Reeve, MetService forecaster, will present this year's seminars. He acknowledges that teaching Met proves to be a major challenge for most flight instructors.

"A lot of people approach teaching Met with a negative attitude. I think that's mainly because it wasn't taught all that well in the past.

"In these seminars, I'm going to discuss how to teach Met, how to simplify it, and how to make it interesting," says Greg.

There's no 'one size fits all' approach. Met can be taught in a range of ways and everyone absorbs information differently. It's good to have some tools up your sleeve, especially when a topic proves difficult. Greg thinks the key to getting across the concepts is to make them relatable.

"I use everyday examples, often things not necessarily related to aviation, which will help students understand the concepts. For example, you feel cold when you get out of the shower – why is that? The water on your skin is evaporating and the evaporation process requires latent heat. The heat gets taken from your body – hence the cold feeling.

"That example brings the latent heat process into a sharp focus, which is very important when learning about cloud formation and icing."

## About Greg

Greg joined the MetService in 1977 as a weather observer, and spent the next eight years between the Whenuapai and Auckland city Met offices. During 1985 and 1986, he installed and maintained weather stations around the North Island.

In 1987 he trained to become a forecaster and his first day as a solo forecaster was on 7 March 1988 – the day Cyclone Bola hit the north of New Zealand.

From 1998 he specialised in aviation meteorology, until 2004 as a forecaster, then as manager of the Met office at RNZAF Base Whenuapai. At present, he works under permanent contract at Ohakea as an aviation meteorology instructor.

Greg was instrumental in the creation of the 2015 AvKiwi Safety Seminar, *WX Matters*. He's also writing a book for PPL pilots which he expects will be complete by the time his Met seminars begin.

## Don't Miss Out

Thanks to sponsorship from Aviation Services Limited, the CAA has been able to keep the cost of the seminar to $160. It includes all meals and twin share accommodation.

Flight training organisations are encouraged to contribute by sponsoring the attendance of their flight instructors.

| | |
|---|---|
| **04 to 05 Aug** | Masterton – Solway Hotel |
| **11 to 12 Aug** | Hotel Ashburton |
| **18 to 19 Aug** | Auckland – Spencer on Byron Hotel |

Registration forms are available on the CAA web site, www.caa.govt.nz, "Seminars and Courses – Flight Instructor Seminar". ■

Photo: istockphoto.com/gabrieleckert

# How the **AMC Process Works**

For most pilots, a medical exam is a straightforward process. However, if you don't meet the prescribed medical standards, flexibility may allow you and your medical examiner to work out a way to keep you in the air.

Usually a medical certificate can be issued the same day as an examination. But if you don't meet the prescribed medical standards, your medical examiner – who is acting for the Director of Civil Aviation – may further consider the case by relying on 'flexibility'.

For flexibility to be used, the medical examiner must first obtain and consider an Accredited Medical Conclusion (AMC). An AMC is a conclusion where one or more experts consider your application.

"The AMC's purpose is to ensure aviation safety is maintained, even when you may not meet the prescribed medical standards," says Judi Te Huia, CAA's Team Leader of Aviation Medicine.

Every AMC application is different. Some are straightforward and can be decided on the same day, while others are more complex and may take longer.

"Often the applications that do take longer require further clinical or medical information," adds Judi.

"Therefore it's really important to supply as much information as possible, when requested, to ensure your application is processed in a timely manner.

"That means, even if you do need to apply for flexibility, you usually don't need to be examined again. The experts will rely on the clinical or medical information you have supplied."

At this point, if you decide to cancel your AMC application, you need to advise your medical examiner, or the CAA, in writing. That means your medical application will be declined.

