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Coming up

- AOPA NZ Darfield Fly-in
  Darfield, 19–21 September
- Taildragger Day
  Hastings Bridge Pa and CHB
  1–2 November
- AOPA NZ AGM 2026
  Greymouth, 28 February '26

For more visit www.aopa.nz

Cover photo: Michael Oakley departing Big Bay, AOPA NZ Haast winter fly-in 2025 (story, page 12)
Photo credit: Aaron Murphy

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Regular Columns

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Deadline for ads, articles and photos for the next (Summer) issue: **20 October 2025**.

President's Comment

In my role as CFI of Marlborough Aero Club, I recently attended the 2025 Flying NZ conference and, even though the weather was more suited for flying, this indoor event proved highly worthwhile. It was encouraging to find that advocacy, scholarships, safety and just culture remain the consistent themes across our industry.

The last quarter has also seen Richard and I meeting with the NZ Aviation Federation and the CAA, and I cannot emphasise strongly enough the importance of these opportunities to collaborate to ensure GA continues to thrive in New Zealand.

Richard will cover the content of these meetings in more detail, but I would like to take the opportunity to thank outgoing CAA Director Keith Manch for his work through the years, and to wish him well in his future endeavours. Keith will be replaced by Kane Patena in December.

This is also an excellent opportunity to introduce our new member services administrator, Nikki McKay, who was appointed by the Executive in June and has since been settling into the role with energy and enthusiasm. Nikki is your first port of call for member enquiries, at member.service@aopa.nz

Should your enquiry fall outside her remit, she will be able to direct you to the appropriate person to handle it. You are also always welcome to contact myself or any member of the Executive (see previous page for contact details) if you would like to raise an issue directly with the Executive.

Finally, Mark Rocket, Kea Aerospace founder and Rocket Lab seed investor, spoke at the Flying NZ conference about his desire to see more Kiwis getting involved in New Zealand's aerospace sector, illustrating his talk with footage of his experience of zero gravity during an 11 minute sub-orbital flight with Blue Origin's NS-32 mission. What a blast! And something I would spend my lotto winnings on for sure!

Sue Kronfeld, President

Introducing Nikki McKay

In June this year, AOPA NZ welcomed Nikki McKay as our new membership services administrator. Nikki will be working part-time from her base in Wānaka, where she and her family have lived for over 24 years.

Nikki brings a blend of skills and experience to the role, combining longstanding experience in online platforms and office systems with plenty of experience in customer service roles, specifically in helping people solve problems quickly.

Previously, she has been a senior business analyst at the Dunedin City Council, co-owner and manager of the *Wānaka Sun*, has worked as the editor of the *Community Bulletin* for online news organisation Crux, worked on projects for a global digital communications company, as well as in administrative roles for numerous organisations. She also starred – on horseback – in all three of the *Lord of the Rings* films.

Nikki is excited about the role, and is familiar with the world of aviation. "I'm not a pilot myself, but have many friends who are," she says. "So I have first-hand experience of the joy that flying brings to people. Living in Wānaka, I am in no doubt at all about the benefits General Aviation brings to a community. We see that every day here, and I am a strong supporter of GA."

Until recently Nikki owned a horse stud farm neighbouring Wānaka Airport. "My three boys, now all teenagers at boarding school, used to love watching planes and helicopters do circuits at the airport. It was one of our favourite family 'outings', which meant we only had to go to the end of our road. My oldest son aimed for a career in aviation from a very young age."

Nikki is also a fan of Warbirds over Wānaka, admitting that she once enjoyed an afternoon's air display whilst riding one of her horses. "I had the best seat in the house."

Heavily involved in her local community, Nikki has offered many years of service as a steward and organiser of the Wānaka A&P Show's equestrian events. She was also centrally involved in the communications and legal teams for Wānaka Stakeholders Group Inc, which saved Wānaka Airport from being turned into a jet airport. In 2022, the group won a large judicial review case in the High Court, stopping the local council from developing the airport for jets. Nikki provided the team of KCs with support leading up to and throughout the trial.

Nikki reports that the first few weeks with AOPA NZ have been really interesting and that she has enjoyed meeting her first handful of members.

"I can tell there are some real characters in the AOPA NZ network and everyone seems so passionate about flying; it is sure to be fun," she says.

Asked if she had a message for members, she said: "I'm looking forward to speaking with many of you, and meeting as many of you as possible, over time."

In the meantime, Nikki will be the friendly voice at the end of the phone should you have any questions about your AOPA NZ membership. She may even answer from atop a horse.

2026 AOPA NZ AGM

Greymouth, a jewel in the heart of the South Island's wild West Coast, will host AOPA NZ's 2026 AGM.

Arriving on Thursday 26 February will allow you to enjoy the exciting itinerary of local flying and tourist activities planned for Friday 27 February. The AOPA NZ AGM is scheduled for the afternoon of Saturday 28, with our annual Awards presentation dinner and speaker to follow.

We will bid our farewells on Sunday 1 March, but there's no reason why you can't add on some time at either end to explore this lovely part of New Zealand.

Our block booked accommodation will be on a first in, first served basis at Recreation Hotel, 68 High St, Greymouth; ph 03 768 5154; email accommodation@rechotel.co.nz – please mention AOPA when booking. The town offers plenty of additional accommodation should we fill this hotel – check the website for recommendations. Further details of the weekend to come.

Outback Air Race underway

A fund-raiser for Australia's Royal Flying Doctor Service, the Outback Air Race is a timed navigation trial event held over fifteen days. Covering more than 3800km with nine stops and more than forty teams participating, the event aims to meet a fundraising target of AU$750,000 for the RFDS.

Our own Dee Bond and Neil Young, known as Team 27 – Kiwi Express, will be midway through the event by the time this mag reaches you, and I'm sure we're united in wishing them all the best. Watch out for a story on their experiences in our next issue.

For more info and to support Dee and Neil, visit https://outbackairrace.com.au or scan the QR code.

You can also make a donation to the Royal Flying Doctor Service on the Team 27 – Kiwi Express donations link.

The duo were also planning to tour the 750XL-II SuperPac in Australia after the Outback Air Race, with details still to be confirmed as we went to print.

Tail Draggers, mark the date!

Head for the Bay for the 1st and 2nd November this year, as Hastings and Waipukurau Aerodromes once again combine to host an outstanding tail-dragger event.

Saturday we're at Bridge Pa airfield, with a briefing over a cup of tea at around 9 – 9.30am before the STOL event kicks off. When you've worked up an appetite, enjoy the $15 TailDragger lunch, followed by JailBar bombing in the afternoon. The bar will be open for the day's debrief followed by a casual PYO meal in town.

Sunday is at Waipukurau CHB airfield. You may want to do some rugby watching at Bridge Pa on the big screen before heading to YP for a briefing over tea and scones. Cub Cup Precision Landing will be followed by the opportunity to check out some local strips. It's always a fun and relaxing weekend, so come along!

For more info, contact Steph 021 769963 or Ross 021 2629550.

Do let us know closer to the weekend if you're intending to join the fun so we can make your lunch!

Welcome to new members:

Matt Rawlinson, Inglewood; Stew Buchanan, Palmerston North; Andrew Richmond, Seddon; Peter Bradfield, Auckland; Robert Boniface, New Plymouth; Adam Butcher, Te Anau; James Cleland, Hamilton; Keith Froude, Otautau; Tony Johnson, Napier; Nikki McKay, Wānaka; Cameron Durno, Taupo; Charles Innes, Lindis Pass; Phillip Hayman, Oamaru.

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In addition, they support us in producing this magazine, allowing us to share stories and information we hope you will enjoy.

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Vice-President's view

As the new boy assisting president Sue Kronfeld, I'm fast learning that AOPA NZ covers so much more than I realised as a member. Executive meetings are held monthly, fly-in meetings weekly, CAA meetings quarterly and NZAF every two months. There are also the odd media training sessions and international AOPA gatherings.

Sub-committees cover social, safety and advocacy, as well as communications, publishing, accounts, member benefits and marketing. The Executive meets monthly, alternating between online and face to face.

Since my last column, meetings have included much discussion around our independent internal review of the fatal accident at Omarama. The review has been positive about the practices currently in place within our organisation for our fly-ins, but also suggested a few improvements, which we incorporated at the recent Haast Fly-in. The regulator's external accident investigation into the Omarama event is ongoing, and we will be paying close attention to any further lessons we can learn from that. We also continue to extend our sympathy and support to our members who were adversely affected by this tragedy.

To achieve excellent safety outcomes, it is incumbent upon the PIC to fly safely at all times, but it is also incumbent upon us all to bring any concerns to the attention of team leaders or organisers. Speaking up after an incident is too late; please speak up early if you have any worries or apprehensions, and similarly if you have ideas to contribute about improving safety practices in the future.

The Executive has also been putting a lot of thought into the future of AOPA NZ. Are we doing the right things for members, what do we offer to members, how should we attract new members, and how should we be marketing ourselves to General Aviation in New Zealand? We are looking to establish local groups who might arrange coffee/lunch/chat fly-ins at AIP published airfields, maybe regularly or just as local one-offs, open to all, advertised over social media, with guests welcome.

