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Mooney

Pilots Association

NEWSLETTER



Greg Dillenbeck somewhere south of the Royal National Park in NSW, flying fast in his Mooney Ovation.

Some more fantastic pictures from Greg:

'Here is the picture I took. Note the sun setting between the cloud and the land horizon. And a shot of MZZ at exotic Lightning Ridge...The story is that I was doing an Angel Flight from LRD to Dubbo and back to LRD early February. A very hot day with strong thermals in the afternoon to 10,000 ft. So, going home to BK, I decided to fly over it all. The photo is in MZZ between LRD and MDG at FL130, clear of the turbulence that is still considerable even at this late hour of the day. Smooth as silk, oxygen keeping the head clear, and the Continental purring along nicely. MZZ maintains just under 180 kts at that altitude. No other non-turbo aircraft can do that...'



Do you have any great pictures, preferably with a few lines to tell us about your adventures in a Mooney?

Please share them if so! Send to Peter, AMPA Newsletter Editor, jrus2233@gmail.com

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Contributions to your AMPA Newsletter are very welcome. If you can share a Mooney story or let others know about news, please send your contributions and photos to Peter at jrus2233@gmail.com

The Prez Sez

AMPA President's Report February 2024

Welcome to the February 2024 President's report.

Well, another year has gone. Happy New Year to you and your families. I hope you had a great festive season.

Our last flyaway and Special General Meeting at Orange went well. We had about 32 members attending and we even made a small profit from the weekend. Dean did a great job organising us around the town and district. Thanks Dean.

Many thanks also to Andrew for organising the tour of the Canola Crushing plant at Manildra. This business has a great history where two brothers coming from a small farming family built a world class crushing plant. And, as usual, a big thanks go to John Hillard for getting Andrew Anderson to join us and give a great presentation on the SouthPan satellite system. This is a very complex and expensive project and hopefully will be up and running in the next few years to provide better GPS navigation, and approach guidance throughout this part of the world.

Both the Special Resolutions were adopted at the SGM and we are now implementing those changes. These were to (1) align our financial year with our membership year and (2) to allow spouses and partners to become associate members of AMPA.

We already have some new Associate memberships coming in. So, if you would like your wife/partner to become an Associate member of AMPA, please fill out the application form and send to Owen (webteam@mooney.org.au). There is no cost for this membership, so please join up and increase our presence in the aviation world.

John Martindale has been sending out the membership renewal notices to re-align us with AMPA's financial year. Don't forget to renew your membership if you get a renewal notice. If you don't get a renewal notice, it will mean that you have subscribed for 3 years and are still a current member.

It was great to meet and host Tina & Gunter Haug at our home in Merimbula. Tina & Gunter are a great couple and, as you will know, have flown their M20K Mooney from Germany to Australia, and are in the process of circumnavigating Australia before flying back to Germany. Unfortunately their time in Australia is short and we would have loved to spend more time with

them. We showed them the local attractions and Frogs Hollow Flyers (just outside Merimbula) put on a bbq lunch for them and a few of us had a great night out to dinner at one of the local eateries. We wish them all the best for their return trip home.

Owen and I (well, mostly Owen) have been working on our next flyaway and AGM in Port Lincoln SA. The dates are Thursday 14th to Monday 18th March 2024. The information is available on our web site, so it might be a good idea to call the hotel and book your rooms now or as soon as you can. We have a group booking at the Port Lincoln Hotel, so just mention either Booking Reference 492249 or Australian Mooney Pilots Association. The rooms are only being held for us until early February.

The registration form is up on the web also.

Maybe you could incorporate it into a longer trip to WA or outback SA afterwards.

It would be great to see a big rollup for my final hurrah as your President.

Please consider taking up a position on the Committee of AMPA. I will stand down as President at the AGM in Port Lincoln and will happily stay on the board if I get elected. Change is always good for any association, so have a think about nominating. You will find it a most rewarding experience.

Owen has the nomination forms, so please contact me or Owen to discuss.

We need to get the word out there, that we are now "Association Members" of the Aircraft Owners and Pilots Association (AOPA). This gives our members a discount on membership. AOPA have been instrumental in getting many of the better changes to regulations within CASA and helping out many of the regional airports who have been fighting Councils for better conditions across Australia. They need our support so please consider joining AOPA.

Stuart has commenced work on the PSP in Western Australia this year, which hopefully will attract some of our WA members. If you are from the west or would like an excuse to fly to the west, this would be a great opportunity to incorporate the PSP into a holiday. The Royal Aero of Western Australia have 3 x M20J's for hire if you want to take the kero burner over.

One thing we need to think about in the future is how we use our not insignificant funds, held in our bank accounts and investments, to better serve our members. There have been a number of suggestions including subsidising our flyaways or PSP's. Suggestions have also included AMPA holding a stock of parts, such as No Back Springs or undercarriage donuts and others. Holding parts in stock can come with some issues such as where do we hold the stock, shelf lives, administrative costs etc. We want to use our resources better to help our members, so if you have any suggestions please contact a committee member. We already have a range of Mooney specialised tools available to members free of

charge. Just check our website for a list of these parts.

You just need to contact SmartAir in Albury NSW to get them sent to you.

So that's about it for my report this time.

