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August 2023 / Volume 20 / Issue 8



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Piper PISTON TWIN TIMELINE

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Understanding Your Piper's Hydraulic System, Part Three

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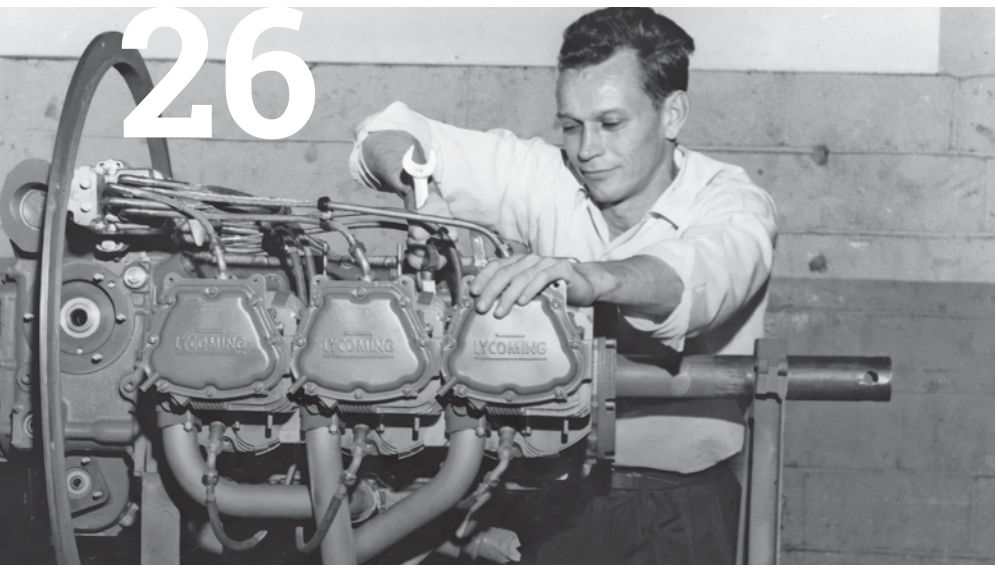
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August 2023

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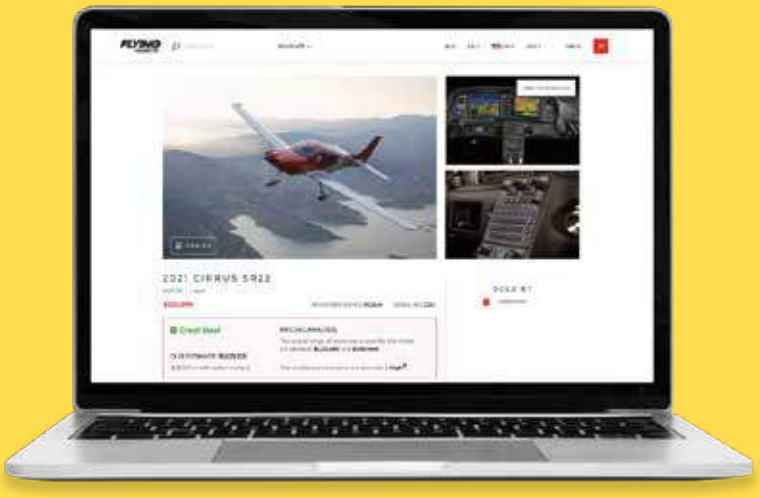
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The View from Here
Jennifer Dellenbusch



20 Years, Month One

TWENTY YEARS AGO THIS MONTH, the first issue of *Piper Flyer* debuted. It featured the Piper J-3 Clipped-wing Cub and articles by Michael Leighton, Kevin Garrison, Thomas Block, Daryl Murphy, and others. Sadly, Daryl Murphy passed away some years ago, and Thomas Block retired, but Kevin and Michael are still with us and contributing great content. Despite having so few members at the time, several of our current supporters were there for us in that first issue.

We owe a big debt to Aircraft Spruce & Specialty, Eagle Fuel Cells, Insight Avionics, Knots 2U, MH Oxygen, Plane Plastics, Preferred Airparts, and Superior Air Parts, who believed in us then and continue to do so.

We hustled to get that first issue ready to hand out at EAA AirVenture Oshkosh. We met a representative from the printing company at a truck stop on Highway 41 to pick up our hot-off-the-press magazines the day before the show. We had a table in the type-club tent that year. It was fun, exciting, and nerve-wracking to start something new.

Our very first members are still with us. Sal Staiano and Debbie Collins had



The View from Here column photo, August 2004.

Continued on Page 10

Letters to the Editor

Send your letters to
editor@piperflyer.com

Flight Test: Piper PA-24 Comanche

By Bob Davy
June 2023

I just finished reading the Comanche flight test article. It was nicely written, but he makes one particularly material error. He repeatedly states that the ultimate load limit of a Comanche is 7.5 g. He may have picked this up from one of my earlier Comanche articles. However, if so, he misinterpreted what I was saying.

The original Comanche 180 had an ultimate load limit of 7.5 g. However, as the gross weights kept increasing, the ultimate load limit decreased in the G load that it would take to break the plane. I worry that someone in a Comanche 250/260/400 may think they have more protection than some aerobatic aircraft, decide they are the next Bob Hoover, and try aerobatics in the Comanche.

Best regards,
Kristin Winter

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known us from previous endeavors; they literally tracked us down and joined on the spot once they found out what we were creating. We have several founding members from our first year who are still subscribers.

In my column in that first issue, I wrote: "…We had an idea, a vision if you will, for creating the ultimate group for Piper owners and pilots. An association that would bring together the best member magazine with the best technical support, the best websites, and the best people."

We've had our share of ups and downs over the years, but that ideal remains the same. We hope we are living up to it.

Blue skies,



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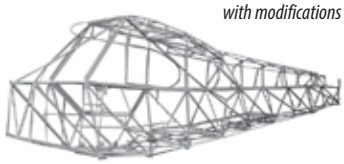
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PA-18 Super Cub (base)	J12446-006	**$18,592.91**
PA-18 Super Cub (base; same as above but includes tabs for metal belly skins)	J12446-007	**$20,516.99**

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PA-18 Modifications • STC Approved • Can be sold separately

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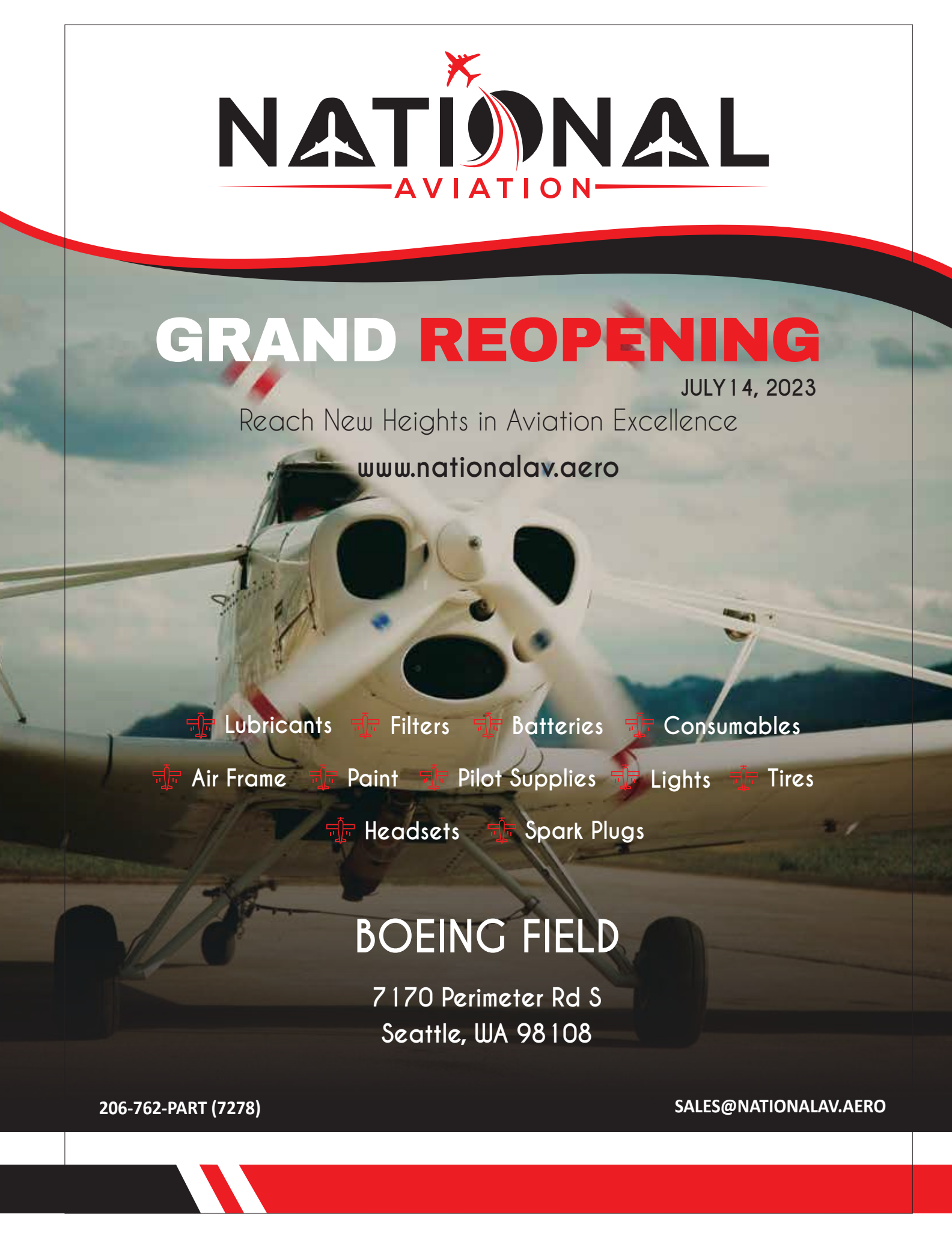
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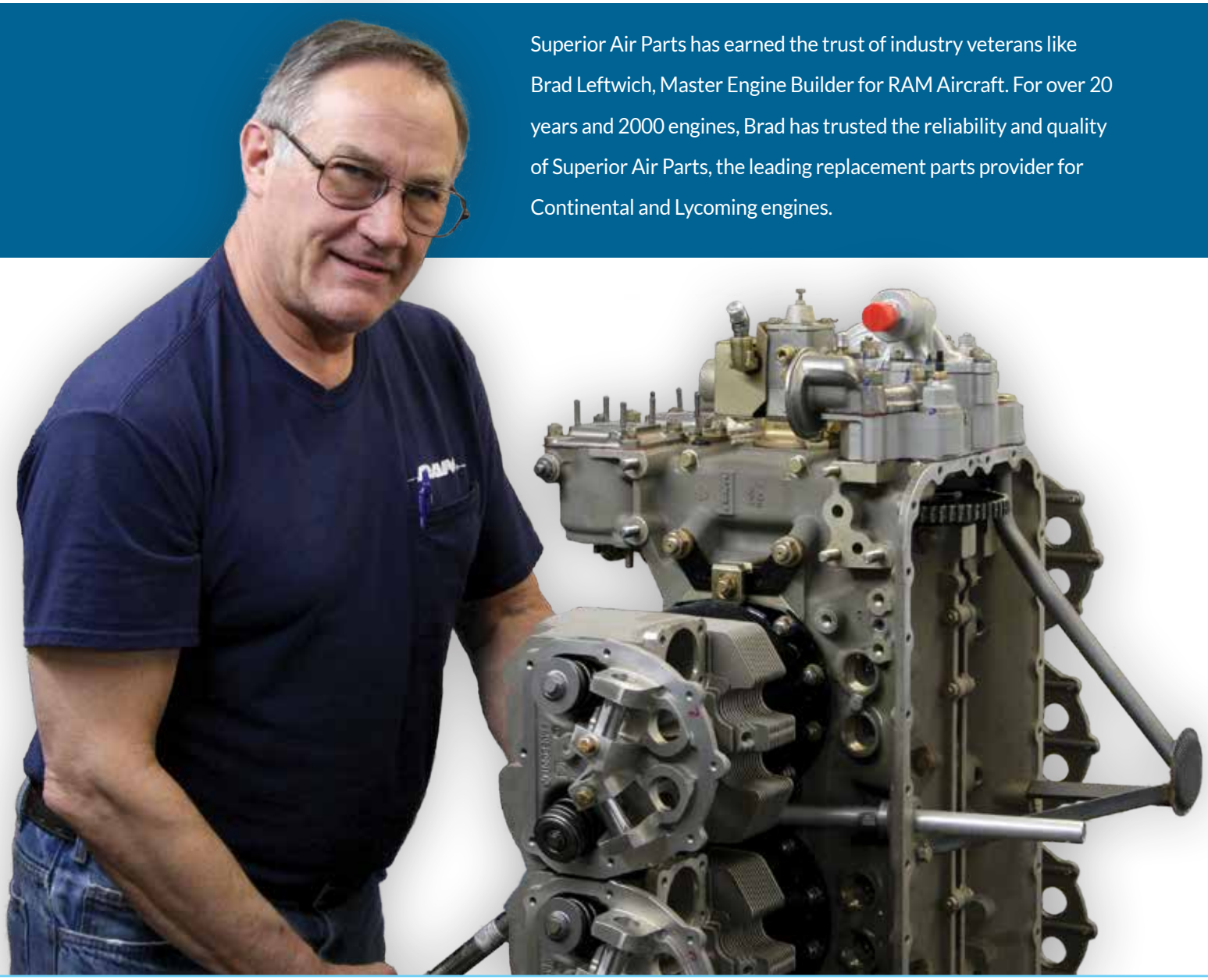
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Most General Aviation aircraft come in one of two flavors. They have one engine installed on their airframe, or they have two. Seeing three or more motors on your average General Aviation spam can is rare.

As pilot trainees, we became proficient at operating a single engine that drove a propeller that was most likely in the front of the airplane. The engine made noise, the propeller spun in a counterclockwise direction, and a windy thrust was produced that launched us into the wild blue and did battle with drag and gravity while enhancing lift.

We knew from experience operating our cars that a total engine failure was a rare event for an internal combustion engine, and our airplane having an engine failure was also at a low order of probability. Still, unlike our car, there was often nowhere to "pull over" if your airplane engine quit.

One engine seemed like plenty at the time, but we students were taught to worry about it quite a bit. Instructors told us it was bad to let our engine run out of fuel or become unhappily dead because of a lack of oil or induction air.

Carburetor heat was discussed, and our instructors told us that carb ice was the devil and should be avoided by prophylactically adjusting the hot air directed off our exhaust manifold to melt the ice before it had a chance to form.

They briefed us on what kind of oil our engine liked and how to add some if it was low. How low was too low? That was a concern too. What if it was using too much oil? How much was too much?

The whole thing still makes me a little nervous. We all want our engine to be happy and willing to pull us through the skies and over the mountains and oceans safely without a hint of a potential NTSB filing, but anything mechanical can fail at any time, and if you only have one engine, its failure can lead to a bad outcome.

For some, a single-engine airplane is all we need or could ever want. Despite all the worry, or perhaps because of it, powerplants fail very infrequently, and when they do, we can usually find a safe place to land and call an Uber to take us the rest of the way home.

If you want (and feel you can afford to operate) a multiengine airplane, twins are great and will take you far and wide in comfort and safety: if you commit to the training and accept their limitations.