NZAF

AOPA NZ is a council member of the New Zealand Aviation Federation, along with virtually all other GA groups including aero clubs, paragliders, model aircraft/UAVs, microlights, NZ Air Women's Association, experimental, gliding, warbirds, engineers and others. The council meets every two months at Wellington Airport. It is well funded through a significant holding in Aspeq, the aviation examination body. It attempts to gather the news, issues, complaints and concerns that affect all spheres of GA, and to then liaise with CAA on behalf of its council members.

At the most recent meeting we discussed items including scholarships to assist young engineers to train at Nelson Marlborough Institute of Technology, media training for representatives of council members, the unfortunate cancellation of Classic Fighters, Warbirds over Wanaka 2026, marketing assistance for council members, the PAN and Safe Haven initiatives, and youth in aviation, particularly in connection with the House of Science STEM education group across the country.

I was lucky to attend the NZAF funded media training workshop in Wellington. An excellent day run by tutors experienced in the world of journalism, it provided an informed basis with which to approach a live interview. With a plan in mind, and sticking to that plan, an interview around an adverse subject can be put to good use and the right message broadcast – it is still scary though!

CAA

In July, Sue and I had a face-to-face meeting with the Civil Aviation Authority in Wellington. Director Keith Manch introduced us to the new Deputy Chief Executive (DCE) Aviation Safety Oversight, Catherine McGowan, who will join our meetings in future, alongside Kane Patena, who replaces Keith as Director of the CAA at the end of the year, and John Kay, DCE System, Strategy and Policy Group. Kane joins the CAA from an NZTA and Wellington Council background, while Catherine comes from a background with NZDF and primary industries.

The meeting saw us discussing a full agenda, including:

- AOPA NZ flying videos, (short five minute videos on topics such as understanding AIPs) which are being jointly produced with CAA to help the safety education of pilots
- The regular refusal of Airways to allow access to airspace for GA aircraft
- The possibility of making CFZ use obligatory
- Extension of CFZ areas to cover more of the South Island
- Obligatory carrying of radios
- Extension of DL9 privileges to include IFR and low level aerobatics
- Adding email addresses to the aircraft register
- The use of uni-directional runway lighting to replace omni-directional lighting in Napier and other airports.

CAA has promised to look into each matter, and we will continue to liaise with them on all these issues.

Richard Eberlein, Vice-President

This issue is so jam-packed there's no room for more than a brief 'hello there' from me!

In truth I've been largely earth-bound of late, but hopefully that will change later this year. Meanwhile, I hope you enjoy these pages of flying adventure, information and occasional mishap. It's always fantastic to share in the excitement GA can generate, even if – perhaps especially if – we can only do so vicariously.

Do keep the stories coming, and happy flying to all.

Anna Mackenzie, Editor

ThinkAviation has lift off!

By Mandy Deans

After a challenging year to establish the Trust, gain charitable status and set up bank accounts, ThinkAviation – the AOPA NZ Charitable Trust (https://thinkaviation.nz)– is finally live!

The Trust's first two fixed wing pilot scholarships were launched in July, and we've had a healthy number of registrants for both the PPL and CPL scholarships. The PPL scholarship provides funding towards a trainee's costs, and the other towards a trainee's costs of a CPL. Valued at $5000 and $7500 respectively, these scholarships aim to promote general aviation in the community and to encourage more youth to take up aviation as a career. Judging has now been concluded and the recipients will be announced on 22 September 2025.

We have promoted the scholarships to aero clubs and training schools, as well as to principals and career advisors at over 300 secondary schools in New Zealand, for their senior students.

There has already been keen interest in the current scholarships and we hope to expand our scholarships later this year and look to add internships to include other aviation careers such as avionics, aircraft engineering and innovation opportunities. We are also talking to several organisations that have expressed interest in our Trust administering their own aviation scholarships.

As part of our future plan, we will foster relationships with aviation industry businesses; those outside the organisation who own aircraft and aircraft manufacturing companies; as well as those providing services to the aviation industry.

We invite all AOPA NZ members to be supporters to help the Trust deliver its objectives – please don't be shy and click on the 'Support Us' tab at ThinkAviation, or give us a call. Other ways to offer support are to encourage great candidates to apply for scholarships, to connect aviation businesses with the Trust, and to share any ideas with us through the website or by talking to our dedicated volunteer trustees.

We invite all AOPA NZ members to donate to the Trust via our website, anyone donating will automatically become a Friend of the Trust. We hope, as aviators who are passionate about flying, you will donate and use your tax receipts. Every donation helps to fuel future impact, and grow opportunities in this fantastic industry. We can organise donations via a secure credit card payment portal or you may make a bank transfer.

We would like to take this opportunity to thank Sid McAuley, outgoing Chairman, for his service to the Trust in its inception year. His dedication, dogged determination and network of contacts was invaluable in getting the Trust set up. A task much bigger than any of us ever imagined. Thank you also for being ThinkAviation's inaugural Friend of the Trust as the first donor, your faith in the Trust and your vision for the future is most appreciated.

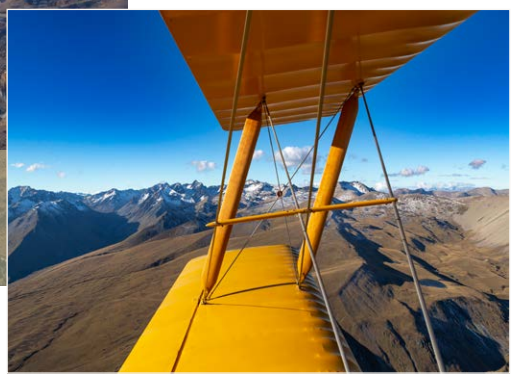
We are still in the process of developing some policies and procedures for the Trust, in order to have a robust organisation going forward. Richard Bradley, our newest Trustee, has been appointed the Trust's Deputy Chair.

Thank you to all AOPA NZ members for your support to date. We look forward to working with you to fulfil our objectives of promoting general aviation and getting more youth and ab initio pilots involved.

Please feel free to contact us at: trust@aopa.nz

All about the options

By Aaron Murphy



In early April I was offered the passenger seat in Tiger Moth ZK-BAA, fresh from its 100 hour check in Wanaka, as it headed back to Canterbury, en route Omaka.

Always eager to reconnect with an aircraft that started my flying career, I gladly accepted and, with a few home duties cleared, planned for a half day trip away.

Tiger pilot Amanda Rutland and I joined Charlie Draper in C170 ZK-SJK at Canterbury's Kimberly Road strip for the 'Cessna shuttle' hop to Wanaka. Keeping us company were Graham and Jo Johnson in Bearhawk Patrol ZK-MAY.

Weather forecasts and webcams indicated some low level cloud across the foothills of the Canterbury Plains but with a few options in place, we departed early in the morning bathed in sunshine and headed southwest.

The initial plan was to head through Burkes Pass. Seeing another light aircraft on ADS-B head in the opposite direction through the Pass set up the first of many mind sets for the day. It was soon apparent though that, as the morning wore on, Burkes Pass was starting to close in with persistent low cloud beginning to thicken up. The first of the alternate plans for the day was put into place and we headed back for clearer skies and the coast, where the constant radio chatter indicated that Oamaru was wide open.

Sitting in the back seat I let the two in the front keep their eyes peeled outside whilst I scrolled through live webcams and various flight planning apps to get a feel for what was happening further up the road. The decision was made to land at Oamaru, re-group and make a plan for the next leg.

Now slightly behind schedule but with time still on our side, we utilised the hour on the ground to refuel, eat, use the facilities and chat with the locals, who made a few helpful phone calls on our behalf to pilots and landowners up the Waitaki Valley. Reports were that the low cloud there was burning off and that we would have a clear run through to Wanaka. By the time we passed Kurow, the sky was gin clear, giving unbridled views of Lakes Aviemore and Benmore and all the way through to Wanaka.

With such crystal clear conditions, it was surprising there was so little traffic in the Wanaka area. Our two aircraft alighted and taxied for the maintenance hangar to pick up the Tiger Moth. Rounding the corner behind the front row of hangars, we found the Tiger outside, only slightly nose into the hangar, and we were excited to pre-flight her and head home. And this is where things slowly started to unravel...

A chat with the engineer indicated that he was almost finished with the Tiger and we could soon be on our way. Not immediately but soon. Amanda's further enquiries revealed that, due a miscommunication somewhere along the line, the Tiger had yet to be fuelled up. An offer to take a ute into town and fill up the jerry cans with mogas was accepted. Being a long weekend, traffic around the airport and town was challenging. Eventually

returning with gas, we started to fuel the Tiger, only to witness fuel leaking from the sight glass.

Refuelling stopped, and the decision was made to defuel to a level to access the sight glass and inspect the washers. Adjustments completed and the fuel went back in... and slowly started to leak again. Process repeated, some further adjustments, and we were finally ready to depart. We'd now been on the ground in Wanaka for close to three hours… you can see where this may be going.

However, with daylight still on our side and the latest weather indicating some cloud forming on the Canterbury Plains but certainly still flyable, we departed Wanaka in glorious sunshine heading for Pukaki. The flight through Lindis Pass offered views we take for granted but that tourists pay thousands for, and it also offered the first sign of possible concern.