Once again Judi and I would like to wish all AMPA members and their families a very happy New Year and look forward to seeing you in Port Lincoln in March

Cheers

John Smith

President AMPA



And The Trez Sez

I haven't really got anything newsworthy or gossipy to go in the newsletter. Just three things from the Treasurer could bear a gentle friendly reminder perhaps:

1. The alignment of membership and financial years as approved at Orange last October is proceeding smoothly although there is still a number of 2024 memberships (\$75) as invoiced remaining due by the end of January.
2. Registrations (\$600) for the Port Lincoln AGM are open on the website. We are still a bit short on numbers and our accommodation block booking cannot be held for too much longer.

3. Our new "Associate" membership for spouses and partners of existing full members (also approved at Orange and suggested by members at the 2023 AGM in Longreach) is proving popular with the loyal support for AMPA over many years by seven people formally acknowledged so far. The application for this is also on the web site.

Regards John

John Martindale

New Members

Welcome to Tony Wrobel based at YLTV

Tony has a history of RAAF apprentice 1976 - Engines, RAAF pilot 1987 - transport, joined Dragonair Hong Kong 2001 A330, A320 & 747. Left HKG 2016 and kept my hand in doing a little flying out of YMMB. Currently running a beef farm in the Strzelecki Ranges. Seriously considering a Mooney to purchase and operate for some business and personal use.

Tony, you will find a wealth of Mooney information and knowledge here. Please don't hesitate to reach out to AMPA members, who'd love to meet and chat.

Welcome to Rob Rossi based at YSHL, (better known as Wollongong to many of us)

Many of us have already met Rob on the forum and may know he is now the proud owner of 8CS, an M20J with many years of AMPA history under its former N reg and former AMPA committee member. Rob tells us the following about himself.

I came to aviation Later in Life, I've all my training in Pipers - Cherokee, Archer, Warrior and Arrow . Obtained PPL November 2023 with the intention of travelling around Australia with my wife as an alternative caravanning around Australia as part of our semi retirement.

Chose a Mooney on the strength of my research based on speed vs economy but after asking

questions on this site and being overwhelmed (in a lovely way) by wonderful Mooney owners willing to help with advice and experiences, including on gentlemen who came to YSHL and took me for a flight! My fate was sealed shortly after takeoff in that Ovation. I couldn't afford an Ovation but also felt it was too much plane at this stage of my aviation journey. However, I knew instantly I had to have a Mooney!

I want to become an expert (for want to a better word) in flying one particular plane, I want to do my PIFR in the plane that I'll be flying and any further training that may available for a Mooney - I believe that knowing one aircraft as well as is humanly possible will help to make me the best, safest version of the pilot that I can and want to be.

Rob, as you probably know already there are several members around Wollongong and Wedderburn, including myself. If you ever fancy graduating to the Wedderburn strip do let us know. You'll find an excellent sealed strip and taxiways, some very friendly and knowledgeable Mooney folks there, much cheaper hangarage, fuel and tech assistance and no landing fees(!) and no, its not nearly as nasty as some folks would have you believe but might take a little bit of getting used to at first. And yes, a Mooney certainly beats caravanning!

Maintenance Matters

Going to need a new engine? An owner's experience...

About the Author: Stuart Payne is co-owner with Rowan Hill of 1985 M20J VH-SJT, based in Jandakot. Stuart is also Vice President of AMPA. After flying to and from the 2023 AMPA PSP in Bathurst, they received some unwelcome news during their next oil change...

Fresh back from the 2023 PSP, and with Rowan intending a trip up to Karratha the following weekend, SJT was booked in for an oil change. Mid-morning I received the phone call that no owner wants from their LAME: "we have a problem, you'd better get down here and take a look". The cut-open oil filter contained large

quantities (probably a table spoon or two) of metal particles (mostly silver coloured but some bronze coloured too), much of it suspended in the oil like glitter. The Chief LAME and their engine expert were adamant that this engine was in need of significant work (re-build) or replacement before SJT would fly again.

Oil Filter internals showing metal particles



At this stage the engine core (a Lycoming IO-360-A3B6D) was the original one that was installed in the airframe 38 years earlier

Engine State	Date	Eng Total Time in Service	Eng Time since overhaul
New	1985	0	0
Field Overhauled (Scone Aircraft Maintenance Services)	April 1997	1,987	1,987
Making lots of metal	April 2023	3,583	1,596
Lycoming Remanufactured exchange engine Fitted	Sept – Nov 2023	0	0

Warning Signs

Our engine has been subject to "on condition" care and maintenance processes since 2009, requiring (among other things) all oil consumption be recorded and trended, and for compression checks to be done at the annual inspections.

Oil consumption had been increasing over the 15 years we've owned it, from 1qt per 6-8 hours to more recently 1 qt per 3-4 hours. We also started having more plug fouling issues, particularly on Cylinder 3. Compression checks have always been fine (interestingly there is much discussion

about the interpretation of those numbers these days).

Late 2022 we were advised that there was significant bore corrosion in two cylinders – this was a surprise (maybe it was recent, or maybe it had not been noticed before). SJT is typically flown for 50-100 hours a year. Rowan and I were discussing at that point whether it made sense to do a top overhaul of an engine with 400 hours to run; or not, prior to the engine making the decision for us!

The Original Plan

Engines cannot last forever. Our core was 38 years old and in that time has hosted approximately one billion controlled explosions across its four cylinders. In theory our engine would last to 2,000 hours (since field overhaul) but there were already signs that this may be optimistic.