For others, an extra engine or two is terrific, especially at night, over water, or in bad weather. Twin-engine aircraft are generally roomier inside and can carry more weight, but are also more expensive to maintain, insure, and operate than their single-engine counterparts.

You can never have too many engines

I admit that I am biased when it comes to the number of engines I think I should have. My flying career was almost all in multiengine turbojets. During my airline years, I held pilot positions on the four-engine Douglas DC-8 and spent 10 years flying three engines on the Boeing 727.

Near the end of my career, the airplanes I flew had more powerful but less numerous engines. I spent much time flying the McDonnell Douglas DC-9 and MD-88, as well as the Boeing 767 and 777. While these airplanes' engines rarely gave me trouble, I must admit that the few occasions I had to shut one down in flight made me wonder how long the other engine would run. I always thought I could use more engines, not fewer.

Much of my flying life in General Aviation has been taken up flying twins like the Twin Beech, Beechcraft Barons, Cessna's 310, 411, 421, and 337, along with all the Piper twins. General Aviation twins are different animals than their airline cousins.

How many engines do you need?

If you are like me, the question of how many engines you need is how many you can afford. No doubt going from one engine to two raises your fixed and hourly costs exponentially. Of course, airborne pilots who have an engine failure rarely think about their cost.

There are a few reasons why multiengine aircraft emerged and are still popular today.

During the early days of aviation, engine failures were more common, and having a few extra engines was a real

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Still, unlike our car, there was often nowhere to "pull over" if your airplane engine quit.

safety factor. Limits on the size, weight, and amount of power an engine could produce also came into play. I don't think the Boeing 727 would have been designed with three engines if they had two more powerful, lighter-weight engines available then.

The additional engines improved overall aircraft performance in areas like endurance, climb, and ability to stay in the air when one of the engines went bad. This ability to remain in the air is especially crucial over water and mountains or in heavy IFR weather.

It is true that today's engines are more reliable and that if you fly high enough over our country, you will often have a wide variety of landing spots should your motor go flooey. When the weather is IFR below a thousand-foot ceiling, the flight is at night, or I am over water, I prefer a multiengine airplane over a single.

Are twins safer?

The multiengine aircraft we in General Aviation fly are wonderful, but they perform and are flown differently than most people think. Loss of control due to the good engine pulling the airplane into a yaw and then a roll, or the aircraft failing to climb on one engine, are two hazards that multiengine pilots must train for and possibly face.

For example, you might think that you can safely fly away on one motor if an engine failure happens right after takeoff in a General Aviation twin. A lot of dead pilots thought that, too, before they augered in. With an airliner, single-engine takeoffs are safely done only if the powerplant fails after the aircraft reaches V_1, a predetermined speed calculated for every takeoff based on aircraft weight and outside conditions.

In a General Aviation twin-engine aircraft, you should reach your best rate of climb single-engine speed V_{YSE}, and have the airplane "cleaned up"—meaning gear up and perhaps your flaps up—before the aircraft will climb out on one engine. *(Be familiar with and follow your aircraft manufacturer's POH instructions and steps.—Ed.)*. Below that speed is reached, during a takeoff engine failure, it is likely safer for you to pull the operating engine back to idle and land straight ahead.

Multiengine aircraft are more complex and require more pilot training and currency than single-engine airplanes. One example is that every twin has a fuel crossfeed available for the pilot to transfer gas from one side of the plane to the other side's engine. Single-engine aircraft, of course, don't need this feature. *(While some single-engine aircraft have fuel selectors for both (and sometimes left and right) tanks, a twin's selection and transfer possibilities are much more complex. —Ed.)*

Continued on Page 62

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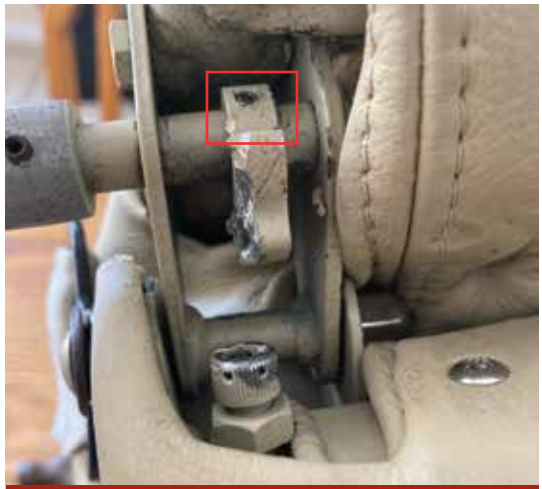
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When the seat reclines, this part pushes against the stop fixture, but because the stop fixture is mangled, it reclines too far.

Q My 1978 Piper PA-23-250 Aztec Model F has mangled seat-recline cams (or at least I think that is the name for this part) on the middle row seats. Please see the attached pictures. The seats always recline fully and won't stay in the full-upright position.

Has anyone seen this problem before, and if so, have you identified a source for replacement parts? Or were these seats rebuilt sometime in the past 45 years, and the installed parts are not standard Piper parts?

Frank

A New cams are available. The part number is 19365-00. New retaining pins are also available under Part No. 480701.

To remove the existing pin, you'll need to pull the shaft the cam is on, and while supporting the shaft, drive out the pin with a punch. You should then be able to slide the damaged cam off the shaft.

You may need to "clean up" that shaft a little to get the old one off and the new one on.

If it were me, I would position the new cam to line up with the stop, then drill the shaft for the new roll pin and install it.

One tip I used when I was wrenching full-time is to run a loop of safety wire through all roll pins to keep them in place, then wrap the wire around the shaft. Complete the loop by twisting the two safety wire ends together for a few turns.

Happy flying,
Steve

Q I have a 1969 Piper PA-28-140B Cherokee 140 with the Lycoming O-320-E2A. Normally, when I lean for cruise flight (at 4,500 feet msl and 2,400 rpm), I expect an increase in RPM until peak EGT, then a drop in RPM. But lately, I have been getting an immediate [missing word] which continues until the engine gets rough. Magneto checks are normal during runup, and the engine makes good power on takeoff and climbs. I'm scratching my head as to what might be the cause/causes. I'd appreciate any suggestions of what might be causing this!

Jim

A You appear to have left out a critical word: "lately I have been getting an immediate [???] which continues..." So, I'm guessing that you don't get the RPM rise.

If I'm right, that might mean the rigging and connection to the mixture arm on your carburetor have slid. This is pretty easy to check on your airplane.

Find the carburetor—it's hanging off the bottom of the engine. At the back of the engine, there's an arm connected to a vertical shaft that goes down into the carburetor—the arm projects aft from the shaft.

When the little arm hanging down from the mixture arm contacts the carburetor body on the co-pilot's side of the back of the carburetor, the mixture control should be full forward (rich). The little arm must contact the carburetor body to get full rich fuel flow.

Get someone to push and pull on the mixture control inside the airplane as you look at the arm. As the mixture knob is pulled aft,

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the main arm pivots around the shaft until the little arm hits the carburetor body on the other side—that's what's called idle cutoff.

If the little arm doesn't contact the carb body, take a good look at the attachment of the control wire to the mixture arm and make sure the control wire housing is secure.

Other things that will lean out a mixture are a loose intake tube, a bad gasket at the intake tube to the cylinder head, or a hole that has been rubbed into one of the intake tubes.

If the little copper primer line to one of the cylinders has broken, that will also lean the mixture.

If I guessed correctly about what your problem's symptoms are, check out the things I mentioned above. Please let me know what you find.

Happy flying,
Steve

Follow-up:

Steve,

Thanks for the response! You interpreted my cryptic email correctly (I sent an updated version to correct several errors in my first email) no RPM rise. I'll discuss these items you mentioned with my A&P and let you know what resolves the issue!

Thanks!
Jim

Follow-up Q:

My A&P/IA checked all the items you recommended and could not find anything to cause my issue. I went to another A&P/IA for a second opinion, and after running to 2,000-plus rpm, then idle, and leaning the mixture, he said the idle mixture was set too lean.

He also noted some blue discoloration on the carburetor. He recommended that I replace the carburetor as it appears to be leaking, which I am doing.

Thanks for your advice!

Jim

Follow-up A:

I imagine you have already bought a replacement carburetor, but if you haven't, you can send yours to Marvel-Schebler Carburetors and they will bench-test it for you.

The fix might be pretty easy. Thanks for getting back to me.

Happy flying,
Steve

Q I own a Piper PA-28-180 Cherokee 180, Serial No. 28-7205080.

Is there a chart or reference for figuring out calibrated airspeed? Mine is an older airplane, so it should be in MPH, but I can't find a chart in the POH.

Ted

A I found an "Airspeed System Calibration" chart in the PA-28-181 manual, but not in earlier PA-28 manuals.

Calibrated airspeed is the airspeed corrected for



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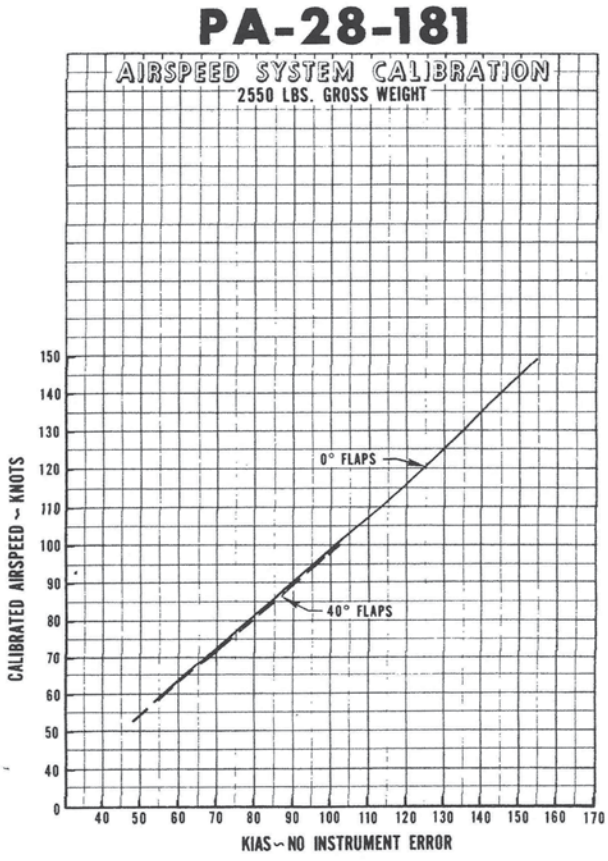
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instrument or installation errors. It's more critical and more evident in faster airplanes.

The POH I mentioned above has a chart labeled "calibrated airspeed." There's no "indicated airspeed" shown on the chart. In this case, there is no correction, or at least not one worth mentioning, for either instrument or installation errors.

A Piper PA-46-310P Malibu airspeed calibration chart shows that at 100 knots indicated airspeed, the calibrated airspeed is 98 knots; at 160, 180, and 200 knots indicated, the corresponding calibrated airspeeds are 158, 178, and 198 knots.

In other words, if there's any difference between indicated and calibrated on this airplane, it ain't much.

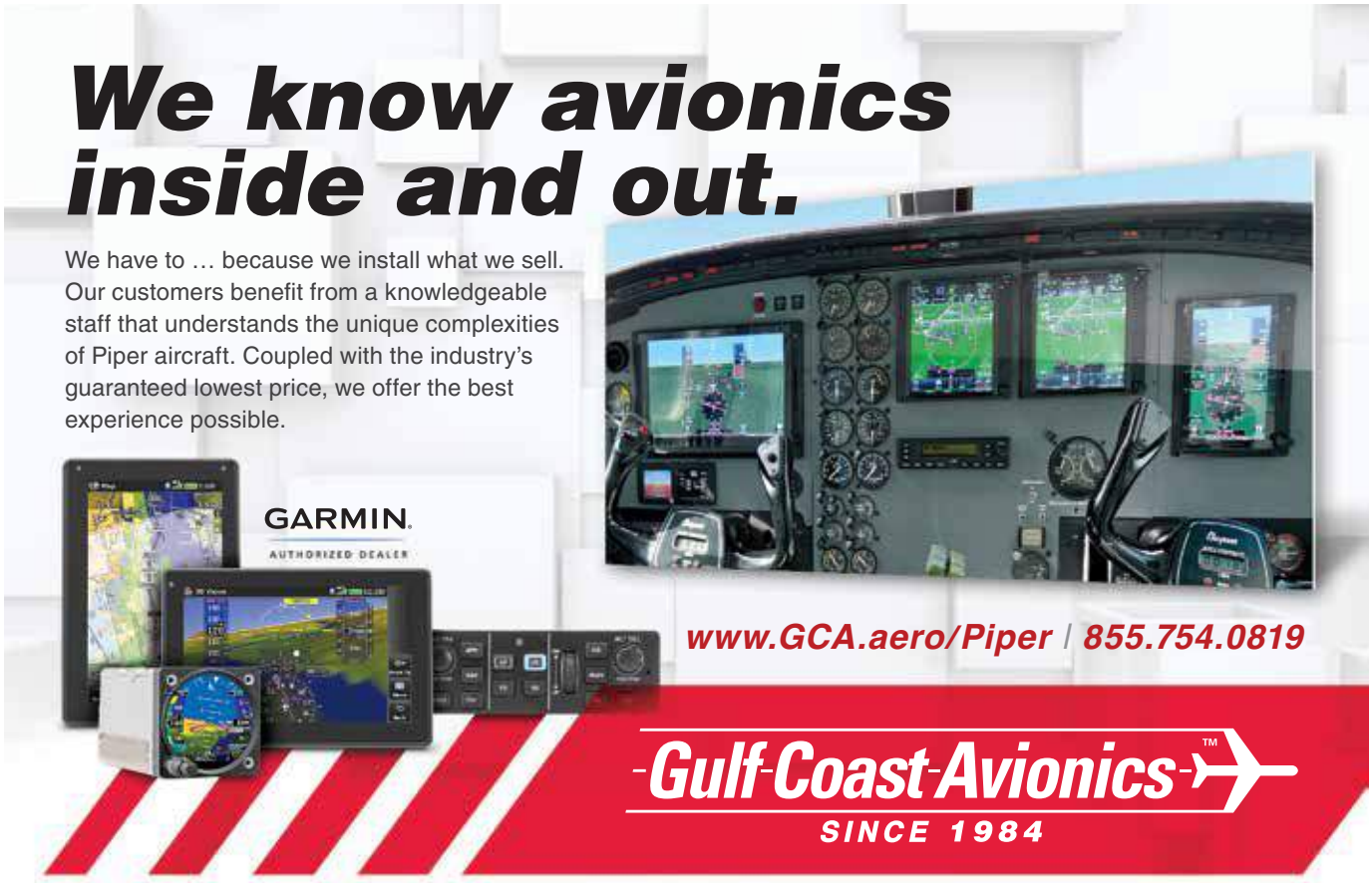
Happy flying,
Steve

Q UL94 fuel from Swift just became available at my airport. Do I need to get an STC to use it? How do I get approved to use this fuel in my Piper PA-28-236 Dakota with a Lycoming O-540-J3A5D?

Charlie

A Lucky you! I wish UL94 was available at my airport. I did a flight test and had UL94 in one of my fuel tanks and 100LL in the other. I also have a sophisticated engine monitor (an Electronics International CGR-30P) so I could check for any changes in EGT temperatures when I switched from 100LL to UL94.