Way off in the distance was a small finger of low cloud hugging the Mackenzie Pass and spilling into the Mackenzie Basin. It dissipated as quickly as it appeared but it was enough to give a hint of what was happening on the other side of the hills.

As we approached the Pukaki circuit we heard a light aircraft make a call overhead Burkes Pass, so we took the opportunity to ask what it looked like from their angle. Cloud on the plains was thickening and starting to hug the foothills in places, they reported, but as they were up at 8500ft, they could only share their perspective from that height. A helicopter inbound to Pukaki from the Rangitata Gorge kindly entered the conversation, saying that the Rangitata Gorge was clear when he'd passed through fifteen minutes or so prior.

So, we had options. The AvGas powered aircraft decided to refuel at Pukaki, and we had a friend's accommodation on the field where we could probably stay, should we not get through. Tekapo was also wide open, another option. We had two recent actual reports from other pilots. Calls to family and other pilots on the east coast indicated cloud forming but, again, it was still deemed flyable. I contacted a couple of aviators to advise them of our plan to leave Pukaki for Canterbury via the Rangitata Gorge area,

Faced with deteriorating conditions when en route up the South Island, ZK-BAA and her chaperones applied prudent decision-making, ensuring a good result all round.

so they could follow the ADS-B aircraft in our group, and we departed, this time with myself in the front seat of the Tiger.

In clear air and from an open cockpit, the views were spectacular, but as we got higher, the clouds on the east coast started to look more and more ominous. Entering the Rangitata River from Bush Stream, we started a descent over Mesopotamia Station towards the Rangitata Gorge. It wasn't until we were three miles or so from the Gorge that the cloud thickened up and lowered. It's amazing that, while you can be legal by the rules, being down low with darkening skies and surrounded by high terrain soon changes your perspective on everything. With only one and a half miles to go to reach the flat plains, it became progressively darker and almost instantaneously all three pilots announced that it was a no go and to make a 180 back towards the sunlight up the Rangitata Valley.

Mesopotamia Station's long, flat runway was virtually telling us to land there, and we did. Malcolm Prouting was soon at the airstrip with a wry smile on his face. "I saw you go over and I knew you'd be back," he said.

Calls were made to those waiting for us on the other side of hills, and the aircraft were tied down for the night, the Tiger even being hangared alongside the NOTAR helicopter. With the back of the airport shuttle/farm ute loaded with fencing wire, tools, animal horns and tired pilots, Malcolm delivered us to a warm fire and let us tell him about the day's adventure; one he's heard before and one he will possibly hear again.

Relaxed and royally fed, we walked up the road to our accommodation at the old Mesopotamia school, watching the stars slowly being enveloped by the cloud we'd turned away from just a few hours earlier.

Awakening the following morning to golden rays across the mountain tops, you could be forgiven for thinking we were in a different part of the world. We wandered down to the airstrip early, eager to make our way home. Reports on the east coast indicated no cloud and almost no wind. We pre-flighted under clear skies but with a thin veil of fog visible up towards the Rangitata Gorge. By the time we were ready to go the fog had almost reached the airstrip, as if to give us one final warning, but departing to the west into crystal clear skies, we set off for home.

You wouldn't have thought that less than 24 hours earlier the entire east coast had been socked in as we made our way through the Rakaia Gorge. A hot air balloon hovered close to the foothills, and a thin smoke trail rose from the Sefton Chipmill in the distance. Crossing the Plains proved uneventful and, landing in North Canterbury, we bid the Tiger Moth farewell as it continued north to Marlborough.

There are plenty of reminders in this about maintaining options and making the right call. Also worthy of note: the pilot and passenger in the Tiger Moth were by far the most prepared clothing-wise!

A tale from the archives of unplanned maintenance

By Neville Bailey

So, there we were. Sarah and I had flown north with a group of South Island aircraft to enjoy Hawke's Bay hospitality and a good dose of camaraderie. A week's worth of group meals, hangar BBQs and airstrip flying made it an all-round excellent experience.

Carrying on to Gisborne – the old stomping ground where I'd cut my teeth as a new instructor many years before – we spent a few days catching up with friends. I even did a scenic flight along the East Coast beaches for old time's sake. The Bearhawk was running well. It always ran well. The usual quart of oil every fifty hours and the plugs ran clean. The electronic ignition and fuel injection ran synchronously to greatly improve efficiency. It is probably the smoothest piston engine I'd flown behind.

Eventually it was time to head home to Ashburton. We donned life jackets before getting airborne as we would cross Poverty Bay, Hawke Bay, then fly coastal along the southern Wairarapa before climbing to 4000ft to cross Cook Strait. Most of the day's flight was over water, a point that has remained in my mind.

A quick chat with Wellington Control and we had a controlled VFR clearance. With Cape Campbell shrouded in low cloud we made a direct line for Kaikoura. All was good. About fifteen minutes north of Kaikoura I spoke to the friendly whale watch crews, who passed on the winds and runway in use. We started an early descent – there was a high cloud base over the sea, but a low layer over the land. Suddenly, and without any warning, the engine began vibrating significantly. Sarah uttered an expletive as I reassured her that it was probably just a fouled plug. Fouled plugs happen from time to time with higher lead fuel, though if I'd given it more than a second's thought I'd have known they're very uncommon when running the engine Lean of Peak (aka very lean). A quick mag check. No change. A sinking feeling set in as

the vibration continued. Straight into the engine failure check list – partial failure or otherwise. Fuel pump on, change tanks, etc. Still no change. The vibration continued and I instinctively turned right, towards the perceived safety of land.

A quick glance at the electronic engine gauges and my fear was confirmed. The number 4 cylinder EGT and CHT had both dropped their indications, indicating that the cylinder temperature was too cold to register. Something had caused the #4 cylinder to stop functioning completely; it was no longer operating as part of the team.

I radioed the Whale Watch crews again to let them know we had engine trouble, and began visually 'paddock hopping' to the safety of Kaikoura airfield. I'll take luck over skill any day, and with a healthy dose of it shining on us, we landed uneventfully, whipped the cowls off and began troubleshooting.

The first unusual indication was the presence of oil on the crankcase and pooling on the air-filter box. Not a huge amount, but it appeared to be leaking around the #4 cylinder flange, and any oil outside the crankcase didn't look good. It wasn't long before we discovered a rather alarming problem. Three of the eight cylinder studs had sheared off #4 cylinder and the broken stud ends were still sitting on the engine baffles. This was suddenly way beyond my skill set, so I phoned a friend, aircraft engineer Kevin Langford.

The next morning Kev was heading north with his toolbox in the back of the Cherokee, and we began the interesting and time-consuming task of removing the offending cylinder. And so began my short and intense education around cylinder related issues. What had been intended as a quick pitstop in Kaikoura was now looking like a few days, or more.

Doing this work in the field meant we had a plethora of engine parts that we didn't want lost or misplaced, so the first priority was to bag and label everything, then put them safely into the back of the Bearhawk. It transpired that two cylinders had to come off, because some of the studs go completely through the crankcase and hold on the opposite side cylinder, increasing the size of what already looked like a fairly big job.

Subsequent inspection of the whole engine over the next weeks showed a number of parts had loosened as a result of the intense vibration, so we systematically went over the entire engine, checking and tightening as we went. The left exhaust had to be taken back for welding. It was now in three pieces instead of one, and got itself a 'dye penetrant' test to check for additional cracks that might not be visible to the naked eye.

Both cylinders were sent to SouthAir for crack testing and, somewhat surprisingly, both were found to be fine. The cylinders only had 360 hours on them, and were by all indications in very good condition. In addition to replacing the rings, SouthAir also sent us a replacement set of cylinder studs. Extracting the original ones was fun. Well, maybe not actual fun. Actually, probably the complete opposite of fun.

But this was also where the good in people shines through. Kev had personally driven the cylinders to Dunedin to ensure they arrived in a timely manner and with no further issues. Murray Paterson checked on progress at SouthAir for me, and Kevin Anderson very kindly flew them back north for us. Additionally, the great people at Air Kaikoura and Wings over Whales were a huge help, all realising that having an aircraft grounded three hours' drive from home was a stressful situation. Both places helped with hangar space and encouraging conversation.

Meanwhile Kev had pulled the oil filter to inspect it, in case any bearing issues may have resulted, either from the vibration or as a downstream consequence of removing the engine studs. Fortunately, and with a sigh of relief, there was no metal showing. Both cylinders were reinstalled in a very long day, along with new oil, a new filter and a very thorough check of all engine components. Logbooks were written up, the obligatory CAA 005D filed, and, after a thorough ground run, we got airborne for the flight back to Ashburton, ten days late, but finally home.

The what and the why

At this stage we had a pretty good idea what had happened, but no idea at all about why it had happened.

I had originally purchased the engine in USA, a rebuilt Lycoming IO540 with new cylinders, new camshafts, new electronic ignitions, and converted to fuel injection. It was a 'narrow deck' Lycoming with an older style crankcase. One of the differences with the narrow deck engine is that they use hold-down plates – a small banana shaped plate – to hold the cylinder flanges to the crankcase. When Kev was reinstalling them, he had noticed a layer of what appeared to be paint or sealant on the underside of the hold-down plates on those cylinders. I watched as he meticulously cleaned it off, explaining that it should be a metal on metal mating surface.