M20Js were built with a variety of engines (per the FAA approved M20 Type certificate) including the IO-360-A1B6D, -A3B6D and -A3B6. The D suffix indicates the infamous Bendix dual magneto is fitted (these magnetos are becoming a little difficult to maintain/get parts for). No STC is needed to swap an -A3B6D for an -A3B6 because the -A3B6 engine is already listed on the Type Certificate. The final production run of M20Js actually had this engine fitted as they came out of the Mooney factory in Kerrville, Texas.

The Reality

As Mike Tyson once said “everyone has a plan until they get punched in the mouth”.

Initial lead time quoted by Lycoming’s WA distributor for “factory new” or “factory remanufactured”

engines was **fourteen months**. (Interestingly, they would not take our core back as an exchange on a “factory overhauled” engine at all, due to our core’s calendar age; the cut-off being 36 years)

Obviously, we wanted our aircraft grounded for as short a period as possible. Fourteen months was unacceptable to Rowan and I (flying addicts cannot be expected to go without their fix for that long!) – our plan was shot. The 14 months was the Tyson punch.

So we set about getting quotations for a field overhaul as a next best option. Now since COVID, there are no aero piston engine overhaul facilities in WA – so the engine would need to be trucked East and back (more cost and delay).



So our future plan was for an IO-360-A3B6 (no D) from Lycoming. This would restore true redundancy of the ignition systems and ensure maintainability of the common Slick magnetos.

Going this route would also give us the benefit of Lycoming’s roller tappet design introduced on IO-360 engines since about 2010, which eliminates the sliding motion between the camshaft and the tappet, maintaining alignment so the roller tappet cannot loosen or turn during engine use, making the engine more durable.

We did entertain the idea of an IO-390 installed under an STC but there were complexities concerning that engine and our prop, and we just did not have the time to fully research and implement that idea.

With input from AMPA committee and members (an incredible technical resource, btw) and our LAME, we developed a shortlist of companies we would trust to re-build our engine, and requested quotations. These ranged between \$65k and \$80k (incl GST) together with a laundry list of assumptions and extra-cost options, any of which could result in very significant cost or schedule increases. Interestingly, most did not source all of their parts from Lycoming either (but I’m not saying they should). Lead times were suggested as 3-4 months but heavily qualified (it could be longer – especially when waiting for parts suppliers to deliver or if defects are discovered post tear-down).

These costs exclude engine removal and re-installation costs.

While we were deliberating over the quotations, the Lycoming distributor in Queensland advised Rowan that, in 2022, they had reserved Lycoming factory production slots and could actually deliver a factory exchange engine in **seven months**! This was a game changer.

Numerous people we spoke to were sceptical of this and said “they’re just saying that to get your business”. See later for the outcome of that!

	Field Overhauled	Factory Remanufacture*
Cost (incl GST)	AU\$64-80k minimum plus potential increases unknown until disassembly	AU\$105k fixed including freight to Jandakot and old core back to Lycoming USA
Lead Time	3-4 months min plus 2-4 weeks road transport. Subject to delivery of required parts from others.	7 months
Warranty	12 months typical	2 yr factory
Roller tappets	Not field installable	Included
Two separate magnetos	AU\$12k option quoted by 1	Included
Parts source	Mix of Lycoming and other	Lycoming and their approved suppliers only
OPTION SELECTION		Chosen option

*The Factory Remanufacture is an engine built by Lycoming with new and old parts but all parts must meet specifications for new parts. There was the option of an engine built from all new parts, however this option was eye watering expensive and the advice we were given was that there really is no difference in quality/durability of these two options. The Factory Remanufactured engine starts with zero-time in service, just like a new engine, with a zero hour new log book.

Everyone's situation is different and will be impacted by future intent to keep or sell the aircraft in the short, medium or long term.

It should be pointed out that overall cost for this engine exchange and all associated work including a full annual inspection was about the same as the 2009 purchase cost of the aircraft - AU\$150k. You have to get your head around that (once you've stopped scratching it).

There is more than just the engine to consider

As our old engine had inconsiderately produced and distributed metal filings through the whole oil circuit including accessories, our project ended up being considerably more than just a "change the engine" exercise.

We needed to also:

- Replace the oil cooler (it is said that one can never get all of the metal particles out once they're in one. Their later circulation through a new engine would be very bad.)
- The governor would need disassembly, flushing and overhaul.
- The prop hub likewise

Then there are the other fire-wall forward things that are required (or at least highly recommended for us) for an engine swap:

- New engine shock mounts.

- Removal, stripping, MPI testing, re-painting and re-fitting the engine support frame.
- New engine controls and cables.
- Overhaul/inspection of starter and alternator (in our case the starter was difficult to get parts for within our timeframe, and we elected to purchase and fit a new light weight starter)
- New engine hoses (ours were due anyway) – they are different to A3B6D hoses!
- Baffle care and maintenance.
- Firewall clean and tidy up (things you can only do when the engine is out).
- Our overall prop condition (not just the hub) was such that a full prop overhaul would extend the prop life for another 1500 h. Cheaping out with just a re-dress and service would have saved some money upfront, but we wouldn't have met tolerances to even allow an overhaul in the future, meaning that we may only get a few hundred hours out of the prop. We elected to do full prop overhaul. Ours is a 3 blade black mac McCauley prop and a new one would set us back another \$35k or so.

An IO-360-A3B6 is **ALMOST** the same as an IO-360-A3B6D !