Continued on Page 63



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A Grand Dilemma

The pilot shortage may lead to training airline pilots who don't know the joys of General Aviation.

There has certainly been no shortage of coverage on the state of the airline industry in our close-knit world. The latest statistics from the International Air Transport Association (IATA) indicate that many regions are either nearly back to or exceeding 2019 traffic numbers, which are considered the apex of the industry's growth before falling apart in early 2020 due to the calamity of COVID-19.

The current and past pilot shortages

If you've traveled, you've probably seen that it isn't all roses. As with virtually every other facet of business, supply chain issues and personnel issues have hampered the recovery. One of the main areas that has been getting a lot of airtime is the pilot shortage.

Oddly, several pilot shortages have been predicted at various points in the last half-century. In each case, while there was a short-term supply-demand imbalance, an exogenous event would come along and snuff these imbalances out; in no particular order, recessions, oil shortages, wars, a global banking industry collapse, and of course, the behemoth of them all—a worldwide pandemic.

During the pandemic, the airlines offered senior pilots early retirement packages, and many pilots were laid off, some choosing not to return.

In the past, these events have corrected the perceived shortages. The pandemic, however, (and the airlines' response to it) has proven to be different. The pilot shortage that was evident just before COVID is now back in full force. During the pandemic, the airlines offered senior pilots early retirement packages, and many pilots were laid off, some choosing not to return. Those measures helped companies keep the lights on at the depths of the slowdown but have now created grief as demand has picked up and the supply is limited.

In the United States, it has become particularly competitive, to the point that many of the majors and some of their feeders are significantly increasing their wages to attract and retain staff. It has even reached the point where foreign pilots can be sponsored for work visas to fill the gaps.

The 1,500-hour rule

Flight schools do their best to pump out new pilots, but this is not an overnight process. An additional challenge is the 1,500-hour rule as a minimum requirement for employment with Part 121 carriers.

Interestingly, the United States is the only jurisdiction with such a prescriptive



rule. While its intentions are admirable, its efficacy is questionable. Other countries in Europe and Asia have chosen a more performance-based solution, where young pilots enter cadet programs and go through a comprehensive program where the end goal is the right seat of an airliner.

High-fidelity simulation and curriculums with two-pilot operations are emphasized from the start. These programs have had great success placing pilots into the right seat with a fraction of 1,500 hours of flight time. Arguably, they get paired up with training pilots for the first while, but the point is that it works.

Side effects

North America has different challenges, though. General Aviation is far more vibrant, and charter operators are far more prolific. In the current situation, many pilots at these operations are moving to the major airlines as soon as possible, creating shortages in the rest of the industry.

This challenge stands to get worse as many of the majors in North America have instituted sponsorship programs that will take a young pilot through the process to the airlines as swiftly as possible.

Another byproduct of this situation is that it treats GA as a means to an end instead of the wonderful thing it is. Entirely focused on the endgame, young pilots are immersed in schools that mimic the clinical, all-business environment of an airline operation, and they miss out on the fun of fly-ins, $100 hamburgers, hangar flying with old-timers, and the community that exists around airplanes.

The challenge for all of us lovers of GA is to find ways to engage these young pilots to learn the virtues of this aspect of aviation.

Tom Machum *is a Boeing 787-9 Captain with just over 20,500 hours. He and his wife, Jennifer, live in Moncton, New Brunswick, Canada. His stories are inspired by his flying adventures in both big and small airplanes. Tom also flies a Piper PA-28-236 Dakota for fun, and his articles are inspired by his flying adventures. Drop him a note and he'd be happy to reply. Send questions or comments to editor@piperflyer.com.*

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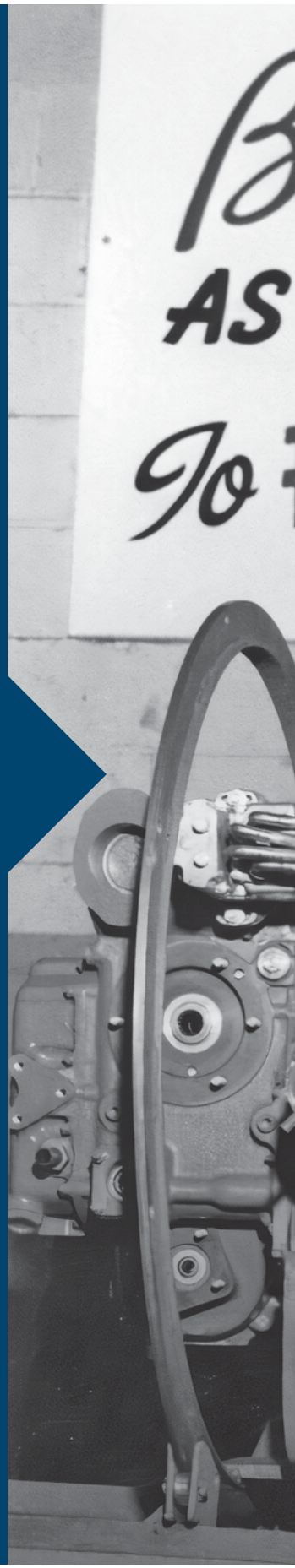
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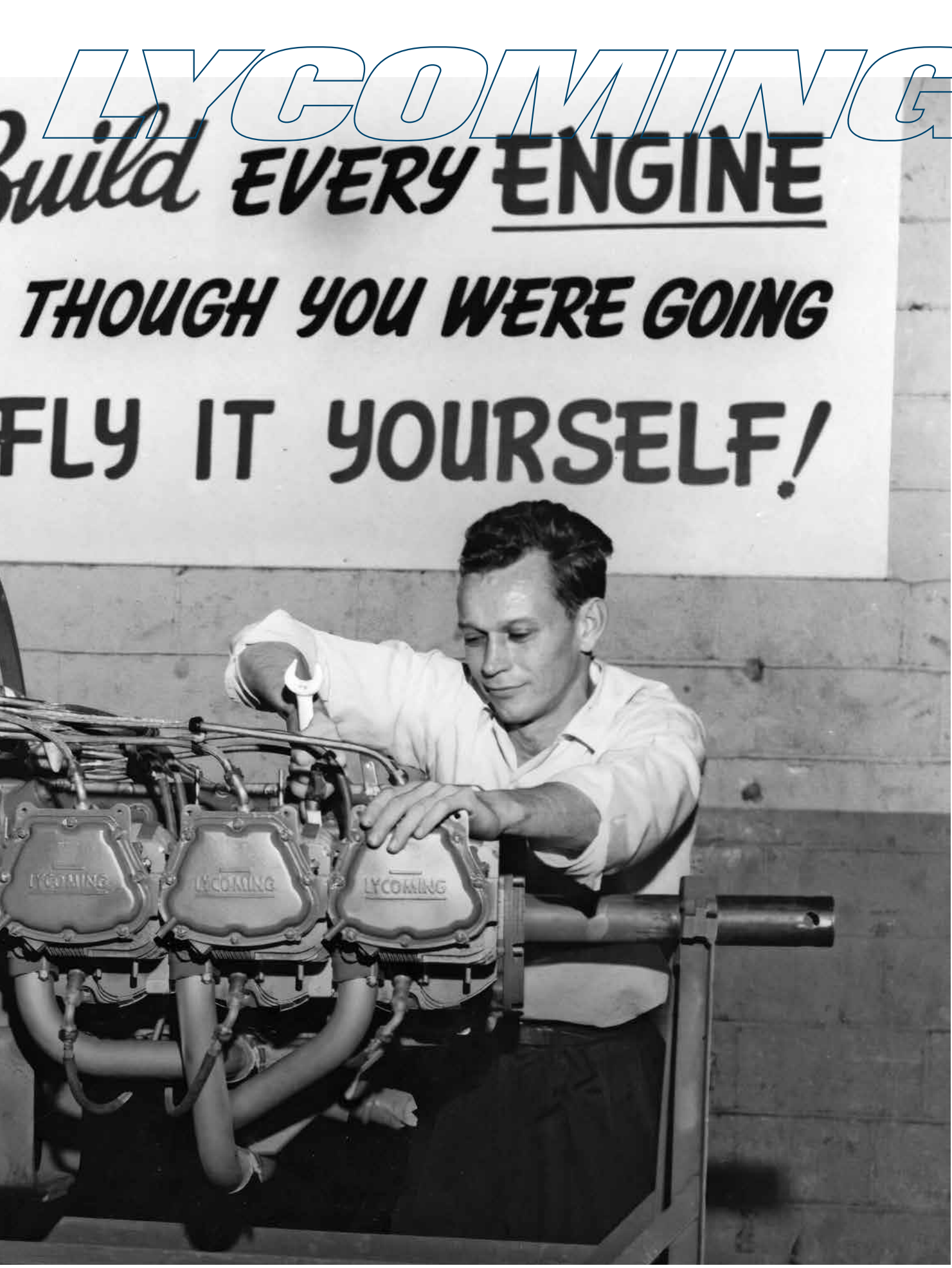


LYCOMING ENGINES, PART THREE:

PREVENTIVE MAINTENANCE

TYLER HARBACH, Field Service Technical Representative for Lycoming, describes preventive maintenance owner/operators can perform to ensure a long service life from their Lycoming engines.




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In Parts One and Two of this series, I shared some best operational practices for getting the most out of your powerplant. For those first reading this series, I encourage you to go back to the previous two issues to catch up! For those who have been waiting with bated breath for Part Three, fret not: as promised, this section will delve into the world of engine preventive maintenance, looking at it from a Part 91 owner/operator's perspective.

I will cover routine maintenance tasks and touch on unscheduled maintenance items. Lastly, I'll cover Lycoming factory services that can prove valuable to the owner/operator and mechanic in the field. Let's dive in!

For some owners and operators, maintenance is rarely something thought of beyond scheduling the mandatory annual inspection and possibly doing an oil change or two if it is a busy flying season. This is considered scheduled maintenance, which includes tasks on a preventive maintenance list.

When adhered to, this schedule will likely be all that is necessary to take you right up to the time your engine needs to be pulled for overhaul. Bear in mind, though, that engines are mechanical objects, and as with anything mechanical, there is always a chance that something can go wrong. Unscheduled maintenance is the result.

Many certificate holders tend to fence themselves into a comfort zone where anything that requires more than a Phillips-head screwdriver to fix results in a prompt call to their local A&P mechanic.

What can you do?

Let's go over exactly what falls into the preventive maintenance category and what would fall outside of this. Why differentiate? Let's get a fresh cup of coffee, pull up www.ecfr.gov on a tablet, and look into some definitions.

Aviation regulations are in Title 14 of the Code of Federal Regulations ("14 CFR"). Chapter 43 is where we will look: "Maintenance, Preventive Maintenance, Rebuilding, and Alteration." This chapter has a lot of information; what is useful for us, though, is found in §43.3, §43.7, and §43 Appendix A(c). You can find links to these items and others mentioned in this article in Resources at the end of the article. Let's look closer at how it applies to preventive maintenance.

By the time you make it through ground school and earn your private pilot certificate, your instructor and checkride examiner will have reviewed the privileges that are granted by your license—including what maintenance you're allowed to do.

Many private pilot certificate holders tend to fence themselves into a comfort zone where anything that requires more than a Phillips-head screwdriver to fix results in a prompt call to their local A&P mechanic.

Often in my presentations, pilots are intrigued to learn what they can do, and 14 CFR 43.3(g) states, in part (emphasis added): "Except for holders of a sport pilot certificate, the holder of a pilot certificate issued under part 61 may perform *preventive maintenance* on any aircraft *owned or operated* by that pilot which is not used under part 121, 129, or 135 of this chapter." The regulation at 14 CFR 43.7(f) states, "A person holding at least a *private pilot certificate* may approve an aircraft for return to service after performing *preventive maintenance* under the provisions of §43.3(g)."

What is this "preventive maintenance" mentioned here? The regulation at 14 CFR 43 Appendix A(c) provides the following definition, with engine-related items listed in numbers 19-23:

Preventive maintenance. Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:

(19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.

(20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.

(21) Replacing any hose connection except hydraulic connections.

(22) Replacing prefabricated fuel lines.

(23) Cleaning or replacing fuel and oil strainers or filter elements.

In summary, as a pilot certificate holder, you are allowed to perform oil changes, service the spark plugs, and



Clogged oil suction screen.



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are authorized to sign off the work using your certificate number. This is a guaranteed way to save some money on routine tasks and maintain a familiarity with your engine, which is always a benefit to flight safety.

Lycoming publishes service information to assist with this maintenance as well. We expect these tasks to be followed per their published schedules to maintain the warranty on a factory engine. Failure to properly maintain an engine could result in warranty claim denial. Service information and warranty documentation are linked in Resources.

Without further ado, let's pop open the cowl, grab some tools, and start a typical preventive maintenance interval with an oil change.

Changing oil

Oil servicing information is found in the latest revision of Service Bulletin No. 480. This publication is quite exhaustive. It gives recommended oil change interval schedules, step-by-step instructions for performing the oil change, and some troubleshooting tips for excessive oil consumption issues.

I know of at least one engine failure that directly resulted from oil starvation due to a completely clogged suction screen—a completely preventable failure!

SB 480 has a section with inspection guidelines for examining the contents of a sectioned full-flow oil filter element or the contents of a pressure screen, as well as criteria for inspecting the contents of the oil suction screen in the sump (more on this later).

SB 480 also provides criteria for recommended corrective actions to take should specific types of material meeting certain sizes or quantities be found in any of these inspections. If you find abnormal material that fits one of these categories, it is highly recommended that you contact Lycoming Product Support. Lycoming offers a factory Materials Laboratory analysis service for folks whose engines are within their published calendar and hourly TBO period and who use strictly Lycoming genuine parts.

If abnormal material is found and your engine qualifies, it can be sent to Lycoming at no cost to you and our lab can identify its composition and suggest where to troubleshoot. This service is invaluable and makes the most of precious troubleshooting time and effort.

A thorough inspection of filter contents is necessary at each oil change, and it is essential to include inspecting the suction screen, sometimes called the "finger screen," when doing this task. The suction screen is located in the oil sump and is a coarse mesh that strains the oil immediately after it enters the oil pickup in the sump, just before the oil pump.

As gasoline engines operate, carbon accumulates as a byproduct of the combustion process. The ashless dispersant oil used in normal operation contains detergents that help to break this carbon down into minute pieces and distribute it throughout the oil, where it gets caught by the suction screen and oil filter. Large chunks of debris tend to be strained out by the suction screen before they can even make it to the pump, and they slowly build up inside the suction screen.

SB 480 advises removing, cleaning, and inspecting the suction screen at every oil change. I know of at least one engine failure that directly resulted from oil starvation due to a completely clogged suction screen—a completely preventable failure!

Additionally, should something internal to the engine begin failing, any large pieces of material will be found in the suction screen, allowing you to take action to prevent failure. If you have not been checking the screen at each oil change, I highly recommend beginning to do so. *(Before performing this or any preventive maintenance task, be sure to read the service instructions in their entirety. You may find that you need to have parts on hand to complete the service; e.g., copper crush gaskets for the suction screen service.—Ed.)*

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Spark plug service

Now, after servicing the oil, it's time to inspect the spark plugs for condition and set the gap. Publications to reference for this step include the latest revision of Service Instruction No. 1042 and your plug manufacturer's current Service Manual. SI 1042 has guidance for selecting replacement plugs and general installation guidelines, and the current spark plug service manual will provide visual inspection criteria, installation instructions, and some troubleshooting guides.