A week or so later Kev showed me a chapter in an old aircraft engine book titled *Paint and Sheared Cylinder Studs* (I kid you not). If ever there was going to be a proverbial smoking gun, here it was. This was confirmed by the best practice advice in Lycoming's engine manuals: "Do not get paint on any mating surfaces or under the cylinder hold down nuts".

In layman's terms it goes something like this. When the engine gets assembled, the engineer ensures that the mating surfaces are clean, and torques the studs to a pre-calculated torque, thereby ensuring a particular stretch of those studs. If paint or any other compound is put on the mating surfaces, the subsequent vibration will gradually wear the paint away and remove the torque on the stud, which gives you a cylinder stud that is no longer tight and able to move in situ. The failure mode that follows apparently happens when the two parts oscillate in proximity and the stud shears off, accompanied, as I can now attest, by a great deal of vibration and an expletive.

We now had the full picture, but quickly realised a few other things. First, once any stud has sheared, the loading on the remaining studs is increased and they may also be prone to failure, resulting in the recommendation that in this situation, all studs on the affected cylinder need to be replaced. The #4 cylinder was going to have to come back off again. Second, we'd discovered contaminant on the four hold-down plates that had been removed (two per cylinder), but clearly it would be prudent to check the others in case they also had contaminants on them.

Several more days of work followed – luckily, it turned out, as they all had evidence of the same contamination. None of the other cylinders had loose studs, fortunately, but they were all torqued to spec upon reassembly.

The bigger picture

There is one more slightly troubling part to the story. The question that lingered in our minds was: If Lycoming's best practice was to ensure metal on metal mating surfaces, why had this been done by the (supposedly reputable) engine rebuilder? And equally, was mine the only engine to which it had happened?

I knew there was only one other engine in New Zealand originating from the place where I'd purchased mine, and that it had already been overhauled. But in the United States there would be many others. (Note that none of this had anything to do with the Bearhawk Aircraft Kitset company). I'd posted about the experience on the Bearhawk forum, and started getting 'off-forum' messages from concerned owners of rebuilt Lycoming engines originating from the same source. Fortunately, several of those aircraft hadn't yet flown (they were homebuilts), and, with the help of their own aircraft engineers, they were able to remove the hold-down plates and clean them. The four who contacted me directly had all found paint on the mating surfaces.

One issue is that because these are amateur-built aircraft, they can fall outside certified best practices. In other words, the caution 'for use in experimental aircraft only' is quite often used by equipment manufacturers (Dynon, for example) to mean that, although an item is of very high quality, it hasn't gone through the certification process (which can be very expensive). This keeps costs down, but was never intended as a means to facilitate deviation from known best practice.

I'm happy to report that we finally got the two cylinders run in and are back to enjoying operating the Bearhawk in its natural element. We've also flown back across the Cook Strait, this time, fortunately, without any expletives uttered.

ODF unleashes memories

By Hadyn Williams

Murray Paterson gave us a heads up midweek that there was a lunch the following Sunday at Nat and Shelly Small's. It always makes the week go better when you've got some weekend flying to look forward to, and the weather to go with it.

Nat's farm strip is a long, flat, slightly uphill paddock. The last time I landed there was many years before in the Old Man's Cessna Cardinal ZK DIH during a winter fly-in. This time we'd be flying our C180 ZK BYJ, which we've co-owned for about twelve years.

I'd initially tried to buy a C185 out of the States, when Murray sent me a link to Barnstormers with a C185 for US$85,000. I got hold of the fella selling it and asked a few questions, and before long had a friend of a friend fly across three states in his twin Beech to test fly it. The current owner had had a minor ground loop and it had a small amount of damage by the right gear but, as the test pilot said, "It's as clean as a beer can inside." He then asked if I'd seen the serial number on it, which I had, but kept quiet. It was number three of the first production C185 (numbers one and two were scrapped after testing). I paid the deposit, had all the transport organised and a specialist booked to crate it up.

Unfortunately, the weekend before it was to be flown out, someone turned up and paid cash on the spot. It was later I found out the test pilot was president of the 195 club and I can't help but wonder if a call was put out to keep the original 185 at home.

Anyway it's funny how things work out. Three years prior my wife and I were hitched on the old family farm at Fox Glacier by Alex Millar who, along with Richard Royds, owned Mt Cook Ski Planes. I'd asked Alex if he could take us on the glacier in a 185 (ZK CBS) and on the way up I told him that one day I was going to own a 185. He smiled and said he'd probably sell me one. Unfortunately a year later Alex passed away.

So back to the disappointment of missing out on the US deal. I was sharing my tale of woe with a fellow North Otago Aero Club member and he mentioned he was also thinking of buying a taildragger and wondered if we should go in together. Within a couple of months we'd brought Alex's C180 ZK BYJ. I couldn't have asked for a better aeroplane, or partners for that matter either.

Being based in Oamaru sets us up nicely to fly most places in the South Island within an hour or two. Nat's is only about fifteen minutes up the road, so we decided to make the most of the day and include a stop at Paringa for afternoon tea also.

We loaded a couple of daughters into the plane and in no time at all we were downwind and on the ground. There looked to be about 21 planes in all. It's great to see so many different types of aircraft at these fly-ins. I don't care who has the most cylinders or fastest cruise, I enjoy all aircraft, and I also think we're living in some of the most exciting times to be a part of aviation. The only thing better than the quality of aircraft at fly-ins is the quality of people.

Nat had set up a couple of tractor rims as a brazier, which was very welcomed by those in attendance. With lunch finished and thanks given we loaded up again and headed to Paringa. We climbed to 9000ft to get over cloud then started the long descent to join downwind for the Paringa Salmon Farm strip.

Being able to pack up and head to the back country is a privilege. There are a lot of good people who work hard behind the scenes in AOPA NZ and The Back Country Pilots Association to ensure we can continue to do this. If you know these people, make sure you buy them a beer and say thanks next time you see them. Being able to share these moments with your kids and your mates only makes it more worthwhile.

Coffees and hot chocolates finished and bags of smoked salmon loaded, we headed for home. Another successful mission complete, I look forward to catching up at the next fly-in.

Living the dream

Dropping in at the Haast winter fly-in

By Laura Young

Between the stress and grief of losing my dad several weeks ago and the hefty pressures that come with juggling the busy work, family and everyday life mayhem, I was in desperate need of a break. After waiting months for a decent weather window for an annual hunting trip, the chance arose in late July.

My friend and work colleague Ivor Yockney and I loaded up DPE, his trusty C185 and set off south from Omaka. We use this plane for my work for DOC – radio tracking kea from the air on a roughly monthly basis. After all the kea were located and accounted for between Nelson Lakes, Lewis Pass and Arthur's Pass south, we clocked off and made the stunning flight south along the spine of the Main Divide of the Southern Alps, past Aoraki and her neighbours, over the headwaters of the dramatic west coast valleys, and descended into the picturesque Landsborough Valley, inland from Haast.

After Ivor skilfully placed us on the familiar Toetoe strip, we covered and tied down DPE, stuffed already cold feet into our boots, donned full winter kit and lugged our heavy packs onto our backs, then eagerly set off up the valley and into the mountains. The goal was to look for tahr, as well as to focus on being present in every single step (think ice-covered rocks and foot placement), to be frozen, physically tested, awed and inspired by the raw beauty that only a winter hunting adventure can offer. It's a mission that fulfils and replenishes me in so many ways.

Just when I thought things couldn't get better, a satellite text came through that the AOPA NZ Haast fly-in was to take place over the following few days. For about five seconds we anguished over whether to keep hunting in the Landsborough or to boost it back down to Toetoe flat, grab the plane and head to Haast.

The following afternoon we were in Haast, watching other planes arrive from all over the country. There was a buzz of excitement at the bar that evening as old friends reconnected and mused on the following day. I was warmly welcomed by everyone I met and instantly made to feel comfortable by many kind folks, particularly Ross Millichamp, Aaron Murphy, Neville and Sarah Bailey, Ian Sinclair, Dave Paterson and many others. I was amazed that so many of them remembered meeting me last year at my first ever fly-in (Darfield) that didn't consist of any flying, and grateful for everyone's friendliness towards this newbie who had turned up out of nowhere, full of eagerness and excitement.

I reckon that if I'd been born sixty years earlier and the opposite sex, I'd have been living in the bush as a deer culler, or working my way to being a 'bush pilot' – one of those legends who flew supplies into remote back country strips or hauled out venison carcasses. I've long been enamoured of this rich period of New Zealand's history. My favourite lectures to deliver to the 2nd year Forest Ecology students when I was working as a researcher at the University of Canterbury revolved around this very topic.

Soon after deer were introduced to New Zealand, they became abundant and were recognised as a pest, and a resource. South Westland and Fiordland were central to deer control, then to the venison recovery industry days. Though it's easy to glamorise the adventurous life of the venison days, there's no doubt things would have been tougher than we can imagine. And aircraft were a huge part of it, generating many stories of excitement, novelty, mishaps and misadventures.