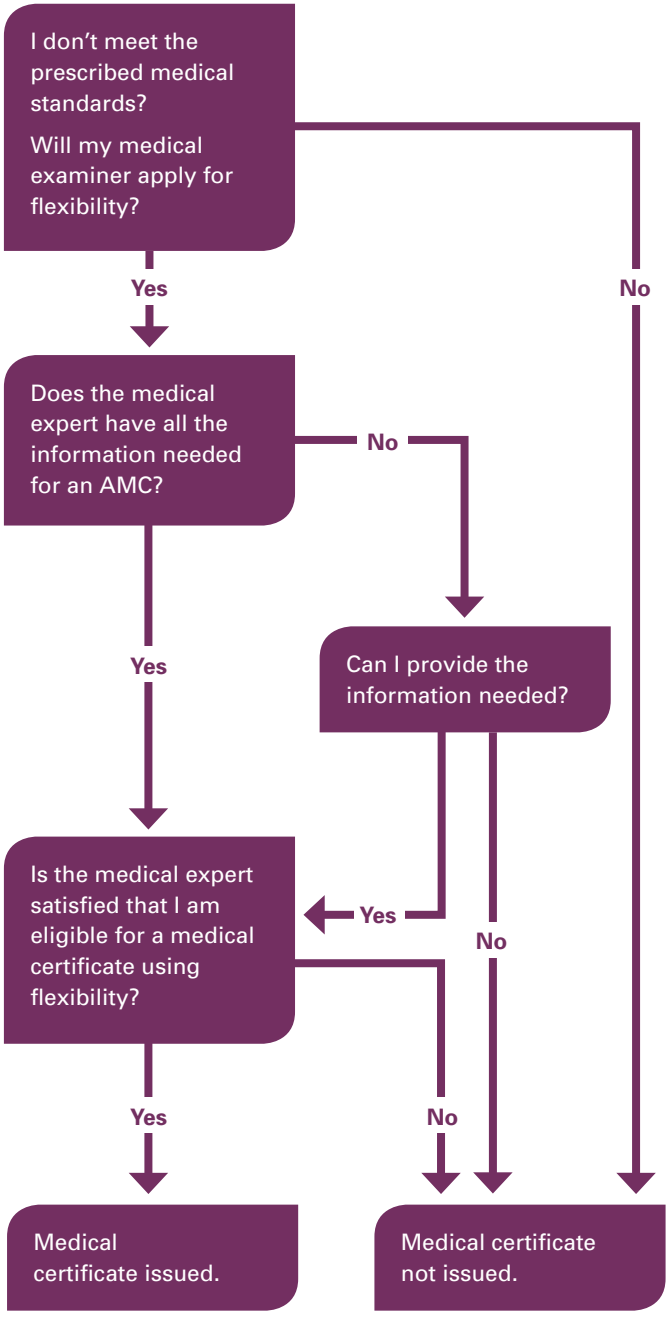
## Review and Appeal Options

If you're unhappy with the outcome of your medical certificate application, you have a number of options. The most often used is to seek a review by the Convener. There's information about this on the CAA web site, www.caa.govt.nz, "Medical – Convener".

Further steps are also outlined on the web site, such as a District Court appeal. You should seek independent legal advice if you want to pursue the court options.

## MOT Review

As part of its review of the Civil Aviation Act 1990, the Ministry of Transport is looking at medical issues, including flexibility. You can stay up to date with this by going to www.mot.govt.nz, "Air – Civil Aviation Act 1990 and Airport Authorities Act 1966 review". ■




This diagram doesn't include any review process. It should be considered in conjunction with the Civil Aviation Act 1990, the Civil Aviation Rules, the Aviation Medical Transitional Criteria Notice 2002, General Directions, and the Medical Manual. This diagram does not replace or override any of those documents.

# Water Aerodrome Operations

Is it an aircraft? Or is it a motor boat? Actually, it's both. If you fly a seaplane, your aircraft is also considered a "motor boat" under marine laws when you use water aerodromes or water alighting areas.

In such situations, you must follow both marine and aviation rules, and any other applicable bylaws, such as those made by the local council.

For example, while choosing an alighting area, you should follow Civil Aviation Advisory Circular AC139-7 *Aerodrome Standards and Requirements – Aeroplanes at or below 5700 kg MCTOW – Non Air Transport Operations*.

The AC states that the depth of the water channel should provide a 1 m clearance below the hull or floats of the seaplane (also known as a floatplane or amphibian) when it is stationary at maximum all-up weight. Also, a water channel should be clear of both stationary or moving vessels and other objects during flight operations. The minimum width of the water channel should be 60 m.

When your aircraft is on water it is considered to be a motor boat, and you must comply with maritime law.

Maritime Rules Part 91: *Navigational Safety Rules* specifies that any vessel, including a seaplane, must not exceed 5 knots in any of the following situations:

- within 50 metres of any other vessel, raft, or person in the water; and
- within 200 metres of any wharf or jetty, or
- within 200 metres of a diver buoy (blue flag with white diagonal).

Maritime Rules Part 22: *Collision Prevention* states that a seaplane on the water must, in general, keep well clear of all vessels and avoid impeding their navigation. However, if there is a risk of collision, the seaplane must follow the same rules as a motor boat.

## Auckland Harbour

Other permissions may also be required to operate your seaplane out of, or into, specific water alighting areas.

For example, an exemption from the Auckland Harbourmaster, and written approval from the aerodrome operator, are required to operate out of the Auckland Harbour water aerodrome. Auckland Seaplanes operates this water aerodrome (see *AIP New Zealand,* Vol 4).

This alighting area is also close to Mechanics Bay. Several helicopters, such as the police and Westpac Rescue, operate out of Mechanics Bay.