To begin, remove the plugs, noting the cylinder positions they have been removed from and storing them safely in a spark plug tray. Check for readily-apparent defects like cracked or damaged insulators or the presence of excessive oil fouling—excessive fouling could indicate the plug wasn't firing and that additional troubleshooting is necessary.

Any plugs with obvious physical damage, such as missing pieces of porcelain insulator, should be discarded. Be careful when handling the spark plugs and follow the age-old aviation mechanic's adage: should a plug be accidentally dropped once, drop it twice—the second time being straight into the trash can. A single drop to the floor can crack the internal insulator and ruin the plug.

Clean dirty plugs and visually inspect them once the carbon and combustion residues are removed. Consider football-shaped center electrodes worn less than half the original thickness worn out and replace the plugs.

Plugs in good visual condition within wear limits should be gapped per SI 1042 and then operationally bench tested. Good plugs should have a fresh copper gasket installed on them (Lycoming Part No. STD-295) and a light dab of copper-based anti-seize applied to the threads, starting a few threads from the tip. Why copper-based, you might ask?

Copper performs better at higher temperatures than other anti-seize types; additionally, the small pieces of copper that get left behind after the grease matrix melts out act as "rollers" to facilitate plug removal.





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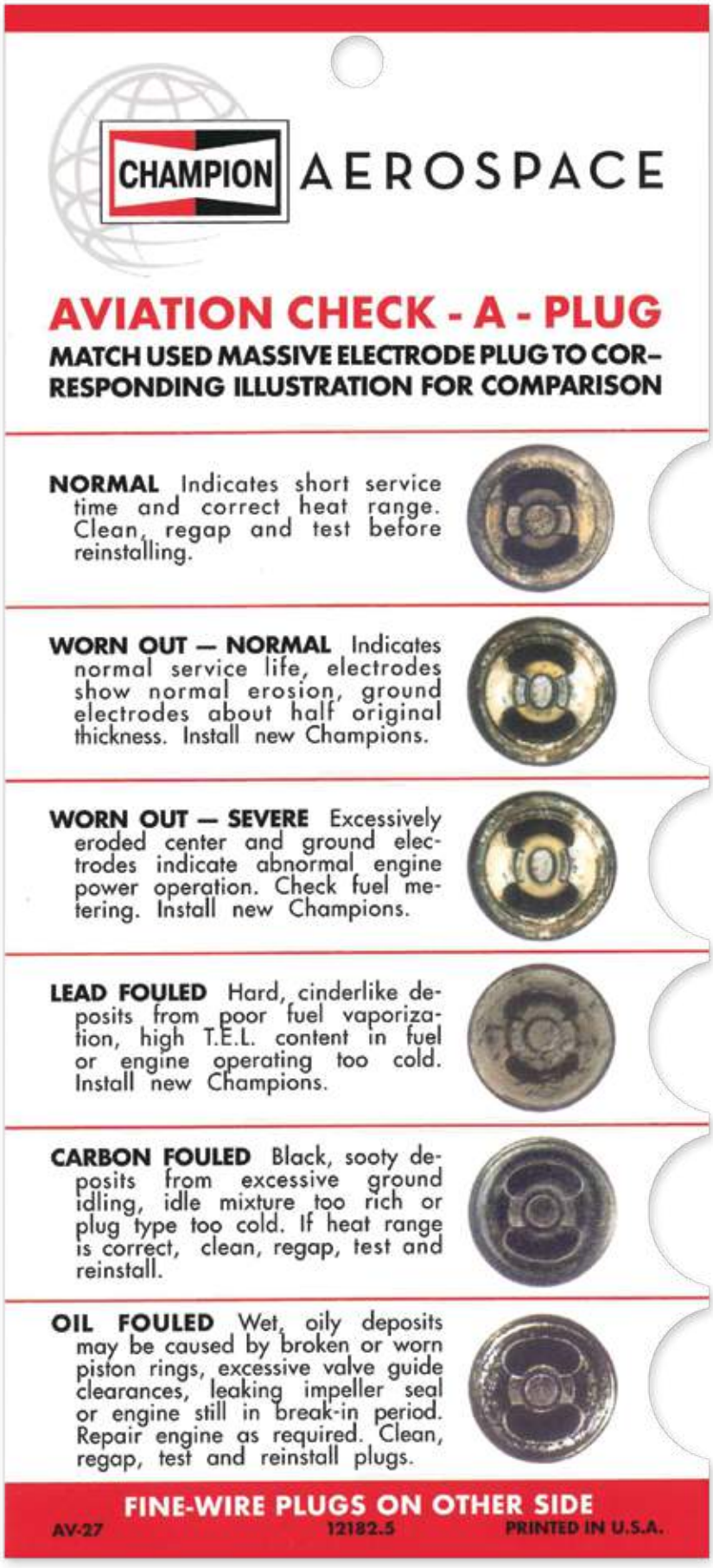
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Your A&P will likely have helpful knowledge from experience, pointing out what is normal and abnormal to see.

After this, the plugs are ready for install. Here's where it is important to have noted the position the spark plugs were removed from, and it has to do with the mechanics of a magneto.

In a conventional magneto ignition system, the current direction alternates every other lead on a magneto, firing from the center electrode to the outer electrodes on one, then from the outer electrodes to the inner electrode on the next lead, following the direction of distributor rotation.

This polarity reversal results in uneven electrode wear over the course of a service interval. To get the longest service life from a set of plugs, it is best practice to rotate them to different positions, allowing the electrodes to wear evenly.

Best practice is to swap them "evens to odds, tops to bottoms" after servicing to ensure you get the maximum life out of a spark plug set. A simple way to do this is to spin the spark plug tray 180 degrees.

After reinstalling, the spark plugs need to be torqued per SI 1042, then the harness leads connected and torqued. A ground run should be performed at this point to verify no oil leaks are present from the oil change and that the recently-serviced spark plugs work well and produce smooth magneto drops. If the engine performs as expected, the engine can be cowled and a logbook entry made.

These are the most common owner-performed *preventive* maintenance tasks and inspections; when it comes to most *scheduled* inspections, you may need to enlist the help of your A&P. In Part Four, we'll dig further into what's entailed in these scheduled inspections.

Tyler Harbach *is a Field Service Technical Representative for Lycoming. Send questions or comments to editor@piperflyer.com.*

RESOURCES

LEGAL

14 CFR 43.3
ecfr.gov/current/title-14/chapter-I/subchapter-C/part-43/section-43.3

14 CFR 43.7
ecfr.gov/current/title-14/chapter-I/subchapter-C/part-43/section-43.7

14 CFR 43 Appendix A(c)
tinyurl.com/14CFR43Ac

LYCOMING TECHNICAL PUBLICATIONS

Technical Publications Index
lycoming.com/contact/knowledge-base/publications

New and Rebuilt Engine Limited Warranty Terms
lycoming.com/warranty

Service Bulletin No. 480F "Oil Servicing, Metallic Solids Identification After Oil Servicing, and Associated Corrective Action"
lycoming.com/content/service-bulletin-no-480-f

Service Instruction No. 1042 AH "Approved Spark Plugs"
lycoming.com/service-instruction-1042-ah

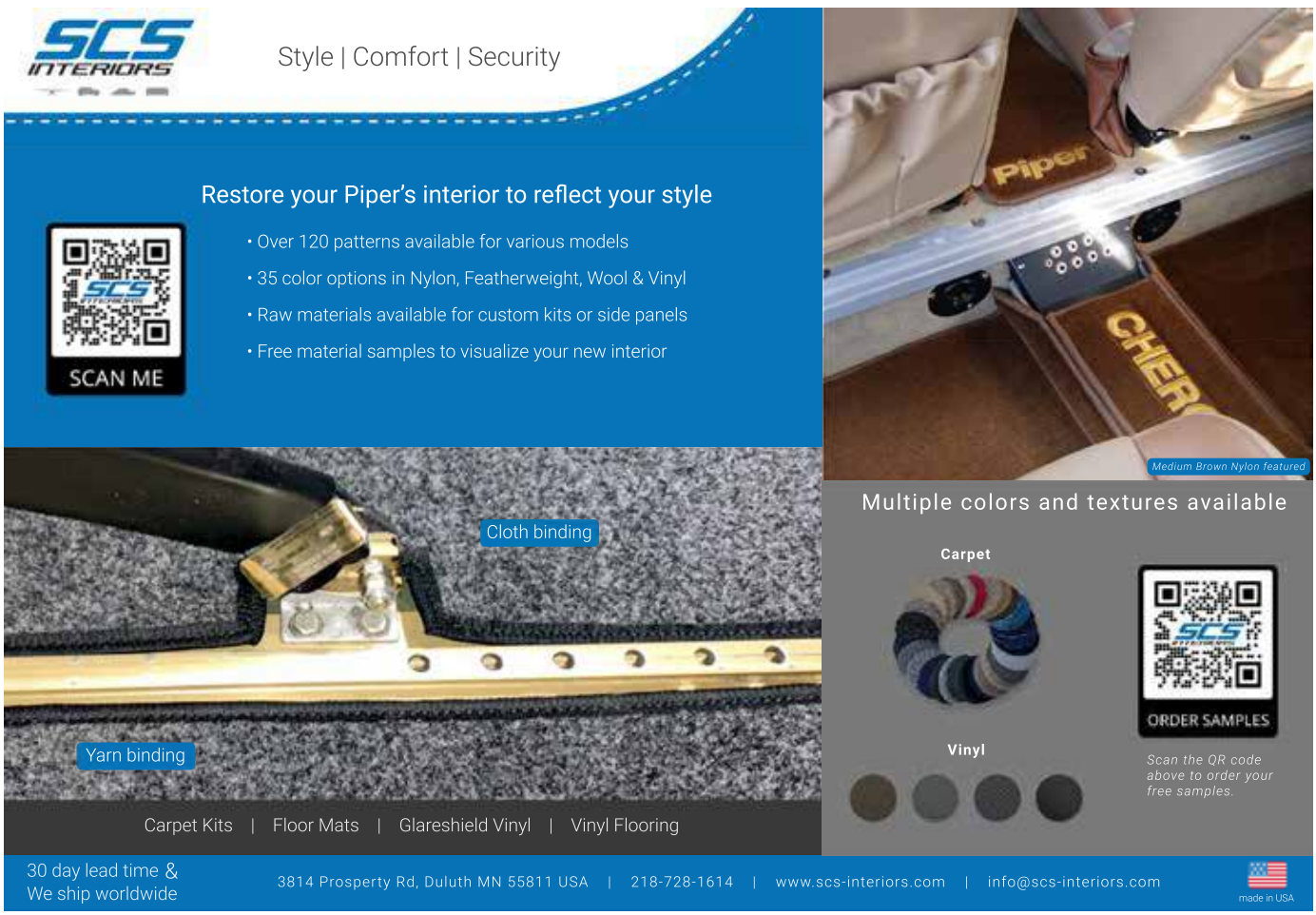
SPARK PLUG SERVICE INFORMATION

Aero Accessories "TEMPEST Aviation Spark Plugs Installation and Maintenance Manual (1710A)"
mcfarlaneaviation.com/media/documents/spark-plug-maintenance-manual.pdf

Champion Aerospace "Aviation Service Manual AV6-R"
championaerospace.com/wp-content/uploads/2015/06/AV6-R-Aug20141.pdf

TRAINING OPPORTUNITIES

Lycoming Engines Service School
lycoming.com/contact/training



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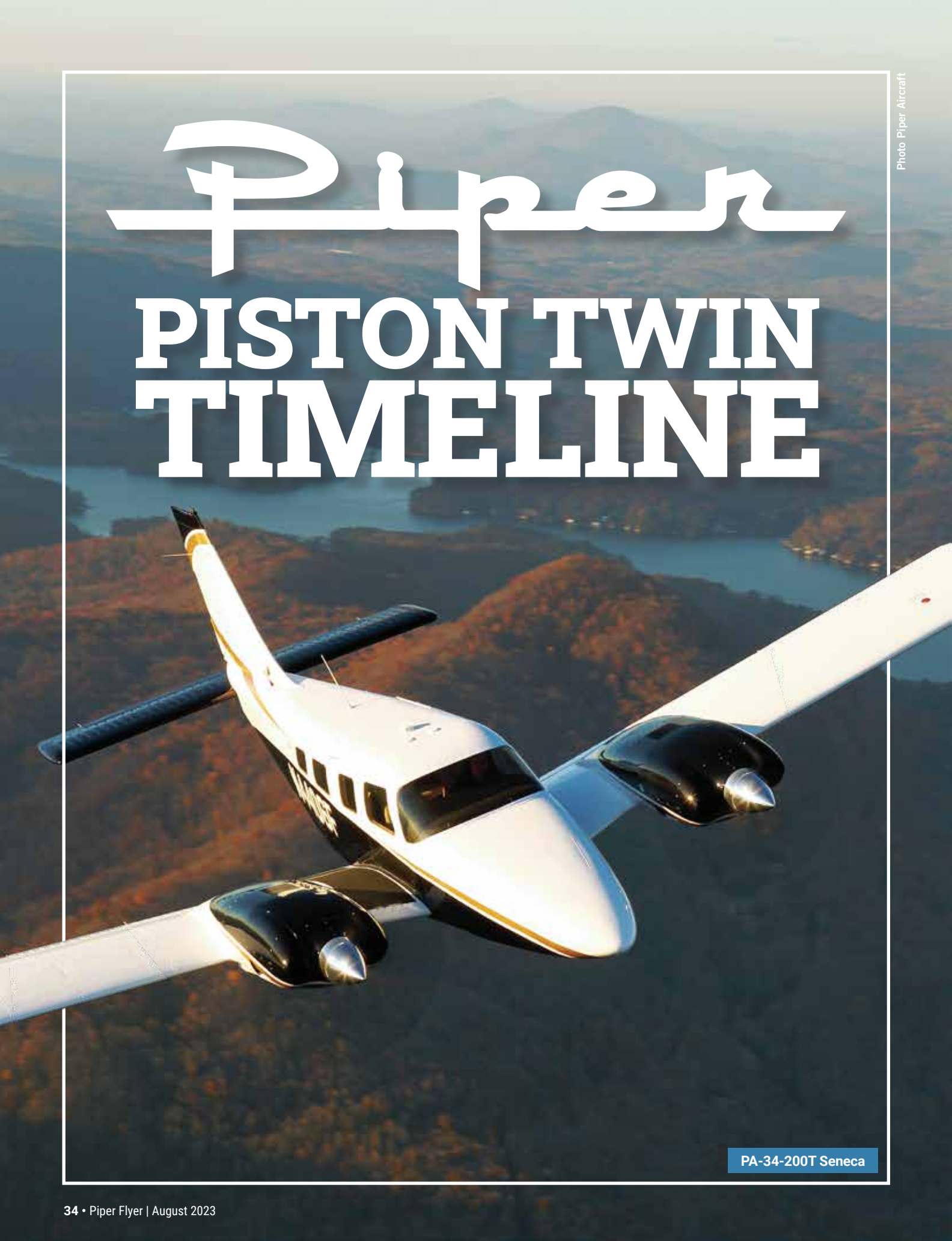
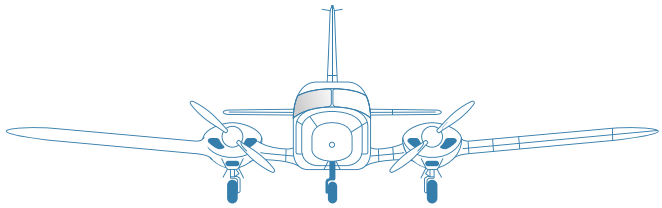


Photo Piper Aircraft

PA-34-200T Seneca



A brief look at the when each Piper twin model was launched.