Ask anyone who has done this particular engine swap and they are likely to start to shake uncontrollably – this is where the devil is truly in the detail!



- The A3B6 core drives the governor at a slightly different speed to the A3B6D, which then requires a new or modified/overhauled governor.
- While we are at the governor, the way the prop control cable attaches is different and more special parts are required from Mooney to make this work. LASAR have a different way to do this but we weren't satisfied their way was legal in Australia for a certified aircraft.
- There is an oil line from the rear to the front of the engine – this fouls the engine supports and must be changed for another Lycoming part at significant cost. This for an engine marketed by Lycoming for M20Js yet the supplied oil line does not fit. Go figure.
- While the primary engine tacho input was not impacted by the change from Bendix mag to Slick mags, the rpm input to the JPI EDM830 was. We ordered a new probe but as luck would have it this was found to be dead on installation. This took another month to sort out as JPI would not ship another until we returned the old one and they themselves verified it was dead (which it was). Fortunately, we still had the primary tacho to fly by, and now have the replacement JPI probe installed and working as it should.

- There is also a tiny governor control oil line fitting to be purchased from Mooney or LASAR

Delivery

No one knows how or why this happened, but we were shocked when contacted by the Lycoming agent to advise that the engine was in Sydney and they needed payment, after which the engine would be in Jandakot days later. This occurred THREE months after order placement. Forget seven months or fourteen months - we got ours in three.

Installation

The early arrival of the engine caught us by surprise as we had not sourced all of the required parts yet, and our local Mooney Service Centre was unable to cope with the size of our job and we instead used Swift Aircraft Services at Jandakot whose services I cannot speak too highly of. Ditto other collaborators like West Coast Avionics and West Coast Propellers who also did great work.

By collaborating with Dave Robins at Swift to allow him to fit our work in between high priority work from his corporate customers, we were able to get the removal and installation work (and an annual inspection) done at a very fair cost, over the course of three months. This period included waiting for engine hoses from Melbourne that could only be fabricated after engine installation and taking measurements.



An engineless SJT with a clean firewall and engine support frame back in, minus the 4 shock mounts



New engine is in



More progress made on the engine install, prop hung, baffles being installed



Wider view of above

Conclusions

Consider what your re-engining options are before you need to – as your need may come earlier than you think. Understand what your options are with the engine supplier as things like core age limits may influence your decisions.

Engines are expensive and not getting cheaper. Only five years ago our engine would have cost about 60% of what we just paid. If you assume even a \$120k engine swap lasts 2000 hours, we need to set aside **\$60/hr** as an engine replacement provision. This is real and significant. We could (until your engine dies) ignore this cost but like death and taxes, the day will surely come when another engine is needed. At that point the only options are re-engine/field overhaul, sale of airframe “as-is where is”, or part-out. In our case, with a well maintained, well equipped aircraft that we intend to keep – the latter two options held little appeal to us.

Exchange rates are a big factor in the engine costs and the base costs are fixed in USD terms (or are increasing). Changes in the AUD/USD exchange rate up or down directly impact our costs.

While the hull value of your aircraft won't increase by the cost of the engine swap, it will surely increase by a portion of that cost. Your investment does not (completely) disappear and you should get an aircraft broker to value your plane and then you decide what value to re-insure at, to protect your investment.

Despite the costs, we are very satisfied with the outcome. We are running in the new engine with mineral oil and at high power settings (75% and above, at about 5000 feet) per Lycoming guidelines. Even so, on hot summer days, we are seeing oil temps in the mid-eighties, and CHTs just less than 200 Deg.C – resulting in an impressive TAS of 160-164 kts at those settings.

The new starter cranks noticeably faster than the old, making hot starts much easier too. Now that the engine shock support rubbers have settled, we have a little engine re-shimming to do but this is not a big job. Cyl 4 EGT is also presently running 45 or so Deg.C cooler than the other 3 EGTs so this will need checking in time to see if it is running rich, or is it a sensor issue, or something else?

We are looking forward to hopefully many years of trouble free Mooney flying to come with SJT.

Footnote: I have accumulated a lot of technical and commercial detail around this project, I am happy to share on request but the detail and commercial info was inappropriate to insert into this article. Contact stuart@mooney.org.au

Over engineered and dangerous?

The Continental direct geared drive alternator and the starter adaptors..

A relatively new (to Mooney) member reports issues with both the Continental starter and alternator attached to an IO-550 in an otherwise excellent Mooney Ovation. This is one area where Continental design often differs with Lycoming.

The IO-550 was the first Continental engined Mooney the member had owned, formerly having been an exponent of Brand X's over several decades. The initial impression of the 6 cylinder Continental was of a beautifully smooth efficient engine that loves to run lean of peak, resulting in considerable fuel savings over the Lycoming TIO540. The new Mooney owner heard horror stories of cylinder problems in Continentals but experienced nothing of that.

The first hint of trouble was the dreaded starter adaptor, which started to slip as the engine exceeded 1000 hours. After consulting various experts and forums, our intrepid aviator soon learned this was not good news. Unfortunately, this can happen with little advance warning and result in an immediate failure leaving one stranded in the middle of nowhere. Once you hear it slip, you could have 20 more starts, or none. Ingenious Continental.. Much better than the clunky old flywheel ring gear and bendix spring invented by Vincent Bendix in 1914?