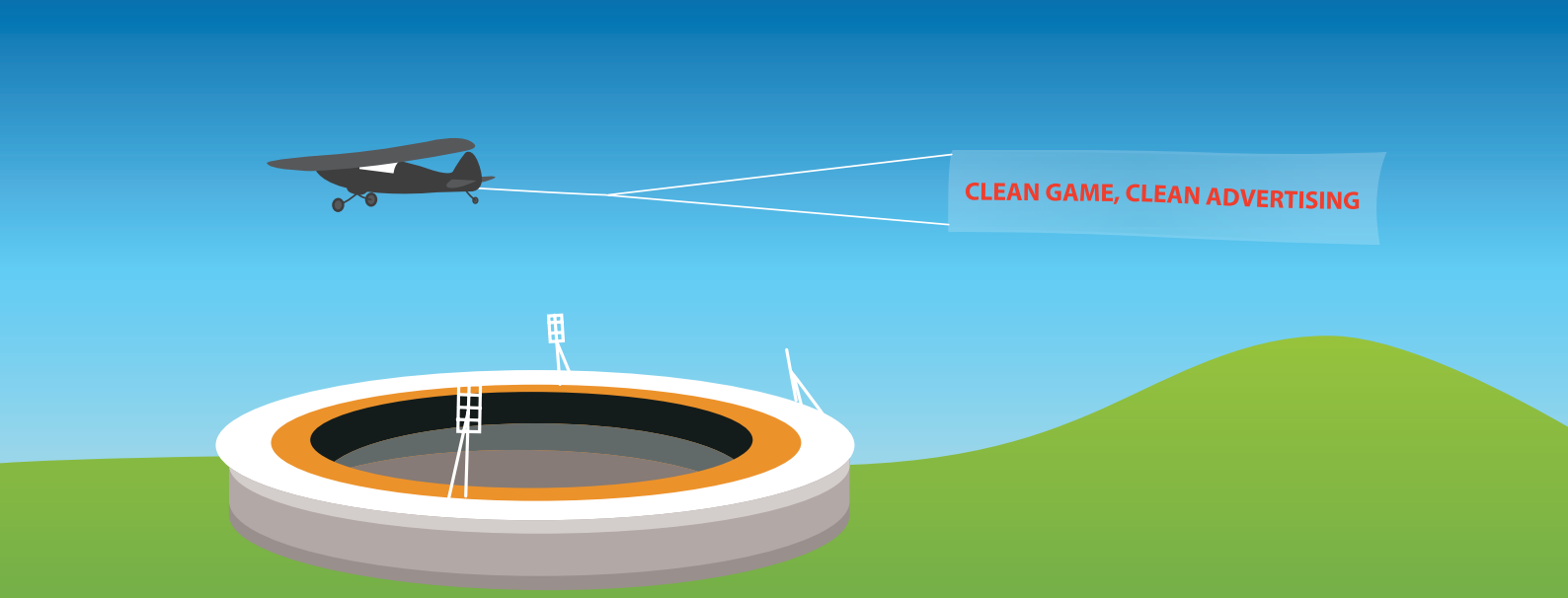
As usual, constantly listening out and looking out is essential, as the Auckland MBZ is very busy airspace.

## More Information

CAA Advisory Circular AC139-7 & AC91-15 (it's just one AC) is available on the CAA web site www.caa.govt.nz, "Advisory Circulars".

Maritime Rules Part 91 *Navigational Safety Rules,* and Part 22 *Collision Prevention,* are available on the Maritime New Zealand web site, www.maritimenz.govt.nz, "Rules". ■


Photo courtesy of Auckland Seaplanes. The registration of their De Havilland Beaver is the same used by a 1940 Short Empire Flying Boat that operated between Australia and New Zealand.




# **Banner Towing's** Potential Hidden Cost

Towing a banner behind your aircraft may seem like a quick and easy way to make a few bucks, but if you're doing it around a stadium during a major event, it may end up costing you thousands of dollars.

Aerial advertising is not new. In fact, in 1902 the first British-built airship carried an advertisement for Mellin's infant food. Since then we've seen everything from blimps (the Good Year blimp probably being the most famous), to shaped hot air balloons, and probably the most common, banners being towed behind planes.

Studies have shown that banner tows are very effective advertising tools with a very high recall and retention rate – perhaps because of the rather unusual method that the advert is displayed.

However, if you're thinking of flying a banner behind your aircraft near a stadium full of people at a major event, then you need to do some research.

## Special Use Airspace

The CAA can only restrict airspace if there is a compelling safety reason to do so. Usually, this is because of high air traffic density, such as many helicopters covering a single event. Sometimes procedures developed by user groups mean that restricted airspace isn't necessary.

Pilots will be well aware of the need to check the AIP Supplements and NOTAMs for special use airspace. But now you also need to consider 'major events' and be aware that these are not notified in the aviation system.