By Jennifer Dellenbusch

Once powered flight proved possible, it wasn't long before early aviation pioneers began to look for ways to go higher, further, and faster. Strapping on an extra engine or three seemed like logical progress.

In 1911, Igor Sikorsky began working on a twin-engine plane called Le Grand. From that sprung the Sikorsky four-engine *Russky Vityaz*. It was 65.6 feet long, the upper wing spanned 88.6 feet, and the lower wing was 65.6 feet wide. Overall, the height of the airplane was 13.1 feet. Its empty weight was 7,496 pounds, and its gross weight was 8,818 pounds.

The massive *Russky Vityaz* boasted two passenger cabins and a storage room for spare parts. There was also an open deck forward of the pilot's cabin equipped with a searchlight and machine gun. It made its maiden flight in 1913.

This not-so-humble beginning sparked the design and production of many multiengine aircraft, with one manufacturer after another creating aircraft with two (or more) engines. Piper's foray into twin-engine aircraft was with the PA-23 Apache.

The origins of the Apache are controversial, with many claiming that the Apache was a design that Piper acquired when they purchased Stinson. Roger Peperell, Piper's official historian, says that's not the case. He has examined original documents and can find no evidence that blueprints or plans for Stinson's design were included in the deal. To read more about this, please read "Apache: Piper's First Indian," linked in Resources.

Regardless of its design lineage, the Apache was a success. The factory had trouble keeping up with demand for the little twin. In fact, demand was so great that Piper enlarged the factory to accommodate the additional work.

The Apache debuted at $32,500, far above the originally planned $15,000, but less than the Cessna Model 310 (at $49,000) and the Beech Model 50 (at $70,000). The Apache proved that there was a market for light twins, and Piper intended to capture that market.

The PA-23-250 Aztec was up next. Additional twin models and variants continued apace, with new ones coming to market almost yearly from 1957 through the early 1980s. Today, only the PA-44 Seminole remains in production. The Seneca has not officially been retired, but Piper reports that they haven't built any in a few years due to reduced demand.

The following is a timeline listing of the Piper twins. For more in-depth information about the Piper piston twins, check the Resources at the end of this article.

1954

PA-23-150 Apache, Approved Jan. 29, 1954.
Engines: Two 150 hp Lycoming O-320 series.

1957

PA-23-160 Apache, Approved Oct. 14, 1957.
Engines: Two 160 hp Lycoming O-320 series.

1959

PA-23-250 Aztec, Approved Sept. 18, 1959.
Approved Dec. 15, 1961, when Item 603(b) is installed. *(603(b) emergency exit installed in accordance with: (b) Piper Drawing 30599, 31520, or 33764-2.)*
Engines: Two 250 hp Lycoming O-540 series or IO-540 series (eligible only on Serial Nos. 27-2000 through 27-4916, and 27-7304917 through 27-7554168). Turbo versions were also available.

1962

PA-23-235 Apache 235, Approved Jan. 22, 1962.
Same as Model PA-23-250, 5 PCLM (5-Place Closed Land Monoplane), except for powerplants.
Engines: Two 235 hp Lycoming O-540 series.

1963

PA-30 Twin Comanche, 4 PCLM (Normal Category), Approved Feb. 5, 1963.
Engines: Two 160 hp Lycoming IO-320-B1A.

1965

PA-30 Twin Comanche, 6 PCLM. Approved May 28, 1965 with maximum baggage and/or passenger weight 250 pounds in baggage area including seats.
Engines: Two 160 hp Lycoming IO-320-B1A.

PA-E23-250 Aztec, 6 PCLM, Approved June 21, 1965.
Engines: Two 250 hp Lycoming IO-540 series.

1966

PA-31-310 Navajo, Approved Feb. 24, 1966. Reissued July 25, 1966. *(Model PA-31 Type Certificate A20SO approved Feb. 24, 1966, for a maximum gross weight of 6,200 pounds takeoff or landing. For Model PA-31 aircraft, Serial Nos. 31-2 through 31-900 and 31-7300901 through 31-8312019, Type Certificate A20SO reissued July 25, 1966, for maximum gross weight of 6,500 pounds takeoff and 6,200 pounds landing.)*



PA-23-150 Apache

James Lawrence

Engines: Two 310 hp Lycoming TIO-540-A1A, TIO-540-A1B, TIO-540-A2A, or TIO-540-A2B (applicable to Serial Nos. 31-2 through 31-659 and 31-661 through 31-751)
or
Two 310 hp Lycoming TIO-540-A2B (applicable to Serial No. 31-660 with nacelle wing lockers only)
or
Two 310 hp Lycoming TIO-540-A2C (applicable to Serial Nos. 31-712 through 31-751 with nacelle wing lockers only and 31-752 through 31-8312019).

1967

PA-31-300 Navajo, Approved June 12, 1967.
Engines: Two 300 hp Lycoming IO-540-M1A5 (the only Navajo with normally aspirated engines).

1968

Aerostar PA-60-600 (Aerostar 600), Approved March 28, 1968.
Engines: Two 290 hp Lycoming IO-540-G1B5, IO-540-K1F5, IO-540-K1J5 (with Bendix fuel injector servos 2524491); IO-540-S1A5 or IO-540-P1A5 (with Bendix fuel injector servos 2524491).
NOTE: IO-540-S1A5 or IO-540-P1A5 engines are optional and installed per AAC Option 35.
Aerostar PA-60-601 (Aerostar 601), Approved Nov. 8, 1968.
Engines: Two 290 hp Lycoming IO-540-P1A5, IO-540-S1A5 or IO-540-G1B5 modified to incorporate turbochargers in accordance with RAJAY STC SE6WE with Bendix fuel injector servos.

1969

PA-31P-350 Mojave, Approved Nov. 26, 1969.
Engines: Two 425 hp Lycoming TIGO-541-E series.



PA-23-250 Aztec

James Lawrence



PA-30 Twin Comanche

Keith Wilson

PA-39 Twin Comanche C/R, Approved Dec. 3, 1969.
Engines: One 160 hp Lycoming IO-320-B1A (left), one 160 hp Lycoming LIO-320-B1A (right).

The Apache proved that there was a market for light twins, and Piper intended to capture that market.

1971

PA-34-200 Seneca, Approved May 7, 1971.
Engines: Serial Nos. 34-E4, 34-7250001 through 34-7250214: One 200 hp Lycoming LIO-360-C1E6 with fuel injector, Lycoming Part No. LW-10409 or LW-12586 (right side); and one 200 hp Lycoming IO-360-C1E6 with fuel injector, Lycoming Part No. LW-10409 or LW 12586 (left side).
Serial Nos. 34-7250215 through 34-7450220: One 200 hp Lycoming LIO-360-C1E6 with fuel injector, Lycoming Part No. LW-12586 (right side); and one 200 hp Lycoming IO-360-C1E6 with fuel injector, Lycoming Part No. LW-12586 (left side).

1972

Model PA-31-350 (Chieftain) and (T-1020), Approved May 3, 1972.
Engines: One 350 hp Lycoming TIO-540-J2BD (Chieftain, Serial Nos. 31-5001 through 31-5004 and 31-7305005 through 31-8452024) and one 350 hp Lycoming LTIO-540-J2BD (Chieftain, Serial Nos. 31-5001 through 31-5004 and 31-7305005 through 31-8452024).
One 350 hp Lycoming TIO 540-J2B (T1020, Serial Nos. 31-8253001 through 31-8553002).
One 350 hp Lycoming LTIO-540-J2B (T1020, Serial Nos. 31-8253001 through 31-8553002).

1973

Aerostar Model PA-60-601P (Aerostar 601P), Approved Nov. 14, 1973
Engines: Two 290 hp Lycoming IO-540-P1A5, IO-540-S1A5 modified to incorporate automatic controlled turbochargers in accordance with RAJAY STC SE60WE with Bendix fuel injector servos 2524477 for Serial Nos. 61P-0157-001 through 61P-0211-021* and 2524491 for Serial Nos. 61P-0213-022 through 61P-0455-176
or
Two 290 hp Lycoming IO-540-P1A5, IO-540-S1A5 modified to incorporate automatic controlled turbochargers in accordance with AEROSTAR STC SE81WE with Bendix fuel injector servos 2524491 for Serial Nos. 61P-0456-177 and subsequent.

1974

PA-31-325 Navajo C/R, Approved May 31, 1974.
Engines: One 325 hp Lycoming TIO-540-F2BD and one 325 hp Lycoming LTIO-540 F2BD.

PA-34-200T Seneca II Turbo, Approved July 18, 1974.
Same as Model PA-34-200 series except engine installation, maximum gross weight, and other minor changes.
Engines: One 200 hp Teledyne Continental TSIO-360-E or TSIO-360-EB (left engine), one 200 hp Teledyne Continental LTSIO-360-E or LTSIO-360-EB (right engine).

1975

Model PA-23-250, Approved Jan. 21, 1975.
Same as Model PA-23-250 (6 PCLM), Serial Nos. 27-2505 through 27-4916, and 27-7304917 through 27-7554168, at 5,200 pounds maximum weight except required equipment.
Engines: Two Lycoming 250 hp I-540 series.

1978

PA-44-180 Seminole, Approved March 10, 1978.
Engines: One 180 hp Lycoming O-360-E1A6D with carburetor


PA-44-180 Seminole


PA-34-220T Seneca V Turbo




Keith Wilson
PA-31-350 Chieftain


Keith Wilson
Aerostar 601P "Super 700CR"

setting 10-5092, 10-5219, or 10-6019 (left side). One 180 hp Lycoming LO-360-E1A6D with carburetor setting 10-5092, 10-5219, or 10-6019 (right side)
or
One 180 hp Lycoming O-360-A1H6 with carburetor setting 10-5219 or 10-6019 (left side). One 180 hp Lycoming LO-360-A1H6 with carburetor setting 10-5219 or 10-6019 (right side)
or
One 180 hp Lycoming IO-360-B1G6 (left side) with fuel injector model RSA-5AD1, (Lycoming Part No. 61J28856). One 180 hp Lycoming LIO-360-B1G6 (right side) with fuel injector model RSA-5AD1 (Lycoming Part No. 61J28856).
(Engines must be both carbureted or both fuel injected, mixing carbureted with fuel injected engines is prohibited, as well as mixing spinners.)

Additional twin models and variants continued apace, with new ones coming to market almost yearly from 1957 through the early 1980s. Today, only the PA-44 Seminole remains in production.

1979

PA-44-180T Turbo Seminole, Approved Nov. 29, 1979.
Engines: One 180 hp Lycoming TO-360-E1A6D with carburetor setting 10-5256 and one 180 hp Lycoming LTO-360-E1A6D with carburetor setting 10-5256.

1980

PA-34-220T Seneca III Turbo, Approved Dec. 17, 1980.
Same as model PA-34-200T series except engines, windshield, instrument panel, landing gear, maximum gross weight and other minor changes.
Engines: One 200 hp Teledyne Continental TSIO-360-KB (left engine), One 200 hp Teledyne Continental LTSIO-360-KB (right engine).

Aerostar Model PA-60-602P (Aerostar 602P), Approved Oct. 30, 1980
Engines: Two 290 hp Lycoming IO-540-AA1A5 engines incorporating Bendix fuel injector servos Bendix Part No. 2524846-1 and automatically controlled turbochargers Aerostar Kits Part No. 300076-515 (left engine) and Part No. 300076-517 (right engine).



PA-31-325 Navajo (foreground) and PA-31-350 Navajo

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PA-34-200T Seneca

Photo Piper Aircraft

RESOURCES

"APACHE: PIPER'S FIRST INDIAN" BY DARYL MURPHY
tinyurl.com/PiperFlyerApacheMurphy

"A PIPER APACHE GIVES BACK" BY TOM MACHUM
tinyurl.com/PiperFlyerApacheGivesBack

"PIPER PA-23 APACHE: A TWIN ON A MODEST BUDGET" BY ERIC PARKS
tinyurl.com/0322PiperFlyermagazine

"PIPER PA-23-250 AZTEC" BY BOB DAVY
tinyurl.com/1120PiperFlyermagazine

"OWNER PROFILE: RICK GARCIA AND HIS 1977 PIPER PA-34-200T SENECA II TURBO" BY DALE SMITH
tinyurl.com/0420PiperFlyermagazine

"REVISITING THE TWIN COMANCHE: A FLIGHT REVIEW OF THE PA-30" BY BOB DAVY
tinyurl.com/PiperFlyerRevisitTwinComanche

"COMANCHE LANDING GEAR" BY KRISTIN WINTER
Five-part series which includes coverage of the PA-30/PA-39 Twin Comanche landing gear systems.
Part One: *tinyurl.com/0721PiperFlyerMagazine*
Part Two: *tinyurl.com/0821PiperFlyerMagazine*
Part Three: *tinyurl.com/0921PiperFlyerMagazine*
Part Four: *tinyurl.com/1021PiperFlyerMagazine*
Part Five: *tinyurl.com/1121PiperFlyerMag*

"THE PIPER NAVAJO: THE LAST OF THE LOCK HAVEN PLANES" BY KRISTIN WINTER
tinyurl.com/PiperFlyerNavajo-Winter

"LIFE WITH A SENECA II: 2023 UPDATE" BY MICHAEL LEIGHTON
tinyurl.com/0423PiperFlyerMagazine

"PIPER SENECA VARIANTS" BY JENNIFER DELLENBUSCH
tinyurl.com/0423PiperFlyerMagazine

"PIPER AEROSTAR SUPER 700"
tinyurl.com/PiperFlyerAerostar700

"SENECA CHRONICLES" BY JENNIFER DELLENBUSCH
Part One: *tinyurl.com/PiperFlyerSenecaChron1*
Part Two: *tinyurl.com/PiperFlyerSenecaChron2*

"EVERYPILOT'S LIGHT TWIN: THE PIPER PA-44 SEMINOLE" BY DALE SMITH
tinyurl.com/PiperFlyerSeminole-Smith

These are only a few of the articles we've published about Piper twins over the past 20 years. Use the search bar in the upper left corner of Piperflyer.com to search for additional Piper twin articles.

Join the 63,000-plus people who have followed Piper Flyer member Eric Parks' journey of buying, refurbishing, and flying a Piper Apache.
piperflyer.com/forum/pa-23/569-buying-an-apache
piperflyer.com/forum/pa-23/832-flying-an-apache

Search for other twin models or start your own journal of Piper Twin ownership at *piperflyer.com/forum*

1983

PA-31P-350 Mojave, Approved June 9, 1983.
Engines: Two 350 hp Lycoming TIO-LTIO-540V2AD.

Model PA-60-700P (Aerostar 700P), (Normal Category) Approved May 24, 1983.
Same as PA-60-602P except engines, propellers, maximum weights, increased zero fuel weight, flight envelope shifted forward, added elevator gap seals, elevator bob weight, cowl flaps, stall warning system, increased span on elevator and rudder trim tabs, and other minor changes.
Engines: One 350 hp Lycoming LTIO-540-U2A and one 350 hp TIO-540 U2A engine incorporating Bendix fuel injector servos Bendix Part No. 2549056 and automatically controlled turbochargers Aerostar Kits Part No. 300154-1 (left engine) and Part No. 300154-501 (right engine).