The beauty of conventional starters and alternators, clunky and crude as their Bendix and external belt drives may be, is that they remain external to the engine. Therefore, when they go wrong, which our intrepid aviator had experienced several times over the years with Lycoming alternators and starters, there is little danger of damaging the internals of the engine. Even a seized alternator might do nothing more than snap the drive belt, which at worst means a simple bolt-on replacement and/or propellor removal if your LAME hasn't seen to fit to cable tie a spare belt to

the crankcase to avoid that necessity. Replacement alternators and starters for Lycomings tend to be generic automobile types, easy to get hold of and relatively inexpensive even with the aviation paperwork (essential for safety of course!) and resulting pricing.

Our new Mooney aviator was horrified to learn that, with the Continental starter motor, it's not unknown for that elaborate spring device to slip on the shaft and deposit resulting metal shavings into the oil with risk of major damage to the engine. Therefore, they decided to deal with this as a matter of urgency but were shocked by the list price of the new adaptor of around \$7000(!) and, of course, there weren't any for months. On top of that, the advice received was that the type of starter motor fitted by the manufacturer, the lightweight Iskra, is the likely cause of damage to many Continental adaptors.

The 'cheap' lightweight geared starters spin over very enthusiastically but because they work through a geared drive, they cannot turn back after starting and the spring cannot be unwound quickly forcing slippage whilst the spring is still gripping the shaft. Therefore, a new big heavy old fashioned but much gentler starter was also ordered for \$1400. Fortunately, a highly reputable Brisbane overhauler had a rebuilt exchange adaptor on the shelf, which they sent overnight without charge, advising that they'd only send a bill when they got the old one back and worked out what it needed to bring it back to new specifications. In the event, the charge was 'only' around \$3000 and better quality after market parts were used, which seemed almost like a get out of jail free card. However the new starter motor is almost twice the size and weight, which can't do much for weight and balance being towards the front of the aircraft, but is incredibly smooth and a joy to operate in comparison to the Iskra.. Therefore, that was the starter issue hopefully solved for at least another 1000 hours... fingers crossed. (Been very good for 200 hours so far.)



The dreaded starter adaptor



The alternator issue wasn't quite as simple and, ultimately, more than a little scary. Continental make their own alternators and they're hard to find good service for. And there is the rub. A quick Google search revealed quite a few failures that have ultimately resulted in engine failures and fatalities. There are two big issues:

1. The alternator coupling is a simple device but assembly is absolutely critical. There are several instances where incorrect assembly has resulted in failure with reports of fatalities in crash comms around the world. Special parts and tools are required, which many LAME's don't have. For example, in one report involving a TIO550 powered Malibu, four fatalities resulted because a mechanic substituted a non standard washer that shredded itself resulting in metal fragments in the engine oil that ultimately

caused a rod bearing to fail and destruction of the engine.

2. Continental recommend a 500 hour inspection of their alternator and the coupling. Quite why this is only a recommendation is a mystery when the consequences could be catastrophic. In the case here, the alternator had gone 1150 hours without trouble. Not being familiar with Continentals and as there was no hint of malfunction, our new Mooney aviator just concluded all was well with the alternator.

The trouble all began when it was noticed the alternator took a few seconds to start charging. This is an alarm bell that should not be ignored because it is probably a sign that the coupling is beginning to slip. The coupling drives through a flexible bright orange elastomer material that is tightly located in a cup. The theory being that should the alternator seize the elastomer will slip and/or shear in the cup without causing further damage to the engine.



Correctly fitted elastomer coupling located in its cup



The elaborate drive gear into which the alternator coupling gear is engaged

Resulting damage if the elastomer coupling moves into contact with its driving gear, potentially resulting in dangerous metallic and elastomer debris entering the oil. (This whole thing resides the engine oil.)

The critical nut and bimetallic washer retaining the coupling as removed.



Filter cut open to reveal orange fragments from the elastomer... hopefully the filter having done its job without fragments proceeding further into the engine, prop governor etc.



they can damage anything. The danger is that there may also be some failure of the metal components. If these find their way into the engine, an engine tear down (or much worse as in the SAIB below) could be on the cards.

Here's an extract from the SAIB resulting from one of the alternator coupling failure fatal accidents :

<https://www.aero-news.net/index.cfm?do=main.ajTextPost&id=7cd2ca0a-3570-48bb-8022-1cd45e0cfcda>

“The SAIB is prompted by a June 28, 2015, fatal accident in Plainville, Massachusetts involving a Beechcraft A36 airplane with an IO-550 engine installed. The NTSB accident investigation report (ERA15FA254) revealed that the alternator drive coupling had failed, which resulted in damage to other internal engine components and ultimately resulted in a catastrophic engine failure due to a lack of oil lubrication.”

Bear in mind that alternators are highly stressed units running at 2-3 times engine speed. They run in simple bearings that work quite hard. Shear loads on the coupling are high when output is high, for example after start. Should the elastomer fail, it's fairly inevitable that (at least) slivers of orange elastomer will be passed into the engine oil that could block oil ways. Hopefully, the oil filter does its job and these particles are caught before

The NTSB report goes on to say, "Either an out-of-tolerance coupling or an improperly installed one can result in insufficient clamping force holding the coupling against the alternator. If there is insufficient clamping force, the coupling can rotate on the shaft and cause unusual wear and the ultimate failure of the coupling."