## What is a Major Event?

In 2007, the Major Events Management Act (MEMA) was passed to ensure major events in New Zealand were run efficiently and to protect the rights of official event sponsors. The Governor-General can declare an event a 'major event' providing it meets certain criteria, particularly around size and exposure of the event. Examples of major events include Rugby World Cup 2011, ICC Cricket World Cup 2015, and the upcoming FIFA Under-20 World Cup New Zealand 2015.

## Clean Zones

During a major event, 'clean zones' – usually the venues and surrounding areas where fans are likely to be concentrated – can be declared for a specified period (usually the day of the event). The clean zones and periods can be found in the *New Zealand Gazette.*

During a clean period, unauthorised advertising – unless it is by an existing business honestly carrying out its ordinary activities – is prohibited within the clean zones and anywhere clearly visible from within the clean zone. It's this provision which applies to aerial advertising. While you may not be flying directly over the stadium, if the banner is visible, it's still going to be covered by the MEMA's "ambush marketing by intrusion" provisions.

## Penalty

The penalty for breaching these provisions of MEMA is a fine up to $150,000. For more information, visit the Major Events section of the MBIE web site at www.med.govt.nz/majorevents. ■

# Satellite-based Augmentation Systems (SBAS) – **Installation Warning**

Photos: istockphoto.com/johan63

When installing a GPS unit for IFR under a foreign Supplemental Type Certificate (typically, FAA approved) or as a modification, design organisations and installers need to understand how the equipment functions in New Zealand. Appropriate flight testing must be completed before approving the operation of the unit.

Wayne Thomas, CAA Team Leader Avionics, warns that a large percentage of operators are using potentially invalid SBAS satellite guidance without realising it.

"ICAO Annex 10 requires that each state defines SBAS service areas, and approves SBAS-based operations within its airspace. Both MSAS (Japan) and WAAS (USA) SBAS satellites are received here in New Zealand, but we are outside their defined service volume," says Wayne.

When a GPS unit receives signals from those satellites with incomplete correction data, it may start functioning in an unpredictable or undesirable manner. In some cases, units may attempt to conduct inappropriate approach procedures.

For more information, email Wayne Thomas: wayne.thomas@caa.govt.nz. ■

# **Free Poster** and Bookmark

This month's *Vector* comes with a poster and bookmark.

## Civil Aviation Rules and Advisory Circulars Poster

We have enclosed an updated version of the Civil Aviation Rules and Advisory Circulars poster. One of the key things to be aware of is the introduction of Part 102 that comes into effect on 1 August 2015. See "New Rules for RPAS" on page 3.

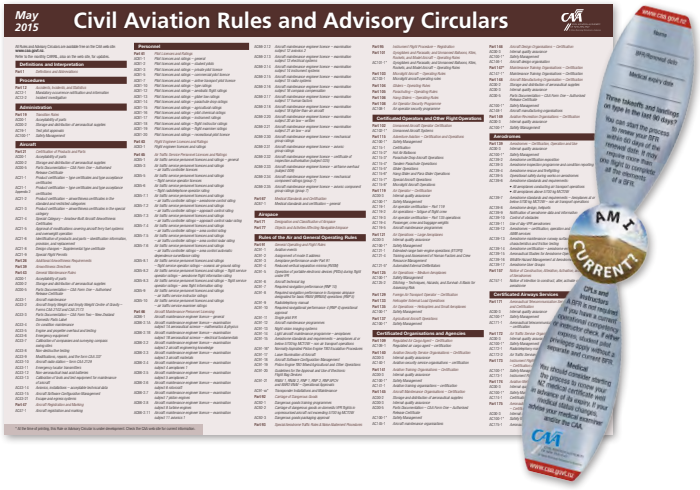
Please replace any older versions you have with the new chocolate coloured poster. The Rules and Advisory Circulars are updated reasonably frequently, so make sure you subscribe to our email notifications at www.caa.govt.nz/subscribe and keep an eye on the "Policy and Rules" section of the CAA web site.

## Bookmark

We have also enclosed an updated version of the *Am I Current?* bookmark. One side reminds you of what you need to do to maintain currency – whether that be a medical certificate or a BFR.

The second side provides some details about the Human Intervention Motivation Study (HIMS) programme for aviation participants which can help if you, or someone you know, is affected by an alcohol or drug addiction problem. HIMS offers advice and assistance with seeking help from professionals, and getting back to work once the problem is controlled. HIMS uses confidentiality protocols. For more information see www.hims.org.nz.

For additional copies of the poster or bookmark, email: info@caa.govt.nz. ■



# Maintenance Controller Courses

The CAA's three Maintenance Controller Courses for 2015 in Queenstown, Taupo, and Auckland, have been so popular that two more have been scheduled:

### Tauranga – 26 to 27 August

Oceanside Resort and Twin Towers
1 Maunganui Rd, Mt Maunganui, Tauranga

### Wellington – 21 to 22 October

Civil Aviation Authority of New Zealand
Level 15, 55 Featherston Street, Wellington

### Register Online

You can register for the course online by going to the CAA web site, www.caa.govt.nz, "Seminars and Courses".