1993

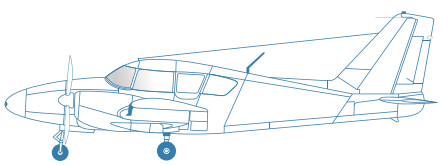
PA-34-220T Seneca IV Turbo, Approved Nov. 17, 1993.
Same as Model PA-34-220T (Seneca III) except nose bowl assembly, instrument panel, interior and other minor changes.
Engines: One 200 hp Teledyne Continental TSIO-360-KB (left engine), and one 200 hp Teledyne Continental LTSIO-360-KB (right engine).

1996

PA-34-220T Seneca V Turbo, Approved Dec. 11, 1996.
Same as Model PA-34-220T (Seneca IV) except engine installation, instrument panel, interior and other minor changes.
Engines: One 220 hp Teledyne Continental TSIO-360-RB (left engine) and one 220 hp Teledyne Continental LTSIO-360-RB (right engine).

Jennifer Dellenbusch *is president of the Piper Flyer Association. Send questions or comments to editor@piperflyer.com.*

Sources: Type Certificate Data Sheets

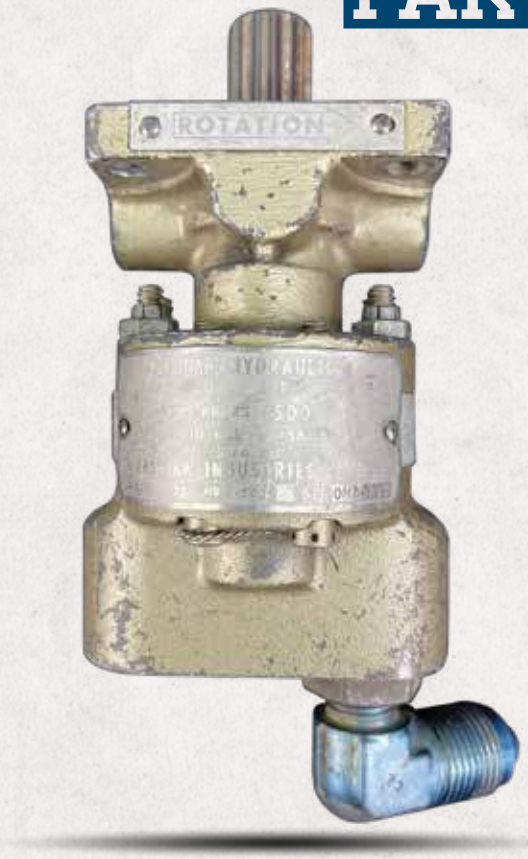






UNDERSTANDING YOUR PIPER'S HYDRAULIC SYSTEM

PART THREE



Some Pipers have engine-driven hydraulic systems. **KRISTIN WINTER** explains what you should know about how these systems work, and what to do when they aren't working correctly.

In the previous installment of this series, I described standalone electro-hydraulic "power pack" systems that extend and retract the landing gear on Piper singles and some Piper twins. *(Part One appeared in the June 2023 issue of* Piper Flyer*; Part Two was in the July 2023 issue. —Ed.).* In this month's article, I will discuss the engine-driven open-center hydraulic systems used on many common Piper twins.

Hydraulics came to aviation in the 1930s, primarily as a method to operate retractable landing gear, flaps, and other systems. Some iconic aircraft in the 1930s that utilized hydraulic systems include the Douglas DC-2 and DC-3.

A system with engine-driven hydraulic pumps was well-established aircraft design orthodoxy by the 1950s as General Aviation developed. Light General Aviation aircraft hydraulic systems can be fairly simple as they only see intermittent use.

Larger transport category aircraft that use hydraulics constantly to boost controls, or need an immediate response, such as boosted braking systems, need the system pressurized all the time. That requires the more complex closed-center system described in Part One.

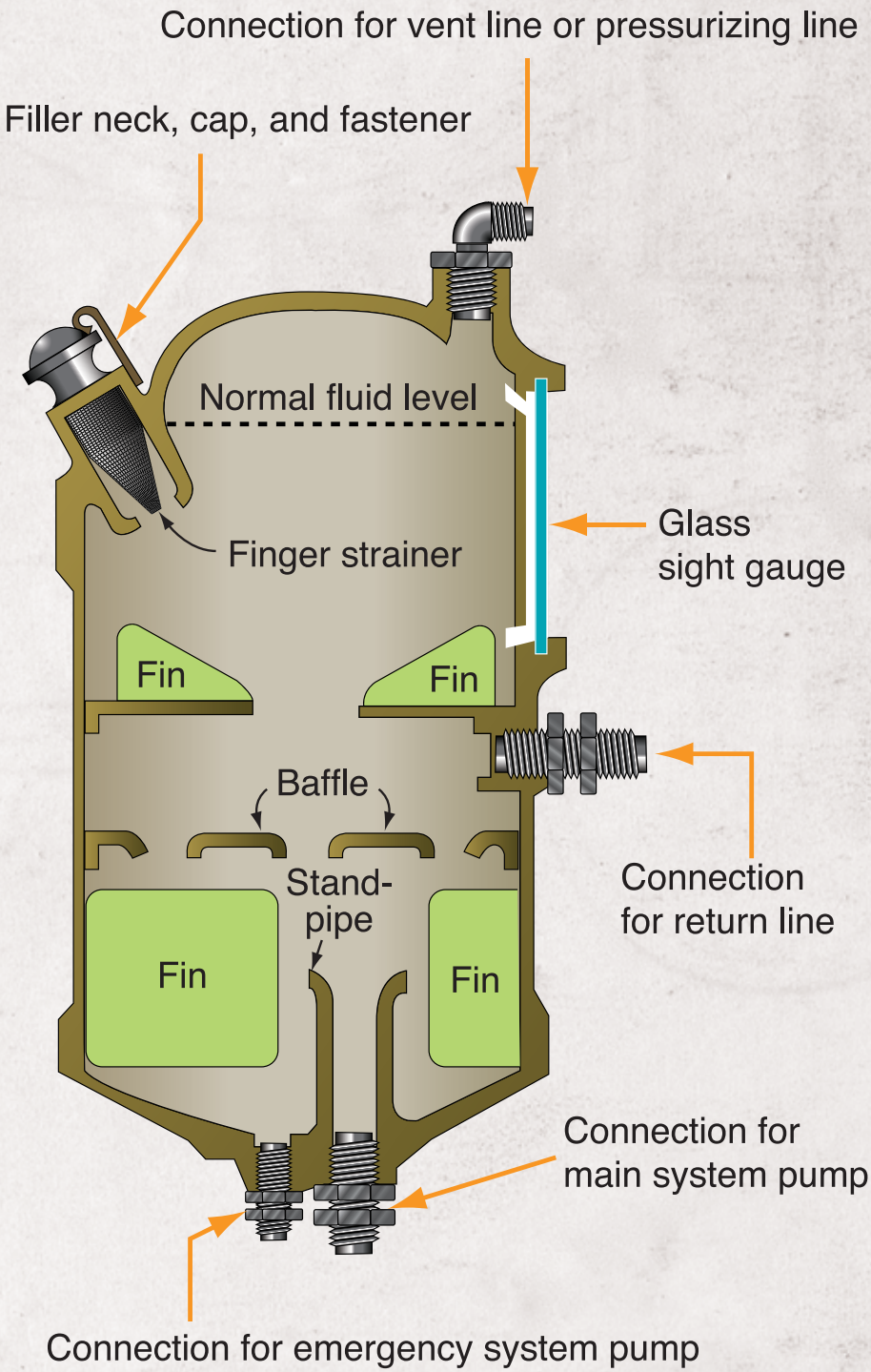
Engine-driven open-center systems

For systems that only operate landing gear and perhaps the flaps, a system that merely circulates the fluid is simpler, cheaper, and lighter. Piper and other General Aviation manufacturers have used open-center engine-driven systems on many aircraft.

Piper first utilized the engine-driven system with the Piper PA-23 Apache, introduced in 1954. They continued using the same basic system design in the Aztec, Navajo, and Cheyenne series.

Pilots of these aircraft need a thorough understanding of how the system in their aircraft operates. It is pretty universal that they use a combination reservoir and valve system, which constitute the "power pack," sans any power. One or more engine-driven hydraulic pumps supply the hydraulic power.

One would think it easy to count the number of engines and assume that the number of hydraulic pumps is the same. Generally, you would be correct, but Piper



Typical reservoir with standpipe.

For systems that only operate landing gear and perhaps the flaps, a system that merely circulates the fluid is simpler, cheaper, and lighter.



throws a curve with the PA-23 Apache/Aztec series. They were initially produced with only one hydraulic pump on the left engine, giving even more meaning to the term "critical engine." However, even that exception is not universal, as Piper started installing a hydraulic pump on each engine in mid-1978, and there are several STCs to alleviate the one-pump problem. The PA-23 is a good example of why type-specific training is a must.

The open-center system used by Piper had two loops of circulating fluid. Each engine powered its own loop, which went from the reservoir to the pump and back to the reservoir through the operating valve(s). Activating the valve diverted the fluid out to the actuators needed to open doors, release the locks, and move the gear up or down.

Emergency procedures

Aside from knowing where the hydraulic pressure is coming from, the pilot needs to know what to do when the system fails. The two common means for an emergency gear extension used by Piper are a hand pump and a carbon dioxide (CO_2) blow-down system.

With a hand pump, selecting gear down and pumping the handle creates the hydraulic pressure needed to lower the gear, and in some systems (rare), you can also use it to raise the landing gear. Unlike the engine-driven pump, which takes the fluid from a standpipe, the hand pump takes fluid from the bottom of the reservoir. This design preserves a certain amount of fluid for the hand pump. Thus, if a line ruptures and the engine-driven pump(s) send nearly all the fluid overboard, enough fluid should be left to lower the landing gear.

The other common emergency gear extension method is using a CO_2 cylinder. These usually look like the large CO_2 canisters used on a seltzer bottle or an inflatable life preserver. Activating the system releases a flood of CO_2 through the lines to the gear, through a shuttle valve, and literally blows the gear down and locked. Piper used it as a backup to the hand pump in the PA-23 Apache series and as an option on the commuter version of the PA-31 Navajo Chieftain.

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Operating tips

One other thing that a pilot should know about these installations is how to check that both pumps are working. Some installations have an automatic warning system that detects a loss of fluid flow or pressure from one engine; Pipers generally do not utilize such a warning system.

The few Piper twins that do use this warning system rely on the pilot to make a habit of checking the two engine-driven pumps. The Piper installation uses a physical connection between the landing gear selector lever and the hydraulic valve.

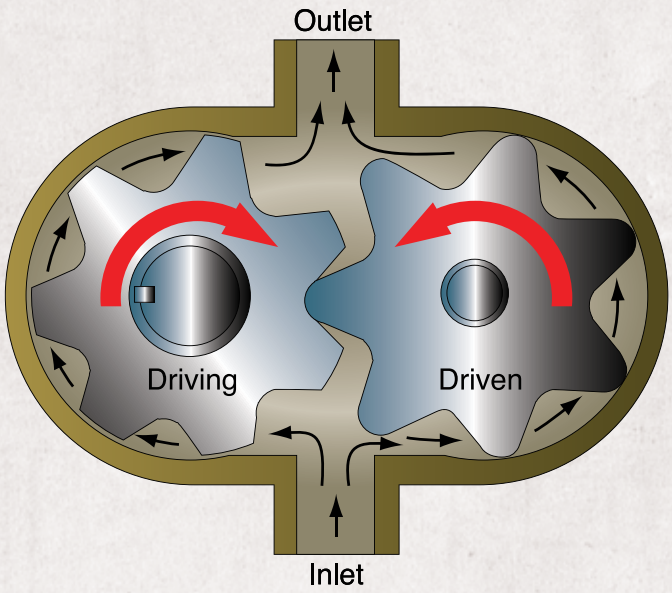
The landing gear lever on the Pipers has three positions. The middle is a neutral position, up selects up, and down selects down. When the cycle is complete, the lever will return to the neutral position. That is a good additional indication that the gear is down. Veteran Navajo and Cheyenne drivers get in the habit of leaving their hand on the lever when lowering the landing gear so they can feel when it returns to the neutral position.

If both engines are running, one doesn't really know if one of the pumps is not running. But each start and shutdown provide an opportunity to test the pump. With just one engine running, putting the landing gear lever in the down position will cause the pump to pressurize the system.

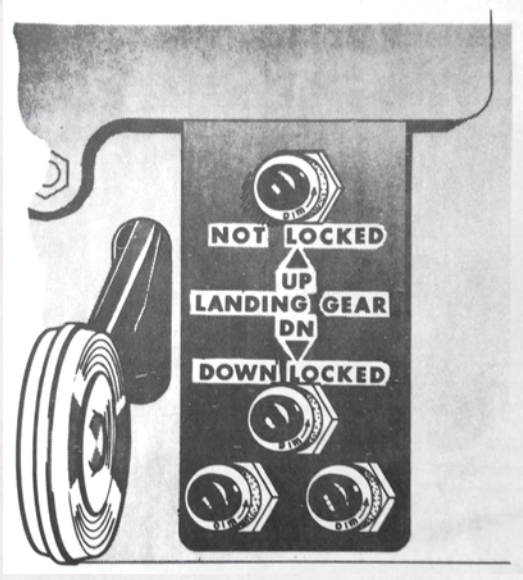
Since the gear is already down, the system quickly pressurizes, and the landing gear lever snaps back to neutral. If it doesn't, then the pump isn't working on the side you just tested. Some pilots start the left engine first and check that pump. On shutdown, they shut down the left engine first, and then check the right pump.

Others, like me, choose to start the right engine first to check its pump occasionally. Switching engine start sides from time to time makes it possible to identify a failed pump in a timely manner. As an aside, it also helps to check the health of the vacuum/pneumatic pumps.

While these gear-type hydraulic pumps are quite reliable, they frequently don't get the maintenance attention they deserve. They are often not overhauled when the engines are overhauled. The result is that they often run to failure.



Simple fixed-displacement pump.



A Navajo gear selector.

Recently, we were contacted by someone having hydraulic issues in a Navajo. Assuming both pumps could not have failed, our focus was initially on other parts of the system. The owner was incredulous to discover that both of his pumps had failed. One had likely failed a long time ago and was just not detected until the other pump failed. While not common, such a scenario is not an isolated one.

The fine details of aircraft systems highlight the need for pilots to spend time learning the systems on their aircraft. It is not enough to assume that your experience in one type of aircraft with a similar system will qualify you to fly that aircraft safely. The subtle differences can provide little gotchas that will bite the unwary and inadequately prepared pilot.