In the accident engine, the unusual wear of the coupling led to the introduction of metal particles and elastomer material into the engine oil system. Foreign material in the oil system can obstruct oil passages that supply oil to engine bearings resulting in oil starvation, bearing failure, and ultimately catastrophic loss of engine power. These engines have a direct, gear-driven alternator with a coupling "clutch" between the engine crankshaft face gear and the alternator drive gear. In the event of an alternator seizure or failure during engine operation, the coupling is designed to slip to minimize core engine damage."

Our new Mooney hero continued to ignore the few seconds for master warning and low volts warning light to go out after starting. Otherwise, charging went perfectly for a few months without any issues until one day it didn't. After an hour or so of fault finding, a LAME decided to remove the alternator and send to quite possibly the only remaining reliable Continental alternator repair station on the East coast. Things then went very quiet. Wondering what was going on and chasing the LAME after a week or so, it transpired that somehow the package was lost in the post but luckily returned that very same day unopened and untouched. (Right!) Our somewhat perplexed Mooney aviator decided to take the 12 kg package and deliver it personally and so bought a \$70 Jet Star ticket (cheaper than the postage!) to Queensland. The repair station was very professional and helpful and did the job same day. They noted the alternator had not been touched for possibly 15 years and about 1150 hours. Naturally, they advised a 500-hour inspection. It turned out the alternator itself was in very good condition. Bearings and brushes were close to perfect but the coupling was toast. Although it appeared fine to the human eye, it failed the torque test miserably. The genuine couplings are now a pricy item and the cheaper non-OEM items were not recommended. Fortunately, the repair station had one OEM coupling in stock 'at the old price' and the 500 hour check with new coupling was signed out for about \$2500, which sounds a lot for an alternator inspection (if you're used to Lycomings) but a fraction of the price of a complete Continental overhauled alternator and

coupling that our aviator thought they might be up for when the package was apparently lost.

Our hero returned to Sydney on JetStar with the alternator hopefully now good for another 500 hours. The LAME who took it off ultimately turned up and refitted and tested it. It was all fine with no delay in charging after start-up. Just over one month on the ground for the whole episode! (or so our hero thought) There are so few who will service these alternators and couplings anywhere now, with many LAME's understandably wary of the coupling and the need for special tools and reluctant to touch them.

But that wasn't the end of the story. About 10 hours later, our aviator was climbing away from a remote Western NSW town when the Master Caution and low volts lights merrily started to flash. The emergency checklist goes through 4 steps before getting to '5. Terminate flight as soon as practicable', which seems to suggest that if 1-4 are completed satisfactorily, it's fine to continue. Our hero is not so sure now! Whilst fumbling around working through checklists, the lights stopped flashing and it appeared the alternator came back on line. So the situation was ignored and the flight continued to Bankstown without further incident. (Some folks never learn.)

The next couple of flights were also fine with no issues but then the flashing lights came back and did not extinguish. Our hero was beginning to learn and being close to their home field, went straight to checklist item 5. 'Terminate the flight as soon as possible'. Being a fan of C H Waddington (the most likely time for any failure is after maintenance) cursing what they thought would be 'that damn coupling again'.

Armed with Mr Google, our hero rang the repair centre recounting all of the recent alternator behaviours and somewhat impertinently asking if the packing sleeve was removed, whether the nut and washer was torqued and tested etc, as per the various tech advice published. To which the repair centre politely replied, 'oh so you've been reading stuff on the internet, well what makes you think it's the coupling? ...and btw, they don't come with a metal packing sleeve any more'. This took our hero back a bit, being so sure that was all it could be because that was the only new part fitted.

The repair centre agreed to look at the alternator and, if the coupling was the culprit, replace it under warranty, gently reminding our hero that '5. Terminate the flight as soon as possible' would have been sensible, especially if the coupling was

suspected and it may have been unwise to continue, whatever checklist items 1-4 implied. So a wait for another LAME to remove the alternator ensued. When the LAME began to remove the alternator, the 100 amp crimped cable connector fell apart literally in his hand. Obviously, that was the reason for the failure! (Some folks never learn). It seems the 100 amp crimped connector had probably loosened some time ago and the increased resistance as it did so leading to considerable heat in the crimped connection, which literally melted the connector. Presumably, the alternator came back online because sufficient molten metal resolidified when the alternator

stopped charging to remake the connection. (Hmm, very dodgy indeed... mental note: go straight to checklist item 5 if this ever occurs again!)



The cause of the second alternator failure. (Possibly resulting from disturbance of the very poor crimped connector after the alternator was removed the first time)

alternator inspections was unfortunate and 'on condition' maintenance of these alternators is not unusual.

After all this, our hero hasn't got so many nice things to say about Continentals. Hopefully, it's all resolved now and it's just a matter of waiting for the Continental cylinders to fail prematurely (!) But it has to be said that much of it was likely due to 'deferred maintenance' and thus avoidable. Ignorance of the recommended 500 hour

In a former life, I had the job of teaching quality and reliability to university engineering students. Much of that is about risk management, which, in its simplest form, is about balancing the probability of failure with the consequences of failure. I have to suggest that engine accessories that can have catastrophic life-threatening consequences is not wise, no matter how elegant they are. Not to mention the unnecessary cost of sophisticated geared drives. As for crimped 100 cable connectors that are more or less bound to overheat in hot, high vibration environments, hopefully that piece of design genius (not) saved them a dollar or so over the cost of a properly made connector. Ed.