Given my enthusiasm for the era, it was fantastic to visit places that featured in these tales. We joined a delightful group including two Bearhawks – Dave Paterson in his family's Bearhawk and Neville Bailey in Bearhawk Bravo – sharing the leadership; Ross Millichamp in his C182, Sam Richards and Graeme Prankerd both in C180s, while I was again in DPE with Ivor.

After departing Haast, our first stop was Mussel Point, North Okuru – a key site from where much of the area's venison was flown out for eventual export. It was a nice long grassy strip that I decided even I could land on with the awesome C172 (OMR) in which I'd learnt to fly. We stood around for a while yarning about planes and history and memorable aviation moments. Everyone had so much knowledge and shared history, and I felt grateful to be among them. More aircraft from another group flew in too – there was plenty of room on that strip for lots of planes.

We departed southwards and a few moments later were pulling in at a bendy gravel road that calls itself an airstrip! To my delight we were at the Waiatoto bridge. I remember thinking 'this is getting exciting!'. It only got better.

A long gravel strip perpendicular to the coast at Neils Beach was next. With another group of planes already parked at the western end, I watched and listened as our group's pilots made good calls and careful decisions then managed with ease the potential chaos by landing the other way and parking at the other end. There wasn't a breath of wind or a cloud to be seen, just the pristine grandeur of snow-covered mountains, verdant podocarp rainforest with towering rimu canopies, hefty kereru flapping across the skies and the sound of the waves lapping on the not-too-distant shore. More great yarns shared as we soaked it all in.

I got chatting to Graeme, discovering that he knew Kea Flat airstrip, up from Toetoe, having joined a group working on it one winter. It was so heartening to meet others who enjoy bringing together their love of the back country and aviation.

Most of my work life over the last twenty years has revolved around walking (well, bush bashing) through the forest and mountains, but flying also plays a vital role. While many assume helicopters are key, fixed wing aircraft are also essential for conservation and ecological research, for example for aerial surveying, thermal imaging, animal radio tracking, baiting, etc. As a child I'd dreamt of learning to fly but hadn't really thought it possible. I'd been working with Ivor on and off for nearly ten years when I confessed my dream, and his response was adamant. "Just go do it, Laura! You live in Marlborough, you have one of the best aero clubs in the country, they do strip flying, there are great instructors… What are you waiting for?"

So here I was, a few years down the track, at the Haast fly-in with a bunch of proper pilots, nearly a year on from earning my PPL – observing, learning, flying... living the dream.

Top: In the right weather conditions Big Bay offers superb beach landings; above: tucked into the flax just off the strip at Martins Bay. Below left: Neils Beach strip; below right: home base at Haast.

The day got even better. We headed inland over into the Cascade towards the southern Red Hills – the ultramafic (highly iron and magnesium rich, low nutrient) mountain range, a rare geological type in New Zealand. We split into two subgroups here, with half the aircraft landing on Martyr strip while the others landed on the coastal Cascade strip, where the first crew had to drag a load of driftwood off the airstrip, then swapping over. This arrangement allowed us to adhere to the DOC concession limitation on number of aircraft landing per strip.

Flying in the Cascade area was great. It brought back memories of working and

Pyke River with Lake Alabaster in the distance

hunting down here years ago. Having the skills to land a plane in the back country on often short, bumpy, rough, unfamiliar airstrips is something for me to aspire to and work on. Lots of inspiring people to learn from in this group and in the organisation in general!

Next up was more raw, rugged Fiordland beauty to take in from above, with a longer stretch this time, heading south along the exquisite coastline. We passed Barn Bay, where I landed about ten years ago with our beloved local Blair Hoult in his yellow Piper Cub. Further south, we gave a waggle as we flew over Gorge River mouth where my lovely friend Robin Long grew up with her family (Beansprout and co – who were standing outside waving up to us).

Next came new territory for me, over Big Bay then south to land at Martins Bay (Lodge) airstrip – a long gravelly one. We pushed all the planes down a side road, nicely stacked and out of the way of the strip, then had a blissful lunch on the balcony of the empty-for-winter lodge, with great yarns and laughs aplenty. Dave Paterson regaled us with the history of the lower Hollyford, including the role (and proliferation) of the Paterson clan.

Soaking up the uncannily warm mid-winter sun, we breathed in the beauty of our surroundings on such a perfect July afternoon. Pleased to have given the crew a good chuckle over our lunch of make-do tramping leftovers (think broken stale wraps, mouldy cheese, the end knob off the salami) and my sheer glee at finally being allowed to use the squeezy sauce that Ivor made me leave behind in the plane due to it being too heavy an item for tramping, we headed back to the planes for the last strip of the day – Alabaster (another key site in the venison days).

On the flight to Alabaster we followed the wide glistening Hollyford Valley upstream. It was something to remember.

Flying with other aircraft was new to me. We were third in the formation on that leg and the experience, while stunning, made me appreciate the hypervigilance and spatial awareness skills required. The sunstrike, the tight valleys, the dark shadows, the turning at each bend, each new valley entered – one must always have one's sights on the aircraft ahead (and be aware of the ones behind) and manage speed, height and position of your aircraft with respect to the others, watch out for surroundings, trees, hills, everything! And that's on a good day! Imagine the wind, downdrafts, turbulence, cloud, moisture and everything else there is to manage on a less than perfect day. I have full respect for what I saw from everyone that afternoon as we alternated between harsh sun and shadows in the dark side of the valley as we headed to Alabaster.

As those who had elected to land took off again towards the lofty Tutoko, my heart felt full. I felt so grateful to Ivor – my flying mentor – for setting me on my way with this journey, and honoured to be welcomed by this flying community at my first flying fly-in. Thanks to the organising team, who additionally face the challenges of being reliant on finding a decent weather gap (also the story of my entire working life)! I was so impressed with the level of discussion and planning around safety; the organising team set an impressive standard for newbie pilots.

I'm thankful to live in this beautiful country. As we flew over the forest and stood at each strip, I contemplated the tough but satisfying lives the early explorers, pioneers and cullers would have had – they paved the way for what we have the luxury of experiencing today.

Hopefully I'll soon join you at another fly-in. I hadn't realised that you don't actually have to own an aircraft to be an AOPA member, so I'm joining up now! Thanks for such an exceptional experience. And that weather... you couldn't ask for a more perfect day.

Rangiora Blue Light

By Steve Brown

Rangiora Blue Light 'Take a Kid Flying' had a break in 2024, but a reminder from AOPA NZ to get the ball rolling for 2025 saw us raring to go.

This year Blue Light staff were on my case and we got a date set for Matariki Friday. We aim to take fifteen children because we, and Blue Light, can manage this number easily, and it reflects the number of suitable candidates.

This year the day dawned windy, but we don't have a postponement date as we reckon we can always entertain the children at RT. A nor'wester meant we headed up and down the coast with the 'front seat swap over' destination of Forest Field.

All got back excited and happy.

This year we had a great barbecue, thanks to Blue Light, and the frisbee and rugby ball had a work out on the lawn.

Great day out, enjoyed by pilots and kids alike. Next year we will start organising in March.

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Keeping an eye on safety

AOPA NZ's sub-committees are formed and leads nominated annually following the AGM. The Safety Sub-Committee this year sees most members continuing in this critical role.

The current sub-committee contains a wealth of experience, with four B-Cats, several ATPL holders and, importantly, many years of combined experience of attending and assisting the running of AOPA NZ's fly-ins. John Evans, Reuben Hansen, Dave Paterson, Neville Bailey and Sue Kronfeld (the President sits on each sub-committee) remain on the committee, while Ivor Yockney stepped down after several years of much appreciated contribution, and B-Cat instructor Holly Lyttle joined. Neville Bailey took over the lead role from John Evans, who has made a huge contribution over a number of years.

Since the AGM we've been extremely busy, with the first task being an internal review following the accident at the Omarama fly-in last March. The sub-committee used this opportunity to identify any improvements that could be incorporated at future fly-ins. The CAA report has not yet been released, but when it is we will also endeavour to incorporate any further findings.

The review included discussions with several of our long-standing members, aiming to identify any changes to format they might have observed. Ian Sinclair also convened a one-day meeting at Omarama, attended by many of those who had been closely involved. NZALPA has been excellent in reaching out to those affected, and Ian's initiative was another step in AOPA NZ's pastoral care, looking after our people.

AOPA NZ uses a number of safety systems to support safe operation at its fly-ins. These include processes such as participant registration, the group selection process, group briefings, participant Fly-in Code handouts, and emergency response handouts. Additionally, AOPA NZ has its own online reporting tool for incidents, available for members to use via the website.

Recently, the Safety Sub-Committee has been working on some small changes to our fly-in documentation, which you will see when you next attend a fly-in. The registration process, briefing documentation and Fly-in Code handouts highlight an increased emphasis on PIC responsibilities and pilot currency.