Kristin Winter *has been an airport rat for over four decades. She holds an ATP-SE/ME rating and is a CFI-AIM, AGI, IGI. In addition, Winter is an A&P/IA and reformed aviation defense attorney. She has over 9,000 hours in various GA aircraft. She owns and flies her Twin Comanche, "Maggie." She flies professionally, instructs, and provides purchasing and operations consulting. She is currently based in Minnesota, which is where it all started. Send questions or comments to editor@piperflyer.com.*



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DESTINAT

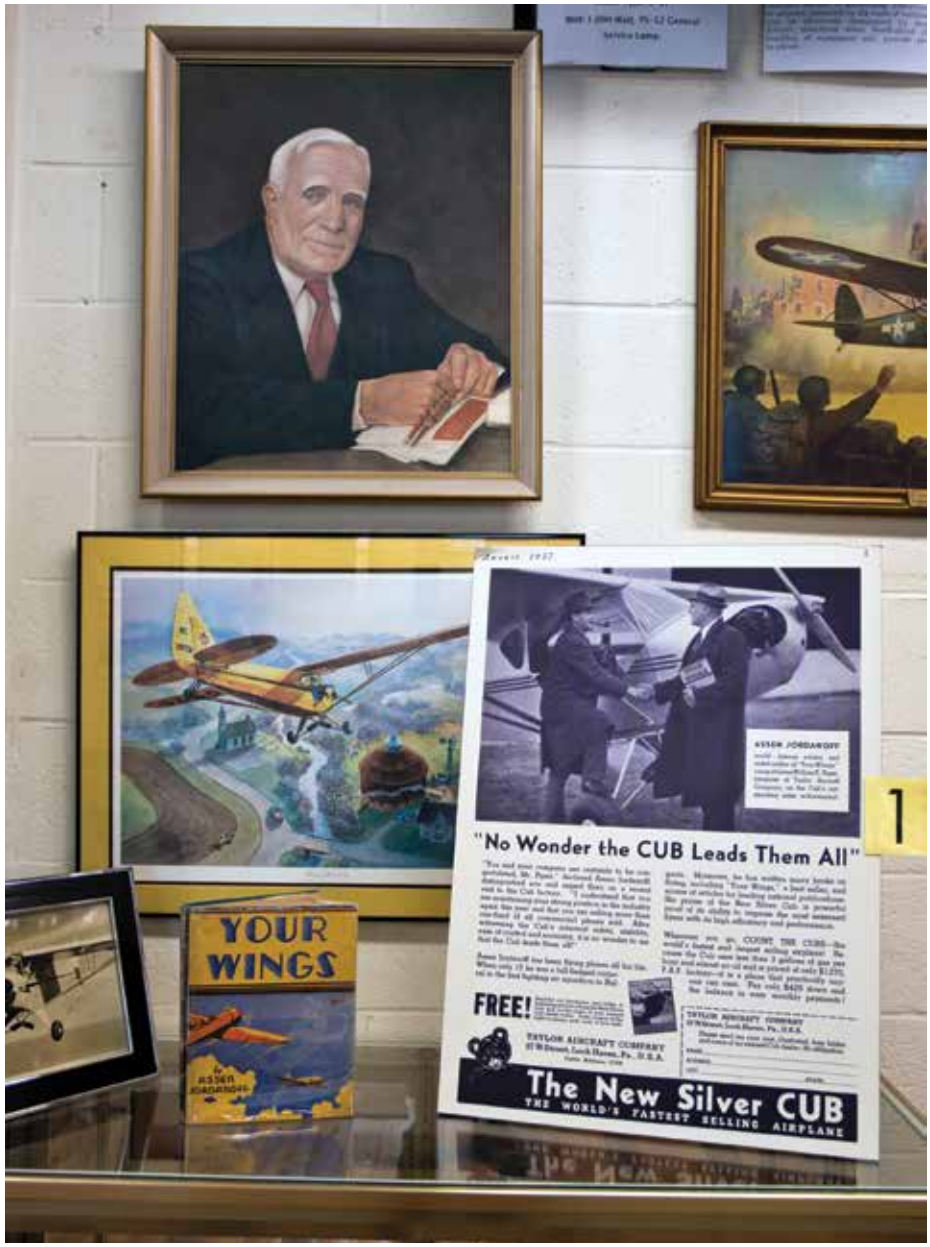


LOCK HAVEN, PENNSYLVANIA

The home of Piper is worthy of a pilgrimage during any time of the year.

Story and photos by Dennis K. Johnson





While every Piper owner should make the pilgrimage to Lock Haven, Pennsylvania, during Sentimental Journey, Lock Haven is worth visiting anytime. The town is located among the scenic hills of the Appalachian Mountains at the confluence of a branch of the Susquehanna River and Bald Eagle Creek. Lock Haven lies under a direct route between Washington, D.C./Baltimore, Maryland and Rochester, New York, or between Boston, Massachusetts, and Pittsburgh, Pennsylvania, so it's a good stop on either a north/south or east/west trip in the Northeast.

The town is 32 miles northeast of State College—home of Penn State University—so pilots can drop off their college students and continue to Lock Haven, or make it a day trip during homecoming week.

The number one sight to see in Lock Haven is the Piper Aviation Museum. Visitors can view Piper memorabilia and aircraft and learn the history of the iconic J-3 Cub and the Piper Aircraft Company there. Across the street stands the original factory building (formerly a silk mill) and successive assembly line buildings where Piper built many of our favorite Cubs, Vagabonds, and Super Cruisers.

Additionally, the area around Lock Haven offers many other attractions. Pilots may want to tour the Lycoming Engines factory or attend a Little League World Series baseball game in Williamsport, just 27 miles east. Outdoor recreation in Pennsylvania state parks is excellent, with miles of hiking trails, hunting, and lakes for swimming, boating, and fishing.

Piper Aviation Museum

To learn the fascinating history of the Piper Aircraft Company, visit the Piper Aviation Museum, housed in the former Piper engineering building where Piper models were designed. New aircraft were developed in this building, and prototype parts were produced and tested at this location until Piper moved to Florida in 1984.

The museum was founded in the 1980s by former employees who wanted to preserve the history of the company. It began

as a traveling roadshow of Piper history and memorabilia in a tractor-trailer driven to airshows nationwide, usually by former employee Calvin Arter and his dedicated wife, Sue. The museum moved to a permanent location in Hangar One at Piper Memorial Airport, and then into the engineering building in 1997.

When asked how a museum in a fairly remote, rural town can survive, museum director Ed Watson, said, "We're thriving; we're actually expanding and have more airplanes on display than ever. A new gallery displays a 1942 L-4 Grasshopper (the military version of a J-3 Cub) and a 1948 PA-15 Vagabond. The next time you visit, you'll see a mural painted on the walls depicting a World War Two scene."

Numerous Piper aircraft are displayed in the hangar, including the City of The Angels, a 1946 PA-12 Super Cruiser which made an around-the-world flight in 1947. Most of the exhibited airplanes were donated by generous friends of the museum.

The only flyable aircraft in the museum collection is a 1950 PA-22-160 Piper Tri-Pacer donated by Phil and Sharon Hoy. Not only did the Hoys donate the airplane, they continue to keep the airplane flying so that the local EAA chapter can give children "Young Eagle" flights.

[The museum] began as a traveling roadshow of Piper history and memorabilia in a tractor-trailer driven to airshows nationwide.

"The Hoys pay for all the maintenance, inspections, insurance, and fuel. It's this unprecedented generosity that keeps us going; of course, we are always looking for grants and such," said Watson.

Museum exhibits cover the entire span of the Piper Aircraft Company, and the archive is a comprehensive source of information on everything Piper. The museum store stocks the latest book by the Piper historian, Roger Peperell, titled "Piper Aircraft–Freedom of Flight." Published in England, with nearly 2,000 photographs and illustrations, this book will keep you occupied for days. You can buy a copy online—see Resources for a link.

Whenever you visit, browse the museum store and support the museum by purchasing Piper clothing, including a fabulous Hawaiian shirt printed with Piper Cubs, plus Piper yellow hats, coffee cups, and much more.

Arriving at Lock Haven

William T. Piper Memorial Airport (KLHV) in Lock Haven, Pennsylvania, sits at 556 feet msl in a scenic valley at the confluence of Bald Eagle Creek and the Susquehanna River. Low ridges parallel the two runways—Runway 09L/27R is 3,799 by 75 feet of asphalt, and Runway 09R/27L is 2,179 by 100 feet of grass. The town operates the airport, so there are no private FBOs.

The airport office is open from 8 a.m. to 5 p.m., Monday to Friday, and from 10 a.m. to 4 p.m., Saturday and Sunday, with a waiting room and restrooms that are open 24/7. There are no landing fees, and tiedown space is plentiful, but call ahead to see if any transient hangar space is available. The airport staff can fuel you




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with Jet-A or 100LL and will give pilots a ride into town.

The Enterprise Rent-a-Car office in Lock Haven is not open on weekends, but if you plan ahead, they will deliver a car to the airport before you arrive. Call the airport manager at (570) 748-5123 for more assistance.

See Resources for links to items listed here and throughout the rest of this story.

Keystone Instruments

If you want to discuss your airplane's instrumentation with a professional, walk across the runway to Keystone Instruments, housed in a hangar on the airport's north side. They are specialists in "steam" gauges and can test, calibrate, and repair your vintage avionics.

Where to stay

The town has a Best Western and a Fairfield Inn & Suites by Marriott. The Best Western is in a slightly better location for walking into town to dine. It's about 0.3 miles from the Best Western and 0.6 miles from the Fairfield Inn to the Old Corner Grill (a central location). Several bed and breakfasts are also available as options.



Parking is easy to find; it's not a bustling town.

Dining

Lock Haven is not a foodie's delight. While there're a handful of restaurants

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downtown from which to choose, many are not open daily—there's not enough customer traffic— so check opening hours or plan a Friday or weekend visit if you want to dine at a restaurant during your visit.

The TripAdvisor website indicates a restaurant's location and cuisine, but there are few reviews. Some restaurants are outside of downtown and inaccessible if you don't have a car.

The number one TripAdvisor recommendation each year is Stella A's, which serves Mediterranean and Greek dishes along with chicken, salmon, and pasta. I've dined there in past years, finding the Greek dishes good but not great. I'm half Greek; I suggest trying the Greek salad, pastitsio, or spanakopita.

I also dined at the Old Corner Grill and Bottle Shop (you can buy yourself a bottle of something potent in the attached bottle shop) on the corner of N. Grove St. and E. Church St. This corner bar seems to be making an effort, with a varied (probably too varied) but typical bar menu. It did offer a selection of "specialty burgers." I enjoyed a South-of-the-Border Burger, which was topped with pepperjack cheese, jalapeño peppers, grilled onions, chipotle sauce, and tortilla chips. Messy, but the hamburger patty was OK, and the toppings tasty. The Old Corner Grill offers a fair selection of beers, too, not just Miller and Bud Light.

Williamsport

While visiting Lock Haven, include a visit to the nearby town of Williamsport, home of the Lycoming aircraft engine factory and the Little League World Series.

Lycoming Engines

Before the COVID-19 crisis, Lycoming hosted tours of their factory and museum at 2 p.m. on most Wednesdays and Thursdays. However, the pandemic upset normal operations, so call ahead to arrange a time. Lycoming welcomes groups, but be certain to schedule your tour at least two months before your planned date. The factory is a secure facility, so visitors must provide their names and identification in advance for a security check.

Contact Matt Joiner at (570) 327-7114 or email communications@lycoming.com for more information.

Little League Baseball World Series

Each year, Williamsport hosts a World Series. Teams from around the world gather to compete in the Little League Baseball World Series. This year, the series runs from August 17 to August 28, but even when games are not being played, it's worth visiting the World of Little League Museum.

Visitors to the museum can learn Little League baseball's history, which started as a small youth league in 1939. The museum, which charges a modest admission fee, is adjacent to the stadiums where the games are played and is open from 9 a.m. to 4 p.m., Thursday to Monday.

During the World Series, admission into the stadium complex is free, but visitors usually have to sit on the famous "hill" overlooking the outfield. Stadium seating in the small grandstand is reserved for team players and their family members.

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DESTINATION

Williamsport Regional Airport (KIPT)

It's a quick flight from Lock Haven to Williamsport Regional Airport, 5 miles east of the town, at 528 feet msl. It offers two asphalt runways: 09/27, which is 6,825 feet long, and 12/30, which is 4,273 feet in length. The airport has a part-time control tower and full-service FBO.

Bald Eagle State Park

Numerous Pennsylvania state parks surround Lock Haven, but one of the best is about 15 miles southwest, the 5,900-acre Bald Eagle State Park. The park encompasses a 1,730-acre lake, which offers many swimming, boating, and fishing opportunities.

Children will enjoy the 1,200-foot-long sand and grass beach, equipped with picnic tables, a playground, changing rooms, restrooms, and parking. Swimming is allowed from 8 a.m. to sunset between Memorial Day and Labor Day.

The park offers numerous boat-launching sites, with fishing boats, kayaks, jet skis, canoes, and paddleboards available to rent. Fourteen miles of trails provide space to wander, and fishing and hunting are allowed.

The park has various camping options, including rustic campsites and campsites with flush toilets and warm showers, RV hookups, and fully equipped cottages. An upscale option is the Nature Inn, a 16-room full-service inn that overlooks the park's lake.

Make reservations online or call (888) PA-PARKS from 7 a.m. to 5 p.m., Monday to Saturday.

Dennis K. Johnson *is a freelance writer for aviation magazines, and photographer who shoots travel photos for Getty Images and Alamy Stock Images. Based in Hoboken, New Jersey, he's an avid traveler, private pilot and owner of a vintage 1947 Piper PA-12 Super Cruiser. Send questions or comments to editor@piperflyer.com.*

RESOURCES

AOPA AIRPORT DIRECTORY (KLHV)
aopa.org/destinations/airports/KLHV/details

BALD EAGLE STATE PARK
dcnr.pa.gov/StateParks/FindAPark/BaldEagleStatePark/Pages/default.aspx



Piper Aviation Museum Details

Hours

The museum is open from 9 a.m. to 4 p.m. Wednesday to Friday, 10 a.m. to 4 p.m. Saturday, and noon to 4 p.m. Sunday. Call ahead to schedule tour groups, which receive a discounted rate.

Admission

Adults - $10

Senior Citizens (55+) and Military - $8

Children & Teens (6-16) - $5

Children under 5 – Free

Family Rate - $25

Contact

One Piper Way, Lock Haven, PA 17745

(570) 748-8283

pipermuseum.com

pipermuseum@comcast.net

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keystoneinstruments.com

LITTLE LEAGUE WORLD SERIES
littleleague.org/world-series

LYCOMING ENGINES
lycoming.com/factory/tours

"PIPER AIRCRAFT–FREEDOM OF FLIGHT"
pipermuseum.com/gift-shop/p/book-piper-aircraft-freedom-of-flight-and-suppliment

PIPER AVIATION MUSEUM
pipermuseum.com

SENTIMENTAL JOURNEY TO CUB HAVEN FLY-IN
sentimentaljourneyfly-in.com

STELLA A'S
stella-as.com

THE OLD CORNER
theoldcorner.com

WILLIAMSPORT REGIONAL AIRPORT
flyipt.com





PRESS RELEASES

*Compiled from press releases

August 2023



MANAGER OF PRODUCT SUPPORT & TECHNICAL PUBLICATIONS JOHN POPEL MAKES TECHNICAL PRESENTATION TO ATTENDEES FROM 12 COUNTRIES

Hartzell Propeller Hosts International Prop Shop Seminar

PIQUA, Ohio, June 20, 2023—Hartzell Propeller, the global leader in advanced technology aircraft propeller design and manufacturing, recently hosted the company's biennial International Prop Shop Seminar. The event brought together propeller maintenance professionals from around the world to promote safety, share technical information, and discuss the latest propeller products and services across a wide range of aircraft platforms.