Your place on the course is not confirmed until payment is received. Payment options are internet banking or credit card.

Course numbers are strictly limited so register quickly.

### Correction

In the article "IFR – Taking the Training Wheels Off", March/April 2015 *Vector*, we incorrectly stated that air traffic controllers are responsible for terrain separation.

Air traffic control objectives, as prescribed in ICAO Annex 11, do not include prevention of collision with terrain. It remains the pilot's responsibility to ensure that any clearances issued by air traffic control units are safe in this respect.

## 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

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 |
|---|---|---|
| 8 Jun 2015 | 15 Jun 2015 | 20 Aug 2015 |
| 6 Jul 2015 | 13 Jul 2015 | 17 Sep 2015 |
| 3 Aug 2015 | 10 Aug 2015 | 15 Oct 2015 |

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2015.

## Aviation **Safety Advisers**

Contact our Aviation Safety Advisers for information and advice. They regularly travel the country to keep in touch with the aviation community.

**Don Waters** (North Island)
Tel: +64 7 376 9342
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Mobile: +64 27 485 2096
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**Carlton Campbell** (South Island)
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Tel: +64 9 267 8063
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Tel: +64 3 322 6388
Fax: +64 3 322 6379
Mobile: +64 27 285 2022
Email: Bob.Jelley@caa.govt.nz

## Report Safety and Security Concerns

*Available office hours (voicemail after hours).*

**0508 4 SAFETY**
(0508 472 338)
**isi@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)
**www.caa.govt.nz/report**
*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-JFZ Cessna 152

| | |
|---|---|
| Date and Time: | 29-Jun-14 at 13:47 |
| Location: | Ardmore |
| POB: | 2 |
| Injuries (Serious): | 1 |
| Damage: | Substantial |
| Nature of flight: | Training dual |
| Pilot Licence: | Commercial Pilot Licence (Aeroplane) |
| Age: | 27 yrs |
| Flying Hours (Total) | 404 |
| Flying Hours (on Type) | 31 |
| Last 90 Days: | 30 |

While approaching the aerodrome on completion of a PPL dual cross country training flight, the aircraft engine lost power due to fuel exhaustion. A forced landing was carried out into a paddock, but the stopping distance available was insufficient and the aircraft rolled through a fence and then overturned as it entered a drainage ditch running along the boundary of the paddock.

The student pilot was unhurt but the instructor received moderate back injuries.

When the aircraft was recovered from the paddock, approximately 2.5 litres of fuel were removed from the fuel tanks. There was no indication of fuel spillage at the accident site.

Both the instructor and student stated that on dipping the fuel prior to departure there were approximately 38 litres of fuel on board as measured on the fuel dipstick.

Unable to uplift more fuel at the departure aerodrome as they didn't have the appropriate fuel card, and no local personnel were present to assist, the crew calculated that for their planned flight time of 55 minutes they had sufficient fuel for the flight plus the required reserve. During the flight, as the aircraft passed NZNE, the crew again assessed the fuel situation and confirmed for themselves that they should have sufficient fuel.

The aircraft's fuel supply was exhausted approximately 2 NM from the home aerodrome while the aircraft was established on a wide base leg for the runway.

The CAA safety investigation found that neither the instructor nor the student were aware that the fuel dipstick was calibrated and marked for 'total' fuel and that 6 litres needed to be subtracted from the total fuel measurement for the C152.

Neither person had been taught during their training that aircraft fuel dipsticks may be calibrated in either 'useable' or 'total' fuel quantity.

It was also found that the fuel dipstick carried in the aircraft was for another C152 (clearly marked on the dipstick), and after comparison with two other C152 fuel dipsticks, the one carried in the aircraft was found to be approximately 3 to 4 litres over-reading at both the 10 and 20 litre graduation marks.

With the crew unaware of the 6 litres unusable fuel, plus the approximate 6 to 8 litre total calibration error of the fuel dipstick, the crew were unaware that the useable fuel they departed with was only approximately 24 litres. The flight time had been calculated to be 55 minutes (22.5 litres @ 25L/Hr).

The crew had decided to depart thinking they had sufficient fuel. They were caught out by their lack of knowledge about useable fuel, and also the use of a fuel dipstick that had been calibrated for another C152.

CAA Occurrence Ref 14/2869

## ZK-TPO Piper PA-25-235

| | |
|---|---|
| Date and Time: | 30-Dec-14 at 14:10 |
| Location: | Taupo |
| POB: | 1 |
| Injuries: | 0 |
| Damage: | Nil |
| Nature of flight: | Towing |
| Pilot Licence: | Private Pilot Licence (Aeroplane) |
| Age: | 59 yrs |

Right-hand undercarriage collapsed on landing. The aircraft is fitted with undercarriage safety cables which prevented damage to the aircraft.