We also more clearly distinguish between the duty of care that has always been the backbone of AOPA NZ fly-ins, and individual PIC responsibilities. It's a clarification, not a change. AOPA NZ has always facilitated the fly-ins, taken care of many of the logistics, and offered a high level duty of care where possible. However ultimate responsibility for selecting the appropriate group to join, ensuring a high level of currency, and deciding which airstrips fit your ability and aircraft type, is always up to each participating pilot. Group leaders and organisers are simply not privy to the information required for those decisions.

Recent years have seen an increase in back country flying worldwide. There are many kitset aircraft that are well suited to back country operations, and at AOPA NZ fly-ins we have seen a commensurate increase in participants enjoying back country flying. While many of us are very happy to land in a large paddock and enjoy the scenery over a coffee, others enjoy the experience of 'getting amongst it' on gravel bars, beaches, DOC airstrips and mountain valleys. Most participants joining back country groups are well versed with operating in these environments, and also with operating in groups.

One observed change is that group members are more often unknown to one another before the fly-in. There's quite a difference between flying with a familiar group with whom you fly frequently and flying with a new group where aircraft speeds may differ and the flying styles of each member are not necessarily known. Hence our group briefings, and the standard operating procedure of establishing and maintaining a flying order throughout the day.

This is one of the reasons why, when at AOPA NZ fly-ins, we ask that everyone operates with an increased margin of safety, thereby allowing for unforeseen circumstances. It can also be useful to remember that in doing this it may sometimes be that you're helping out your fellow group members.

See you at an AOPA NZ fly-in soon!

"We're okay, but..."

Jay McIntyre is the owner, LAME and IA of JEM Aviation, Omaka

By Jay McIntyre

The call came in around 11am on Saturday morning. "Jay, I'm in a paddock near the coast. Had a prop overspeed then the engine quit. We're okay, but the plane's a bit munted."

What the hell? Prop overspeed probably means loss of oil. Jeez, what's happened? I'd picked the owner up from Woodbourne barely two hours before, and now he was back on the ground?

We'd completed an annual inspection on his Arrow the previous day. It had been a protracted affair as we had a wait on some parts, primarily a new oil cooler and ignition harness. Once I knew all was well (comparatively!) my mind went into overdrive and I started working through what we'd done because I was sure that the engine hadn't just 'failed'. My initial thoughts revolved around work that had been done on the engine oil system, namely replacement of the oil cooler, three time-ex oil lines and fitting of a quick-drain oil valve in the sump. Had we not connected the lines properly? Had the new cooler failed? Had my tradesman not lock-wired the sump valve? Had the quick-drain failed?

All seemed very unlikely as we'd carried out extensive ground runs, including a compass swing, the day before with no issues. What on earth… I became sure the sump plug had come out as I didn't remember checking it myself.

So it was with some trepidation that I made my way to the scene of the accident. Not a pretty site, but the owner had pulled off a great job getting her on the ground from a relatively low altitude. He had elected to put the gear down and the aeroplane was pulled up in about 50m. Unfortunately, at the end of the roll, the RH gear had dug in, collapsed and slewed the aircraft to the right, substantially damaging the RH wing. Remarkably, the prop was unscathed but there was a big crack in the engine crankcase.

I started looking around. Lots of oil on the belly. No leaks from the oil cooler or oil hoses and the quick-drain valve was there and lock-wired. What the hell? I pushed the drain valve up and some oil came out. Now I was really puzzled. I noticed some marks on it and angrily thought 'those gash buggers used a pair of pliers to screw it in!'

About five seconds later reality washed over me and I realised that the NLG mechanism must have somehow contacted the quick drain when the U/c was retracted and let all the oil out! Cold sweat time… Oh my God! It all made sense, given when we did the ground runs there was no oil leakage as the gear was down.

That evening, I consulted Google and sure enough it was all there. Multiple occurrences of this event worldwide – argh. Going down the rabbit hole revealed that Airworthiness Directive DCA/PA28/174 had been issued in 1980 to cover this very event. It had been signed off as embodied in 1982. Hmm…

From here it became a real human factors exercise and the typical 'swiss cheese' scenario.

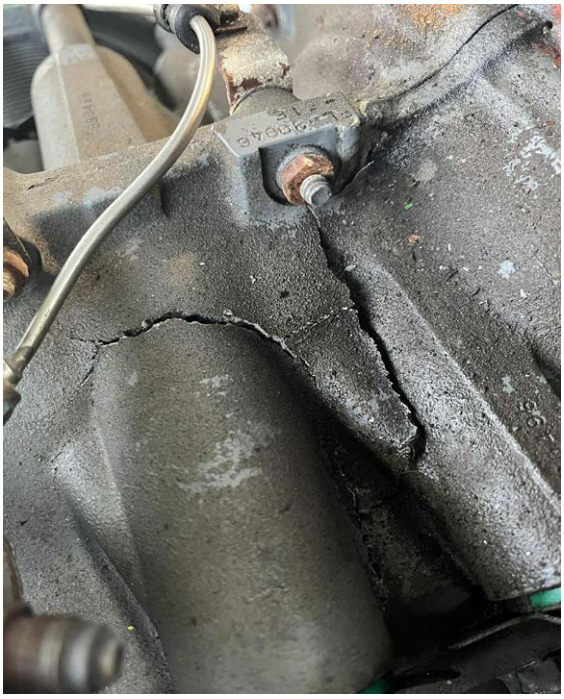
While carrying out the inspection, the boys pointed out there was no quick drain fitted. As I had one on the shelf I thought we might as well fit it and make life easier. I remember briefly wondering why one had not been fitted before, but didn't follow that train of thought up as I was engaged in other tasks. I did check that the valve was eligible to be fitted to that model of engine (which it is).

The tradesman who fitted it is under training and did as he was asked. If he'd had more experience, would he have looked at the situation and considered what would happen when the gear was retracted? Probably a long bow to pull…

The AD calls for the correct sump plug to be fitted and for the fitting of cautionary placards on the engine mount structure adjacent to the plug as a warning. These were not fitted and most probably had not been there since the engine mount was repainted (probably when the engine was overhauled in 2008). I do find it interesting that this AD (and others like it) are not repetitive. Signed off as embodied 43 years ago with no requirement to ever check it again (particularly the placards), it does seem like an incident waiting to happen. I'll certainly be adding it to my Maintenance Planning spreadsheet as an annual check!

My real concern is how many other ADs like this are out there? As engineers we tend to assume that if an AD has been signed off, all is well! Maybe I need to start reviewing all previously signed off ADs on my entire fleet? But man, who has the time to do that!?

While we waited for the new oil cooler to arrive, we completed the annual with no oil in the sump. If we'd filled the sump



before the retraction checks were done, we would have seen oil streaming onto the ground and rectified the issue. Again, a bow to pull, but not such a long one.

Unfortunately, we did not refer to the manual whilst changing the oil as there was a warning to fit the correct sump plug in the Maintenance Manual. Interestingly there is no warning about this in the Annual Checklist, which one would think the best place to have a warning!

The only bit of luck we had in this was that prior to leaving I asked the owner to carry out a couple of circuits to make sure all was good as we had carried out some work on the NLG. While all tested satisfactorily on the jacks I wanted him to make sure it was all fine before heading back to Auckland. As the attached screen shot shows, if he hadn't done those circuits the aeroplane would have been well off the coast when the engine failed.

On a different note, last edition's Yak-3 cooling issues were solved with a re-core of the coolant radiator. Unbeknownst to us, the core was breaking down internally, resulting in a gradual lack of efficiency. Now we are faced with not being able to keep the temps up during these cooler months!

Lastly, something that will make all of you happy: whilst purchasing an ELT for a newly registered aeroplane, my friends at Aviation Radio advised that replacement batteries for the Kannad 406 AF Compact ELT have recently increased in price from around $800 to around $2500! It would seem Kannad are making this model obsolete and want everyone to upgrade to the Intregra model as the replacement unit is around $2000… not sure what the price for an Integra battery is at this time.

All really annoying when we were forced to fit the damned things!

Controlling the combustion event

By Mike Busch, A&P/AI and founder and CEO of *Savvy Aviation*

Each time you change mixture, RPM or MP, it affects combustion timing. Understanding how is your best defence against harming your engine by doing something dumb.

Every time you move the throttle, mixture and prop controls, you modify the speed, intensity and timing of the combustion process. If you don't have a clear mental picture of how changing MP, RPM and mixture affects the combustion event, you'll never truly understand optimum power settings or leaning, and you'll simply have to operate your engine by rote – which is exactly what most pilots do.

Little was known about this stuff back when Beech wrote the POH for your aeroplane. Much of what we now know comes from recent research done by my old friend George Braly at GAMI's Carl Goulet Memorial Engine Test Facility in Ada, Oklahoma, arguably the most sophisticated digitally instrumented piston aircraft engine test cell in the world. Not satisfied with simply looking at engine temperatures and pressures and fuel flows, George has placed solid state pressure transducers into the combustion chambers, enabling him to analyse what's actually going on inside the cylinders on a microsecond-by-microsecond basis.

With that preamble, let's take a look at some of the data from the GAMI engine test facility, and see exactly what happens when we fiddle with those engine controls.

Effect of leaning

Figure 1 shows what happens to a big-bore TCM engine at sea level, full throttle and redline RPM when we progressively pull back the mixture control from full-rich to ultra-lean without changing anything else.