This months most ridiculous price for a small standard part



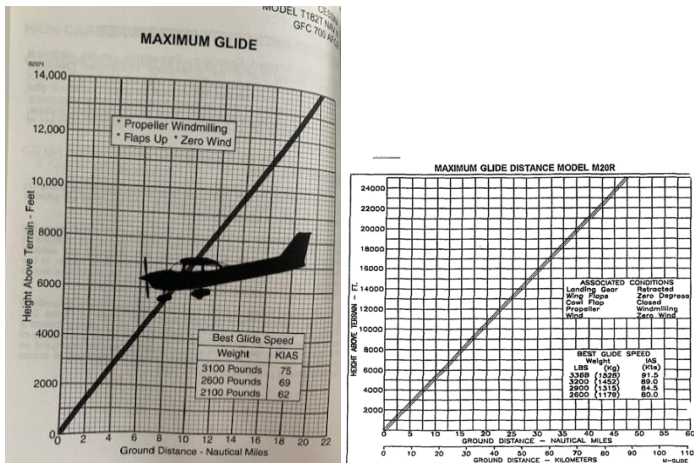
This is an oil pressure transducer for a later Ovation, \$2500 express drop shipped from the factory. (One month by the time UPS sent it around America and Australian Customs suspiciously held it, eventually opening the package, clearly suspecting the Mooney factory have gone into drug trafficking – or something.)

Please send your 'unobtainium and /or most ridiculous price experiences' to the editor. E.g. The 'no back spring' discussed at length on the forum probably even beats this one!

How impossible is the impossible turn (II) ?

The discussion of the impossible turn in the last issue resulted in a little discussion about how a Mooney would fare in a turn back after EFATO. (BTW we welcome feedback on what we say here, so please don't hold back if there is something you'd like to add, contact Jrus2233@gmail.com) One member commented that he practiced the manoeuvre from about 700'

agl from crosswind and, because the Mooney is such a good glider, it would fare better than the Bonanza in the video. If we compare a gear up Mooney Ovation with a Cessna T182T, we can see that the Mooney is indeed a better glider going significantly further from 10,000', But in the bottom left-hand corner of the graph, where an EFATO is likely, it's hard to see much difference.



Do you use full flap for landing?

After a few hundred hours and still struggling to achieve consistently tidy landings in a long body and being advised that full flap is 'normal' for landing a Mooney, one member found this gem in the excellent AMPA Mooney Safety Program Operations Reference Manual under the title of 'Bob Kromers Gems'. Bob is a former Mooney factory test pilot. (Please note this section is annotated with 'not necessarily endorsed by AMPA')

Partial Flap Landings

There are some who believe that every Mooney landing should be with full flaps. While this is the case for bigger airplanes (ever see an airliner or a heavy corporate jet land with partial flaps?), our Mooneys land very well with partial flaps. I've always felt that the complete Mooney pilot knows how to land with all flap settings. Many customers used to call me at the factory asking how to avoid the strong pitch up in their M20K airplanes during go around. Our recommendation? - use partial (take-off) or no flaps in the M20K during the approach and landing, especially if a go around was a probability. My personal technique in every Mooney I fly is to make IFR approaches with partial or no flaps. The last thing I want to deal

with is a strong pitch up and an out of trim airplane if I have to miss the approach and go around. Especially IFR.

The M20K and M20M series require lots of nose up trim with full flaps to maintain a trimmed approach speed at low power. Add full power for a go around and you are instantly out of trim and strong forward pressure is required to keep the nose down until the trim can be readjusted. A partial flap approach and landing eliminates this, so why not learn how to land your Mooney with partial or no flaps? Go out some VFR day and practice partial and no flap landings.

Make sure to adjust your final approach speeds (1.3 V_{stall}) upwards slightly to account for the slightly higher stall speeds with partial or no flaps. I think you'll like what you see.

These are just some ideas taken from my flight test days at the factory. I was fortunate enough to sit in the cockpit of the engineering prototypes and experience lots of these different tests. While at MAPA, I tried to pass along some of these hints and tips taken from these flight test programs. Certainly, no one knows how to fly your airplane better than you do. If you have your own technique that works, great! Just consider some of these points taken from hard flight test data.

Our member comments: A nosewheel first landing can at best be embarrassing and potentially much worse. Keeping the nosewheel off the ground isn't always easy, especially in a long body with full flap and forward centre of gravity, as is the case with a couple of portly blokes upfront and tanks filled to max landing weight(!) Some Mooneys sit on the ground nose up making avoidance of nosewheel first more of an issue. Partial flap seems to give improved elevator authority and enable the nosewheel to be kept off the ground more easily avoiding

excessive amounts of nose up trim. Whilst many seem to say a go around is a bit of a challenge in a Mooney, especially in a rearward trimmed long body, demanding a big push and timely rudder input, it doesn't seem to be significantly more challenging than (say) a Lycoming engined 182. But Mooney go-arounds, as with most types, do sometimes come to grief. The downside is that final approach speed is a little faster to maintain the required margin above stall and the approach angle is slightly shallower. Inevitably a little more runway is required.

AMPA Calendar

Membership renewal

Please see 'The Trez Sez' earlier in the newsletter for new membership arrangements.