Maintenance investigation found that the bolt through the lower end of the hydrasorb unit had sheared allowing the undercarriage to collapse. Cause of bolt failure undetermined. As a preventative measure, the maintenance provider will remove and inspect the bolts at each 100 hour inspection.

CAA Occurrence Ref 14/6083

## ZK-GCS Schempp-Hirth Discus CS

| | |
|---|---|
| Date and Time: | 15-Feb-15 at 14:20 |
| Location: | Ramarama |
| POB: | 1 |
| Injuries (Minor): | 1 |
| Damage: | Destroyed |
| Nature of flight: | Private other |
| Flying Hours (Total) | 224 |
| Flying Hours (on Type) | 11 |
| Last 90 Days: | 22 |

During a local gliding flight, the pilot encountered restricted aileron movement. The situation could not be recovered, and the pilot successfully bailed out of the glider. The glider was destroyed on impact with terrain.

CAA inspection of the wreckage discovered picket equipment entangled among the right aileron pushrod mechanisms.

CAA Occurrence Ref 15/541

## ZK-BQV Piper PA-18

| | |
|---|---|
| Date and Time: | 01-Mar-15 at 11:40 |
| Location: | Hamilton |
| POB: | 2 |
| Injuries: | 0 |
| Damage: | Substantial |
| Nature of flight: | Training dual |
| Pilot Licence: | Airline Transport Pilot Licence (Aeroplane) |
| Age: | 56 yrs |
| Flying Hours (Total) | 19012 |
| Flying Hours (on Type) | 2000 |
| Last 90 Days: | 238 |

On initiating a go-around following a precautionary landing with power exercise during a BFR, the engine failed to respond when the pilot opened the throttle. During the landing roll-out the right hand wheel contacted a water trough. The undercarriage collapsed and the aircraft came to a stop on its belly. Aircraft sustained damage to the undercarriage, right wing and one propeller blade.

Following the accident, the engine was removed from the aircraft, successfully test run, then stripped and inspected. Nothing was found which could have affected the engine operation.

The aircraft had adequate fuel in both fuel tanks at the time of the accident. The aircraft fuel system was inspected with no defects found. Relative humidity at the time was 64 per cent, therefore it was thought unlikely that carb ice would have occurred.

CAA Occurrence Ref 15/857

## ZK-IDJ Robinson R22 Beta

| | |
|---|---|
| Date and Time: | 01-Mar-15 at 13:15 |
| Location: | Maritanga Station |
| POB: | 1 |
| Injuries: | 0 |
| Damage: | Substantial |
| Nature of flight: | Mustering |
| Pilot Licence: | Private Pilot Licence (Helicopter) |
| Age: | 54 yrs |
| Flying Hours (Total) | 560 |
| Flying Hours (on Type) | 106 |
| Last 90 Days: | 16 |

As the helicopter moved forward from the hover it flicked into a vicious right roll from which the pilot was unable to recover. The helicopter hit the ground. The investigation revealed that the likely cause of the accident was due to the helicopter being subjected to localised variations in wind conditions which led to a loss of tail rotor effectivness.

CAA Occurrence Ref 15/842

# It's More than **Vector**

Thanks for letting us know your new address – we get a flurry of messages after every *Vector* mailing. But the wording of the emails clearly shows that many do not understand the legal obligations of holding a New Zealand aviation document.

Section 8 (2) of the Civil Aviation Act 1990 requires every applicant for a New Zealand aviation document to supply an "address for service" in New Zealand including, where applicable, telephone and fax numbers.

The Act also requires aviation document holders to notify the Director **promptly** of any changes to the address for service, telephone number, or fax number.

You can do this by emailing info@caa.govt.nz.

An "address for service" is a physical address. You can have mail sent to a different address if you like, but maintaining a current physical address for service with the CAA is a legal requirement under the Act. This applies to both individuals and organisations, whether based in New Zealand or overseas. The requirement is specified on relevant application forms.


If you live overseas, or plan to relocate overseas, you must nominate a physical address in New Zealand. That could be the address of a lawyer, a family member, or an aviation organisation. In doing so, you accept that delivery to that address is formal notification for the purposes of the Civil Aviation Act 1990.

If you use a separate postal address, that can be a New Zealand address or an overseas address, but be aware that *Vector* magazine is sent only to New Zealand postal addresses.

Applicants under the Trans-Tasman Mutual Recognition Act 1997 also need to comply with the Civil Aviation Act 1990, and the relevant forms (24061/09 and 24061/10) reflect this.