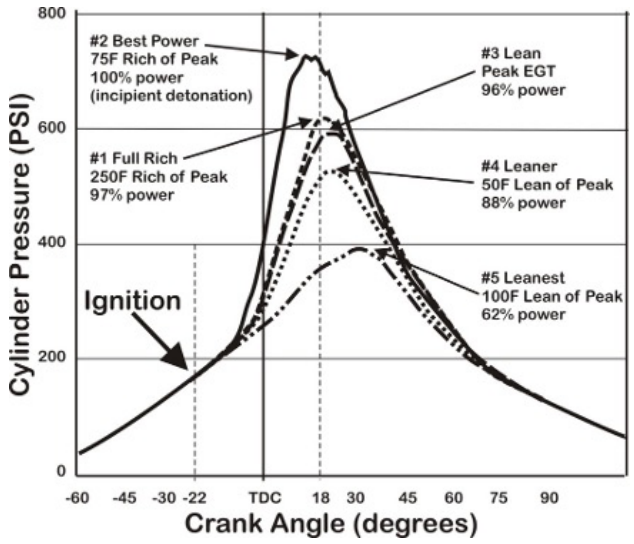


Figure 1: Effect of moving mixture control from full-rich to ultra-lean without changing MP or RPM.

As the mixture is leaned from full-rich to best-power mixture (approximately 75ºF rich of peak EGT), combustion becomes more and more rapid, causing the peak pressure to occur earlier and earlier – closer and closer to TDC. The result is increased peak pressure, degraded pushrod-to-crankshaft geometry, and generally more stress on the engine (but not enough additional power to talk about). If you look closely at trace #2 in Figure 1, you'll see the subtle beginnings of a detonation signature. (This is mild detonation – not enough to damage anything, but a warning that we're approaching the danger zone.)

But look what happens if you continue to lean from best-power mixture to peak EGT. Combustion starts to slow down, the peak pressure occurs further after TDC, the excessive stresses are eliminated, and the power output and combustion timing are nearly identical to what we saw at full-rich mixture.

So why don't we take off leaned to peak EGT instead of at full-rich? Well, we certainly could do that without fear of any short-term engine damage from detonation. In the long run, however, the high exhaust gas temperatures would probably shorten the life of our exhaust valves and valve guides. But one or two take-offs leaned to peak EGT probably wouldn't hurt.

Now look what happens if we continue to lean beyond peak EGT into the lean-of-peak (LOP) realm: the combustion rate continues to slow, the pressure peak occurs even later, the peak pressure and power output decline significantly, detonation margin increases… and of course, EGT decreases. A take-off made with the mixture set at 50ºF lean of peak EGT wouldn't abuse the engine at all. The only problem is that you'd use more runway because the engine would be putting out only perhaps 90% of the power that it does at full-rich.

What this means is that an engine at full take-off power will not be harmed a bit by leaning from full-rich to 50ºF lean of peak, provided you pull back the mixture control briskly and don't dawdle too long between best-power mixture (where engine stress and detonation risk are highest) and peak EGT (where exhaust temperature is highest). I'm not suggesting that you actually do this, only that you understand what would happen if you did.

Effect of reducing MP

Figure 2 shows the effect of throttling back from 30 inches of MP to 25 inches after take-off. As you might expect, this reduces peak combustion pressure – but it also results in a couple of not–so-obvious changes. The timing of the pressure peak is dramatically retarded from a stressful and detonation-prone

14º after TDC to low-stress but inefficient 22º after TDC. (To bring the peak back into the optimum 15º to 20º ATDC range, we'd probably want to pull the prop control back to 2500 RPM – see below.)

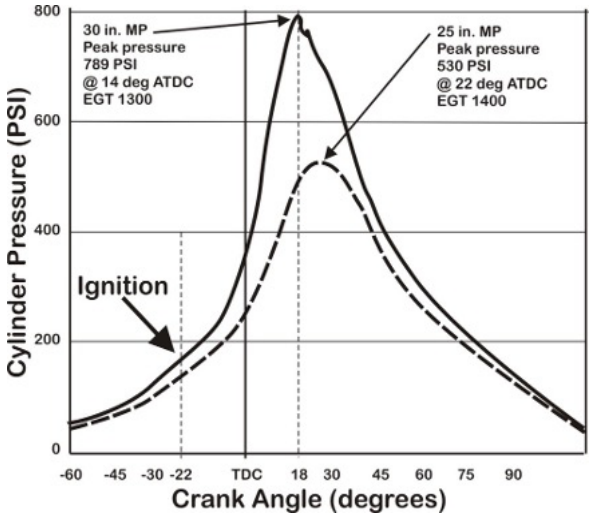


Figure 2: Throttling back from 30" to 25" reduces peak combustion pressure, retards the peak pressure point, and improves detonation margins dramatically. Note light detonation at the higher MP.

Also, despite the fact that power output is decreased, EGT actually increases from 1300ºF to 1400ºF. There are two reasons for this. First, the act of throttling back also reduces fuel flow, and takes the fuel control unit out of its full-throttle enrichment mode. Second, retarding of the combustion event means that less heat energy is converted to mechanical energy by the time the exhaust valve opens, so more is wasted through the exhaust.

Effect of reducing RPM

Finally, Figure 3 shows the effect of reducing propeller RPM from 2700 to 2500 after take-off, with no throttle reduction or mixture change. Note that the result of such an RPM reduction is a higher pressure peak that occurs earlier – closer to TDC. Thus, although pulling back the prop reduces engine power output, it increases the stress on the engine and reduces detonation margin (although in this case, no detonation signature is apparent in the pressure trace).

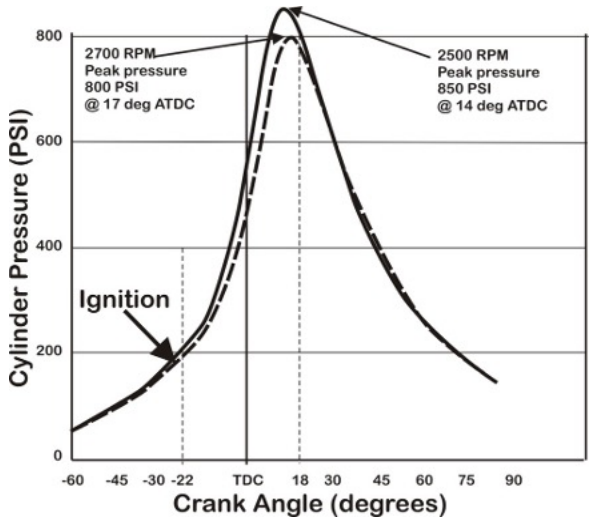


Figure 3: Reducing RPM from 2700 to 2500 advances the peak pressure point and reduces detonation margin. Although power output is reduced, engine stress increases.

This explains the old rule about always reducing MP before reducing RPM. Note that reducing MP causes the pressure peak to decrease and occur later, while reducing RPM causes the pressure peak to increase and occur earlier. Thus, doing both together tends to cancel out the timing change, and to keep peak pressure and its timing relatively constant.

If you haven't nodded off by now, you might well ask why reducing RPM causes the pressure peak to occur earlier. Shouldn't the fuel/air mixture burn at the same rate, regardless of the position of the prop control? In the words of the old joke, "How does it know?"

Indeed, the elapsed time from ignition to peak pressure does not change significantly as you pull back on the prop control. What does change is the number of degrees of crankshaft rotation that occurs during this time interval. Since the crankshaft is turning slower, it doesn't rotate as many degrees by the time the pressure peak occurs, so the peak occurs at fewer degrees after TDC.

Putting it all together

Later this decade, many of us will probably be flying behind engines equipped with fancy FADECs that automatically vary the ignition timing to keep that all-important pressure peak in the 'sweet spot' of 15º to 20º after TDC. But for now, the responsibility for doing so remains with the pilot. So let's quickly review what we've learned.

Leaning from full rich to best-power mixture (approximately 75ºF rich of peak EGT) causes combustion to occur more rapidly and the pressure peak to advance. Continuing to lean toward peak EGT and into the LOP realm causes combustion to slow down again, retarding the pressure peak. Leaning from full rich to peak EGT causes very little change in engine power output, but continuing to lean beyond peak EGT results in a power reduction that is more or less linear with fuel flow.

Reducing MP and RPM also affects the intensity and timing of the pressure peak, but in opposite directions. Reducing MP (throttling back) results in a lower pressure peak that occurs later (in terms of crankshaft rotation), while reducing RPM results in a higher pressure peak that occurs earlier. Reducing both MP and RPM (preferably in that order) results in opposing changes to the intensity and timing of the pressure peak that tend to cancel one another out.

Detonation occurs only when the pressure peak is high and early. Therefore, the greatest risk of detonation occurs at or near best-power mixture (50ºF to 100ºF rich of peak EGT). Interestingly, this is exactly where most POHs recommend that we operate, but it's bad advice. (They didn't know any better back when they wrote it.) Detonation margin can be further impaired by high MP and low RPM.