IFR Refresher

Date TBA

Several years ago, we ran an on-line IFR refresher course that was very well attended and very highly regarded by our members. We are hoping to run the event again later this year. It will

be an on-line event focussing on the changes in the new Part 91 as well as other important operational matters. Ed: This was fantastically informative. Even if you're just thinking of a PIFR or CIR, it's extremely valuable. And if you did your IFR rating a few years ago, even more so! The AMPA IFR 'cheat sheet' that accompanied the last course is absolutely brilliant and may well have saved a few of us from a little embarrassment during proficiency checks and Flight Reviews.

Other Events that might be of interest:

AIRSHOWS DOWNUNDER	Fri 01 - Sun 03 MAR 2024 Shellharbour Airport NSW.
WARBIRDS OVER SCONE	Sat 23 - Sun 24 MAR 2024 Scone NSW
ALDINGA AIR SHOW	Sun 7 APR 2024 Aldinga SA
FLYIN' FOR FUN	Fri 12 - Sat 14 APR 2024 Parkes NSW
NHILL AIRSHOW	Sat 24 APR 2024 Nhill Aviation Heritage Centre, Nhill VIC
CENTRAL COAST AIRSHOW	Warnervale NSW some time in 2024 TBA
AUSTRALIAN AIR RACE	September 2024

A few Youtube links:

1. Being over maintained? Mike Busch has a few words on when to say no and why. (Nah, couldn't happen in Australia....) (Its not like exercise, the more you do the better!)

https://youtu.be/Vu9n_x_a8KE?si=evCAAQXLmr1sC0qo

2. The M20 story – fastest single engine piston plane

<https://youtu.be/QT7CzszkMEY?si=CMANDn2-5D0Q7PDH>

3. The three(?) M20 lengths

<https://youtu.be/EV-p6p4iOSc?si=zg1fERjhxN3KcL-J>

From The Mooney Flyer

The Mooney Flyer is a monthly on-line newsletter published by Phil Corman. It always contains a range of useful and interesting articles and can be accessed free of charge at

<http://themooneyflyer.com/>. The contents of recent issues are listed below and AMPA members are encouraged to read them.

From the Feb issue:

Welcome to the July Edition of THE MOONEY FLYER.

Go to: <https://TheMooneyFlyer.com> to download and read your PDF and/or FlipBook version.

In This Edition:

- 8 Ways to Be a Better Mooney Pilot by Phil Corman
- Flight Officer Gene Autry by Jim Price
- The View from a Distance by Parvez Dara
- Long Lost Relatives and Close Calls by Richard Brown
- Let the Games Begin – Major Avionics and Interior Upgrade by Terry Carraway
- Quiz Time by Jim Price

And an important issue from last time

Aircraft Dormancy

Aircraft Dormancy has been an issue recently with some aircraft that I've taken on to sell after the owners have had either medical problems or are too old to be able to acquire insurance. They don't want to give up on flying and giving the airplane up is like GIVING IN!! I get it but given the LONG list of squawks I have seen, I would highly recommend that these owners either have someone fly them in the airplane frequently so that the airplane can stay moving and the engine can evaporate the moisture in it. In general, airplanes are made to be exercised regularly. Doing so will prevent the significant squawks that occur when an aircraft sits up for a significant amount of time. Dealing with this as an aircraft

salesman is a pain in the neck and so is giving the owners continuous bad news with yet another thing going wrong! The list keeps growing on airplanes like this until it is a very expensive proposition in the end. DON'T LET THEM JUST SIT THERE!!! Airplanes are built to be flown and you can reduce your maintenance cost tremendously by flying them regularly until you decide to sell them. If you can't fly them regularly or can't find someone to fly them regularly, I highly advise that you sell the aircraft while it's still within its exercise window before certain squawks take place that can be very costly. If you'd like to discuss this further, please call me and I will give you some further input personally. 602 884-2111

Plus all of our regular features including Ask The Top Gun, Have You Heard, Upcoming Mooney Events, Mooney CFIs, Product Reviews and more

Fly Fast, Fly Safe

Phil & Jim

Mooney special tools

AMPA has purchased a number of Mooney specific tools that are available for loan to members. The tools that we have available include the aileron, elevator and rudder travel boards for all Mooney models, over-centre tools for the nose and main landing gear, and tools to replace the landing gear donuts.

The equipment is owned by AMPA but is stored by Smartair in Albury; Smartair also manage the loan of the tools to members.

The tools are available to AMPA members only. There is no charge for their use if returned in good order within the specified time but a late fee will be

charged for every day of late return; the maximum late fee will equal the replacement cost of the equipment. Members must agree not to make copies (or allow copies to be made), to pay freight both ways, in advance, and to ship the tools back to Smartair after a maximum of 5 working days from receipt.

The full terms and conditions of use are available on the web site.

To borrow any of the above equipment, contact Pieter Mol at Smartair in Albury by telephone (02 6021 2929) or email (pieter.mol@smartair.com.au).

The AMPA tools are:

P/N 030003-200	Aileron/flap travel board
P/N 030005-100	Rudder travel board
P/N 030004-100	Elevator travel board (M20C, D, E, F, G, J)
P/N 030004-503	Elevator travel board (M20K, L, M, R, S)
P/N 030012-100	MLG spring installation tool
P/N 030011-001	MLG shock disc tool
P/N 030038-501	MLG disc changer tool
P/N 030035-503	Rudder spring tool
P/N 030011-100	GSE MLG biscuit changer
P/N 030008-100	Nose gear over-centre tool