You also need to advise other organisations that you do business with, of your change of address. If you subscribe to *AIP New Zealand*, for example, you need to contact Airways. If you operate an aircraft with a 406 MHz distress beacon, you must notify RCCNZ of any changes to your contact details. ■

# 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

## Aerospatiale AS 350B2

### Flexible Hydraulic Hose

| | |
|---|---|
| Part Manufacturer | Airbus |
| Part Number: | 704A34412253 |
| ATA Chapter: | 2910 |
| TTIS hours: | 19.1 |

During the pre-flight inspection, the pilot noticed hydraulic fluid over the main rotor transmission and deck area. Further inspection revealed that two of the recently fitted flexible hydraulic hoses were leaking from under the protective sleeves. The flexible hydraulic lines were replaced. Eurocopter Information Notice No. 2506-I-29 refers.

CAA Occurrence Ref 14/3893

## Robin R2120 U

### Positive and negative wires

| | |
|---|---|
| Part Model: | R2120u |
| Part Manufacturer: | Robin |
| Part Number: | N/A |
| ATA Chapter: | 2400 |
| TTIS hours: | 3974 |

During the first start of the day, the instructor and student experienced severe smoke in the cockpit and from inside the engine cowls. The smoke was originating from a positive wire running from the battery relay to the aircraft main bus. The positive and negative wires had chaffed through and shorted. The burnt wires were removed and replaced with new items.

CAA Occurrence Ref 14/3656

## Britten-Norman BN2A-26

### Left Magneto

| | |
|---|---|
| Part Manufacturer: | TCM |
| Part Number: | BL-349290-1 |
| ATA Chapter: | 7410 |
| TSO hours: | 491.8 |

During a 500-hour inspection, distributor Block P/No 10-391586 was found unservicable with a loose bush. New Distributor Block P/No 10-391586 was installed. Following a number of similar reported occurrences, both the FAA and TCM have been advised of the defect by the CAA.

CAA Occurrence Ref 14/3563

## Diamond DA 40

### Distributor Gear

| | |
|---|---|
| Part Model: | 4347 |
| Part Manufacturer: | Slick |
| ATA Chapter: | 7410 |
| TTIS hours: | 186.9 |

Following erratic ignition firing to the cylinders, causing engine rough running, maintenance investigation found that the distributor gear electrode arm had detached from the gear. A number of defect reports have been received by the CAA where the electrode arm has been found loose during scheduled inspection, but more recently, three reports where the electrode arm retention has failed completely. The CAA informed both Champion Aerospace and the FAA of these defects.

Champion Aerospace responded that they are aware of a small percentage of Slick distributor gear fingers coming loose and have implemented process improvements to resolve it in the short term, as well as possible hardware changes to definitively fix it in the long term. They have observed that these failures are predominately happening in 4 cylinder, direct drive applications which do not incorporate a vibration dampener such as an impulse coupler or the rubber drive cogs used in most 6 cylinder and some 4 cylinder applications.

CAA Occurrence Ref 14/3618

## Robinson R66

### Overcentre Latch

| | |
|---|---|
| Part Model: | STC No. 13/21E/1 |
| Part Number: | 03653 |
| ATA Chapter: | 2500 |

During daily inspection the RH forward spray tank over centre latch was found to have failed at the lever pivot support. The failure was determined to be due to fatigue. A doubler for each pivot support has been designed and installed.

CAA Occurrence Ref 14/6062

## NZ Aerospace FU24-950

### Steering link torque tube

| | |
|---|---|
| Part Model: | FU24 |
| Part Manufacturer: | Pacific Aerospace |
| ATA Chapter: | 3250 |

The pilot reported the steering torque tube broken, and reported to maintenance. The tube had fractured and there was corrosion on the crack surfaces. Airworthiness Directive DCA/FU24/127A requires the steering torque tube to be inspected for cracks every 100 hrs and replaced if cracks are found. The torque tube was replaced.

CAA Occurrence Ref 14/4195

## Diamond DA 42

### Elevator trim

| | |
|---|---|
| ATA Chapter: | 2732 |

During descent for the approach, the elevator trim jammed with the AP engaged. After disengaging the AP, the trim was still jammed and the approach was discontinued. The PIC ran through the QRH which resulted in pulling the AP circuit breaker. After 2-3 minutes, the trim wheel unjammed. The crew returned back to the aerodrome without further incident.

Initially, it was suspected that the autopilot system was at fault and the autopilot was deemed to be u/s until further rectification could be performed.

Following the second occurrence where the autopilot was not used, maintenance investigation found that the elevator trim jammed due to a small amount of ice which formed inside the trim mechanism due to the presence of moisture when the aircraft was operated in low OAT conditions.

CAA occurrence 14/3791 refers to second occurrence which occurred 3 days later.