The timing and intensity of peak combustion pressure are among the most important parameters in piston engine operation. Unfortunately, you don't have a panel instrument to show you that information. In the absence of such instrumentation, a solid understanding of how these parameters are affected by changes to mixture, RPM and MP is your best defence against damaging your engine by doing something dumb.

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The perfect shot

By Ross Millichamp

One of the minor frustrations of being the owner/operator of a light aircraft is the difficulty of getting good pictures of your pride and joy in flight. In this article I interview Aaron Murphy about his passion for aviation photography, and discover some tips for getting the best shots of aircraft in flight.

I first ran into Aaron three or four years ago at a Darfield Fly-in where he was rushing around with a big camera taking pictures of aircraft coming in to Charlie Draper's strip. He didn't appear to be attached to a particular aircraft so I assumed he was an aviation enthusiast rather than an AOPA NZ member. I could not have been more wrong! Turns out Aaron is a Boeing 787 training captain with Air Japan, a subsidiary of Japan's biggest airline ANA.

Aaron learned to fly at the International Airline Academy of New Zealand, the commercial training wing of the Canterbury Aero Club. He was a member of one of the first student intakes in the days when IAANZ operated out of the eastern side of Christchurch Airport.

Once qualified he went to work for Wigram Barnstormers, who flew Stearman and Tiger Moth biplanes on aerobatic adventure flights out of the now defunct military airfield in the middle of Christchurch City. Next came three years flying Piper Senecas and Cessna 402s on charter and freight flights out of Wellington for Vincent Aviation. By the time he moved to Eagle Airways, a subsidiary of Air New Zealand, Aaron had a lot of single pilot, multi-engine, IFR time, something that would be unusual today.

At Eagle Air Aaron flew Metroliners and Beech 1900s out of Hamilton and Taupo. Next he spent a year flying ATRs for Mt Cook Airlines (another Air NZ subsidiary), two years flying Boeing 737s for Jet Connect (a Qantas subsidiary) and from there went to Air Japan. After twelve years on Boeing 767s he moved to the 787, which he flies around Asia on a two week on/two week off roster.

This all came to a screaming halt in 2020 when the covid virus hit. As a contractor, Aaron was one of the first pilots to be stood down, and, although he was still technically 'on the books', he didn't fly commercially for two and a half years. The time out also delivered opportunities to pursue other interests.

Always interested in photography, the covid stand-down allowed Aaron to take lessons with New Zealand photographer John Foster. Looking for the chance to try out his new skills on light aircraft, Aaron turned up at a Darfield Fly-in. Soon he was catching rides with the likes of Charlie Draper, Lionel Green and Neville Bailey, and his photography skills developed quickly. He is now back flying with Air Japan, but has become a regular at AOPA NZ events when they coincide with his rostered breaks back in Christchurch.

I recently spent a bit of time on the ground and in the air with Aaron, hoping to glean some insights into how to take the perfect image of an aircraft in flight.

Aaron (right) enjoying a smaller than usual cockpit with Lionel Green

Equipment

The foundation of Aaron's kit is a Canon EOS 5 DSLR body and a couple of professional level lenses. He mostly uses a 24-105mm for air-to-air photography and a 100-400mm for ground-to-air work. Most digital camera bodies have sensors capable of producing excellent images, but there are no shortcuts in the lens department. Higher quality lenses offer sharper images and faster focusing, which is a key feature for taking pictures of fast-moving objects.

Camera settings

The perfect image of an aircraft in flight requires sharp focus, good composition and, ideally, propellor blur to convey movement.

Being able to control the shutter speed of the camera is key to achieving effective propellor blur, which can be difficult with 'point and snap' cameras and phones. Aviation photographers face a conundrum. You need a slow shutter speed to

blur the propellor but a fast shutter speed to achieve a sharp image of the fast-moving object. Aaron finds that 1/180 –1/200 second shutter speed is an effective compromise, but it does require good technique. Moving (panning) the camera with the aircraft and pressing the shutter when the image appears steady in the viewfinder is critical. DSLR cameras have a large viewing screen which makes it easier to frame a fast-moving object.

Aaron takes most of his pictures in RAW format as this stores far more data than jpeg, allowing greater flexibility for adjusting images on the computer back at home. He uses Adobe Lightroom software for image processing. Image processing software allows you to maximise each image – in the same way that darkroom processing gives film photographers greater control of the final print. The downside of RAW is that the files take up much more room on the memory card. Always carry spare cards!

Other camera settings Aaron favours for aviation photography are:

- ISO at 100
- image stabilisation on, preferably in 'active' or 'sport' mode
- continuous focus (allowing the camera to track the subject and predict where to focus the lens)
- frame advance on continuous (where the camera will keep taking pictures as long as the shutter is held down). Modern cameras have differing continuous speeds and sometimes offer slow and fast continuous options, so experiment to find what works best.

It's all about the light

No matter how good your equipment is, the quality of the shot will be influenced by the availability of light. In general, having the sun behind you at a low angle delivers the best images. It is much harder to get great pictures in the middle of the day when the sun is directly overhead. The images may look good in the viewfinder but the final result is often underwhelming.

Taking pictures into low angle sun can also produce some interesting effects, but you generally need to avoid having the sun shining directly into the camera.

Framing

It can be tempting to fill the viewfinder with the subject, but that can work against you. Modern digital cameras collect so much detail that you can get a very good image by cropping in on the subject later, and having a bit of space around the subject gives you context, as well as the opportunity to try out different compositional crops later.

Approach editor Anna Mackenzie comments that people tend by default to use landscape (horizontal) over portrait (vertical) format, but that portrait format has a lot to offer, even with seemingly horizontal subjects such as aeroplanes – and certainly portrait is what is required for a magazine cover!

She adds that being aware of a few simple compositional rules can also be beneficial. Understanding the different ways of applying the rule of thirds, utilising leading lines, and leaving space ahead of the aircraft so that the viewer's eye has a sense of the space it will be moving into can all help lift your images to the next level.

Air to air pictures

Air to air pics create their own set of challenges. The big advantage is that the target is moving at the same speed as the photographer, so it should be easier to get a sharp image. Any turbulence will become an issue however, so Aaron advises that air to air photography is best done on calm, smooth days.

Another advantage of air to air is that the photographer, pilot willing, has the ability to position themselves wherever they can make the best of the available light and background.

Anna notes that you should also give some thought in your advance planning to your background – choose one that is not so busy that it will dominate the central image - and also consider the colour of the plane against the background. High contrast but complementary colour compositions are reliably visually appealing she says.

The safest way to take air to air pictures is to have the subject aircraft fly straight and level while the other aircraft moves around at the request of the photographer.

Neville Bailey was kind enough to fly the chase plane on our recent trip to take pictures of ZK JBT, and I felt that his job was the most demanding. One issue that is difficult to overcome is that most of our aircraft do not have fully opening windows on the passenger side. Taking the door off is an option but can require a host of paperwork, a special harness for the photographer and the need to pay close attention to potentially loose items in the cockpit. In reality, cleaning the passenger's window is the safer option and provides perfectly usable images.

Aaron typically uses his 24-105mm lens for air to air photography so needs to

get reasonably close to the target aircraft. Longer lenses are physically difficult to use in a tight aircraft cockpit unless you can open a window or remove a door. If you're using an extending telephoto lens, please pay attention to not scratching the aircraft's perspex as it extends!

Air to air photography needs significant planning in order to get quality images in a safe manner. It is better to do it as a planned exercise than trying to do it 'on the fly' when encountering other aircraft along the way. A pre-take-off briefing between the pilots and photographer is essential, as is good communication once in the air. All parties need to feel comfortable at all times, and safety takes priority over all else.

Ground to air pictures

The speed of the target as it moves across the viewfinder is the primary challenge in ground to air photography.

It is generally easier to get a sharp image if the aircraft is moving slowly and you are close to it. Being closer allows the use of a wider lens which has a greater depth of field (a bigger area in front of and behind the subject that is in focus) than a telephoto lens. Your aperture setting also controls depth of field. Experimenting with focal length and aperture setting will help you discover the optimum combination for your own equipment.

Start taking pics when the target is still a distance away as it allows the camera's predictive focus more time to get a fix. Getting a little elevation so that you are not shooting straight up at the target can produce a more interesting image with more background details and better lighting.

Take time to plan a ground to air shoot in advance, again thinking about light, image composition and framing.

Final thoughts

Digital cameras have revolutionised aviation photography, partly due to advances in technology, but also because you can literally take thousands of shots in the search for that one perfect image. It is difficult to truly predict the perfect shot and at times it happens by accident. Sure, you might have the best gear, be in a great location and have good technique, but there will often be one image of a series that really stands out.

As pilots we have access to amazing places where the location will always be the hero of the image. Remember to give the location as well as the subject the opportunity to shine.

Pilots are often – rightly! – focused on the operation of the aircraft, or on getting a briefing for the next strip we will be visiting. Assigning photographic duties to your passenger, or taking the right-hand seat in a friend's plane from time to time so you can give your photography your full attention, may generate the best images.

Aaron's final piece of advice is to always take back-up pictures of special places on your phone. That way, should your storage card fail – which is not unknown – you will still have images of that special place or flight.

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