CAA Occurrence Ref 14/3795

## Diamond DA 42

| | |
|---|---|
| ATA Chapter: | 2732 |

The elevator trim system appeared to jam or freeze when levelling out from the climb. The autopilot was not in use as it had been declared u/s following a previous occurrence when the elevator trim could not be operated. During return to the aerodrome the trim released on short finals.

Maintenance investigation found that the cause for this occurrence, plus the earlier occurrence, was due to a small amount of ice developing inside the trim mechanism (both incidents were in negative temperatures). The mechanism has since been rectified by removing all moisture from it.

CAA Occurrence Ref 14/3791

## Grumman American AA-5A

### Centre section/both spars

| | |
|---|---|
| Part Manufacturer: | Grumman |
| Part Number: | N/A |
| ATA Chapter: | 5710 |
| TTIS hours: | 7059 |

During wing removal for repainting, both wings were difficult to remove from the wing centre section. Once the wings were removed, significant corrosion was evident at lower surface of the wing/centre section overlapping areas. After clean up, pitting was found on the OD of the centre section and on the ID of both wing spars.

An apparent lack of solid film lubricant and grease during the previous wing installation, and possible condensation build up in wing spars migrating into the centre spar and wing overlap areas, were considered to be possible causal factors.

The Maintenance Manual does not allow any repairs to either the centre spar or wing spars, therefore the type certificate holder was contacted and they advised that there are no manufacturer approved repairs available. Drawings were obtained and a local design organisation was contacted to advise on a possible approved repair scheme, but due to the estimated price to provide and carry out approved repairs, the owners have elected not to continue.

Research carried out determined that wing spar corrosion is a known problem with the Grumman AA series aircraft, with a number of aircraft operated overseas being retired due to spar corrosion and the prohibitive cost of repair and unavailability of new spars.

The Grumman AA-5 Maintenance Manual advises "To ensure maximum limited life, if corrosion is detected on wing or inboard spars, remove as quickly as possible and protect the surface from further corrosion IAW AC43.13-1A *Acceptable Methods, Techniques and Practices-Aircraft inspection and Repair*".

A thorough inspection should be carried out during normal scheduled servicing of the fuselage/wing spar join area and it is recommended that any signs of corrosion should be investigated further.

CAA Occurrence Ref 14/5720

Grumman AA-5A corroded wing spar.

## Hughes 369HS

### Pilot door hinge

| | |
|---|---|
| ATA Chapter: | 5210 |

The helicopter had just departed when the pilot's door opened. He managed to hold on to it but noticed the top door hinge pin had allowed the door to come off at that point. He returned to land but had to let go of the door at the last stages of landing. The door then separated from the helicopter and broke the bottom door hinge. It fell a few metres on to the grass with just a scrape mark on it. The helicopter landed safely. Investigation could not determine why the top hinge released the door.

CAA Occurrence Ref 14/4845

# WX Matters

Weather can be a puzzle – you've got all the pieces, but how do you fit them together to create the right picture?

Accident investigations suggest that pilots who had weather related accidents didn't understand the weather.

This year's seminar can help you navigate your way through the mass of information out there.

You'll also hear of some close encounters of the weather kind from pilots who lived to tell the tale.

At the seminar, you'll get early access to our free apps and new online course, plus learn how to fit the pieces of weather information together.

AvKiwi Safety Seminars are FREE to attend.

AV KIWI SAFETY SEMINARS

**Tauranga**
Tuesday 16 June, 7:00 pm
Tauranga Aero Club

**Taupo**
Monday 15 June, 7:00 pm
Suncourt Hotel and Conference Centre, 14 Northcroft Street

**Gisborne**
Wednesday 17 June, 7:00 pm
Gisborne Aero Club

**New Plymouth**
Monday 22 June, 7:00 pm
Taranaki Air Ambulance Trust
Air Ambulance Hangar, Airport Drive, New Plymouth Airport

**Hastings**
Thursday 18 June, 7:00 pm
Aerial Mapping Hangar,
Hastings Aerodrome (Bridge Pa)
Followed by refreshments at Hawke's Bay and East Coast Aero Club

**Paraparaumu**
Thursday 25 June, 7:00 pm
Kapiti Districts Aero Club
25 Dakota Road, Paraparaumu Beach

**Dannevirke**
Friday 19 June, 7:00 pm
Fountain Theatre, 2 Ward St

**Wellington**
Friday 26 June, 7:00 pm
CAA, Level 15 Asteron Centre,
55 Featherston Street

**Feilding**
Wednesday 24 June, 6:00 pm
Flight Training Manawatu,
Cardinal Hangar
Followed by fish and chip supper

**Palmerston North**
Tuesday 23 June, 3:00 pm
Massey University Campus,
Japanese Lecture Theatre
(Opposite commercial complex)

**www.caa.govt.nz/avkiwi**

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