The seminar attracted nearly 100 attendees representing 12 countries from around the globe. Participants included individuals from propeller shops, fleet operators, aircraft manufacturers, maintenance professionals, airworthiness agencies, and aviation schools.

The purpose of the event was to promote propeller safety, clarify standards and practices for Hartzell props, present the latest technical information and company products, provide ideas to improve and streamline operations, foster a greater understanding of the company's advanced technology and innovation, and facilitate an information exchange with customers.

"The seminar proved to be a highly engaging and informative event for our attendees and for the company," said JJ Frigge, President of Hartzell Propeller. "We were delighted to welcome so many propeller experts from around the world to our headquarters in Piqua, Ohio, and we look forward to continuing these important conversations until our next Prop Shop Seminar in 2025," Frigge added.

Hartzell Propeller presenters at the International Prop Shop Seminar included President JJ Frigge, VP of Quality Burt Mattice, Director of Business Development & New Technology Mitch Heaton, Director of Aftermarket Sales Alex Krauskopf, and Manager of Product Support & Technical Publications John Popel.

Hartzell Aviation's flagship company is Hartzell Propeller, the global leader in advanced technology aircraft propeller design and manufacturing for business, commercial and government customers. The company designs next-generation propellers with innovative blended airfoil technology and manufactures them with revolutionary machining centers, robotics, and custom resin transfer molding curing stations. For more information go to https://hartzellprop.com

MYGOFLIGHT EXPANDS PRODUCT PORTFOLIO WITH ACQUISITION OF FLIGHT FLIX, LLC



June 26, 2023, Denver, CO – MyGoFlight, (www.mygoflight.com), the leading manufacturer of premium quality mounts, cases, flight bags, and accessories for aviators, has announced its acquisition of Minnesota based, Flight Flix, LLC (www.flightflix.net) a prominent and trusted provider of innovative external camera mounting solutions for aviation enthusiasts. The strategic acquisition will bolster MyGoFlight product offerings, further solidifying its position as a trusted brand in the aviation industry.

Flight Flix, LLC has built a powerful reputation in the aviation community for its innovative camera mounting solutions. Their products are known for their high-quality construction, versatility, and ability to capture stunning aerial footage. With this acquisition, MyGoFlight will gain access to Flight Flix's innovative product line, allowing the company to offer its customers a more comprehensive range of solutions and expand into other markets like motorsports.

"We are thrilled to welcome Flight Flix, LLC into the MyGoFlight family," said Dominic Martinez, President, MyGoFlight. "This acquisition aligns with our strategic vision of expanding our product portfolio and delivering exceptional solutions to aviation enthusiasts worldwide. Flight Flix's camera mounts are highly regarded in the industry, and we are excited to combine our resources and expertise to take them to even greater heights."

Brian Domareck, as CFO, played a leading role in orchestrating the financial aspects of the acquisition, ensuring a seamless integration of both companies and maximizing value for MyGoFlight and its stakeholders.

"I am honored to have played a part in the successful acquisition of Flight Flix, LLC," said Brian, "The integration of Flight Flix's innovative camera mounting solutions into MyGoFlight's product portfolio is a testament to our commitment to providing aviators with innovative mounts and accessories."

Tracey Schneider's visionary approach led to the realization that MyGoFlight's expertise in mounts, cases, and flight bags could be extended beyond the aircraft's interior.

"I am incredibly proud to have played a role in the acquisition of Flight Flix, LLC," said Tracey Schneider, CMO of MyGoFlight. "Expanding our offerings to include camera mounts aligns perfectly with our commitment to providing aviators with the best accessories for their needs."

Ryan Mohr, Founder of Flight Flix, LLC, expressed his enthusiasm about the acquisition, saying, "The sale to MyGoFlight presents an incredible opportunity to accelerate the growth of Flight Flix's products and reach a wider audience of aviation enthusiasts."

The acquisition of Flight Flix, LLC is a testament to MyGoFlight's commitment to innovation and its dedication to providing aviators with the highest quality accessories and solutions. With the expanded product portfolio, customers can expect an even greater selection of camera mounting solutions designed specifically for aviation applications.

Both MyGoFlight and Flight Flix, LLC customers can look forward to continued excellence in customer service, timely delivery, and the same level of commitment to quality that they expect. The combined strengths of these two industry leaders will pave the way for exciting developments and advancements in aviation accessories.

For more information about MyGoFlight and its products, please visit www.MyGoFlight.com.

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AD

Airworthiness Directive



AD 2023–09–09: SPOT-WELDED V-BAND COUPLINGS

A new AD addresses potential cracking of couplings installed on the exhaust systems of various airplanes powered by turbocharged reciprocating engines.

By Steve Ells

Airworthiness Directive (AD) 2023-09-09 is effective July 17, 2023:

"The FAA is issuing this AD to prevent failure of the spot-welded, multi-segment exhaust tailpipe V-band coupling.

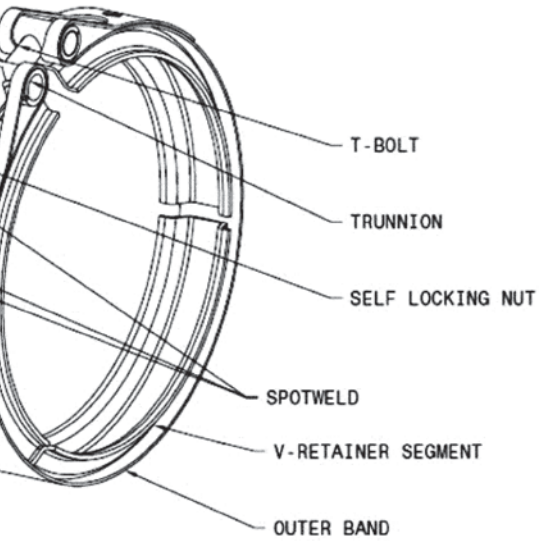
"The data studied by the [FAA] working group contained evidence of pre-existing cracking of the couplings, known embrittlement at the spot weld locations simply due to that manufacturing method, and outer band cupping on the multi-segment couplings (which is the result of age, over-use, and potential over-torqueing [sic])."

"Current inspection procedures are inadequate to detect these cracks in a timely manner. Accordingly, the FAA is mandating inspection procedures and a life limit to protect the fleet."

V-band clamps have been problematic for over 45 years

Since 1974, National Transportation Safety Board (NTSB) accident and incident investigations have led to the issuance of seven NTSB Safety Recommendations concerning exhaust systems and/or exhaust V-band couplings; 20 FAA ADs to address the unsafe condition with exhaust systems and/or exhaust V-band couplings; and 10 FAA Special Airworthiness Information Bulletins (SAIBs). The industry has also taken action to raise awareness of the concerns associated with V-band coupling failures.

The General Aviation Joint Steering Committee (GA–JSC) working group recommended that a replacement interval (500 hours for spot-welded and 2,000 hours for riveted and single-piece) be incorporated in the Airworthiness Limitations sections of the



maintenance manual. The GA–JSC report is linked in Resources.

This new AD would apply regardless of whether the turbocharger is installed as part of the Type Certificate, under an STC, Parts Manufacturer Approval (PMA), or field approval. Outside of Type Certification, it is the responsibility of the owner, working with a licensed mechanic, to determine if the configuration of the aircraft includes a spot-welded multi-segment V-band coupling installed at the tailpipe-to-turbocharger exhaust housing.

This AD addresses an unsafe condition for spot-welded, multi-segment V-band coupling installed at the tailpipe-to-turbocharger exhaust housing flange for turbocharged, reciprocating engine-powered airplanes and helicopters. The vibratory environment for turbine engines on helicopters is different and is not part of the identified unsafe condition.

Steps to compliance

1) Within 50 hours time-in-service (TIS) after the effective date of this AD, review the aircraft maintenance records to determine the number of hours TIS accumulated on each V-band coupling.

2) If the V-band coupling has accumulated less than 500 hours TIS: Initially remove the V-band coupling from service before it accumulates 500 hours TIS or within 50 hours TIS after the effective date of this AD, whichever occurs later. Thereafter, remove the V-band coupling from service before it accumulates 500 hours TIS.

3) If the V-band coupling has accumulated 500 or more hours TIS or if the hours TIS of the V-band coupling cannot be determined: Initially remove the V-band coupling from service within 50 hours TIS after the effective date of this AD. Thereafter, remove the V-band coupling from service before it accumulates 500 hours TIS.

The inspection alternative to time-mandated removals

As an alternative to initially removing the

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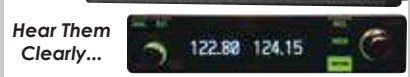




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V-band coupling from service as outlined in steps 1 through 3 above, you may perform the inspections described in part below and in the "Inspections" section of the AD. See link to full AD in Resources.

Do the initial inspections at the time the V-band coupling would have been removed from service and thereafter at intervals not to exceed six months or 100 hours TIS, whichever occurs first, for a period not to exceed two years after the effective date of this AD.

If the V-band coupling fails to meet any inspection criteria in steps 1-3 above or the "Inspections" paragraph below, it must be removed from service before further flight. Removing the V-band coupling from service and installing a new V-band coupling does not terminate the requirement to do future repetitive inspections.

The following definition in the AD clarifies that this AD does not apply to *riveted* V-band clamps: "For purposes of this AD, a 'V-band coupling' means a spot-welded, multi-segment V-band coupling installed at the tailpipe to turbocharger exhaust housing flange."

Inspections

The AD also contains instructions for inspecting the spot-welded V-band clamps while installed on the turbocharger/exhaust junction.

1) Inspect the V-band coupling and the area around the V-band coupling for exhaust stains, sooting, and discoloration. If any of those conditions are found, remove the coupling and, instead of the inspections listed above in 1 through 3, do the inspections described in (i) through (vi) below.

The instructions for inspecting the V-band clamps when removed from the engine include:

(i) Using crocus cloth or fine abrasive cloth and mineral spirits or Stoddard solvent, clean the outer band of the V-band coupling. Pay particular attention to the spot weld areas on the V-band coupling. If there is corrosion that cannot be removed by cleaning or if there is pitting, before further flight, remove the V-band coupling from service and install a new V-band coupling.

(ii) Using a 10X magnifying glass, visually inspect the outer band for cracks, paying particular attention to the spot weld areas. If there is a crack, before further flight, remove the V-band coupling from service and install a new V-band coupling.

(iii) Visually inspect the flatness of the outer band using a straight edge. Lay the straight edge across the width of the outer band as depicted in figure 1. If the gap between the outer band and the straight edge exceeds 0.062 inch, before further flight, remove the V-band coupling from service and install a new V-band coupling.

(iv) With the T-bolt in the 12 o'clock position, visually inspect the attachment of the outer band to the V-retainer coupling segments for gaps between the outer band and the V-retainer coupling segments from the 1 o'clock through 11 o'clock positions. If there are any gaps between the outer band and the V-retainer coupling segments, before further flight, remove the V-band coupling from service and install a new V-band coupling.

(v) Visually inspect the bend radii of the V-retainer coupling segments, throughout the length of the segment, as depicted in figure 1 to paragraph (l)(1)(iii) of this AD, for cracks. If there are any cracks, before further flight, remove the V-band coupling from service and install a new V-band coupling.

(vi) Visually inspect the outer band opposite the T-bolt for damage (distortion, creases, bulging, or cracks) caused by excessive spreading of the coupling during installation or removal. If there is any damage, before further flight, remove the V-band coupling from service and install a new V-band coupling.

If any of these conditions are found, replace the V-band coupling. Replacement is not a terminating action; the 500-hour life limit for spot-welded clamps is still active.

Inspections prior to installing new clamps

In addition to the inspection criteria for spot-welded V-band clamps presently in service, no clamp with more than zero hours TIS can be installed until it has been thoroughly inspected by complying with the inspection criteria in this AD.

The AD also specifies "Installation Prohibitions" which limit the installation of

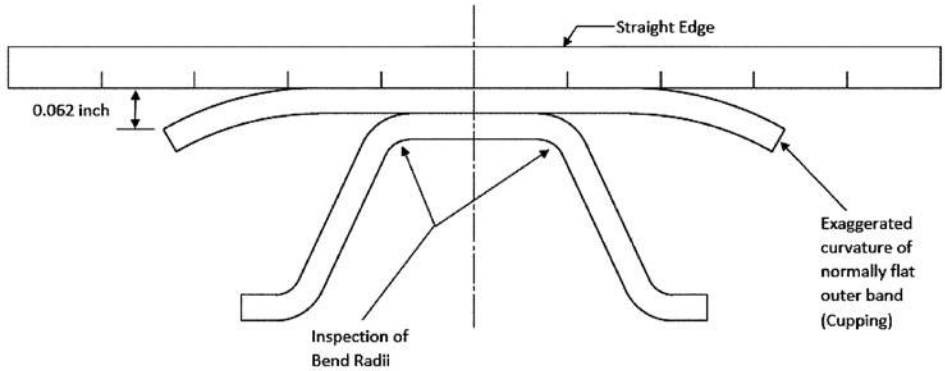


Figure 1 to paragraph (l)(1)(iii) – Inspection Depiction

used V-band couplings through three specific provisions based on the hours on the coupling and the time elapsed since the effective date of the AD. Refer to the AD and consult with your A&P for specifics.

Clamps with more than 500 hours TIS may not be installed.

Reference material

Guidance regarding V-band clamp maintenance and inspection is included in Special Airworthiness Information Bulletin (SAIB) CE-18-21 dated July 13, 2018. This SAIB announced the availability of a Best Practices Guide and recommended the public apply these best practices in the maintenance of turbocharged reciprocating engine-powered aircraft.

The SAIB included a copy of the Best Practices Guide. The SAIB notes that the Guide is constantly updated. Refer to the link below in Resources for the most current version. As of this writing, the most current version is dated April 2018.

Instructions for installing a V-band coupling can be found in Appendix B: Best Practices Guide, Paragraph 3.1.

IMPORTANT: This article describes work that may need to be performed/supervised by a certificated aviation maintenance technician. Know your FAR/AIM and check with your mechanic before starting any work.

Steve Ells *has been an A&P/IA for 45-plus years and is a commercial pilot with instrument and multi-engine ratings. Ells also loves utility and bush-style airplanes and operations. He served as associate editor for* AOPA Pilot *until 2008. Ells is the owner of Ells Aviation and the proud owner of a 1960 Piper Comanche. He lives in Templeton, California. Send questions and comments to editor@piperflyer.com.*

RESOURCES

AIRWORTHINESS DIRECTIVE 2023-09-09
tinyurl.com/PiperFlyerV-BandAD

GENERAL AVIATION JOINT SAFETY COMMITTEE, "EXHAUST SYSTEM TURBOCHARGER TO TAILPIPE V-BAND COUPLING / CLAMP WORKING GROUP – FINAL REPORT"
www.gajsc.org/safety-enhancements/system-component-failure-powerplant/final-report-bpg-acs_013018/

FEDERAL AVIATION ADMINISTRATION, "BEST PRACTICES GUIDE FOR MAINTAINING EXHAUST SYSTEM TURBOCHARGER TO TAILPIPE V-BAND COUPLINGS / CLAMPS"
www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/cos/aging_aircraft/media/maintaining_exhaust_system_best_practices.pdf

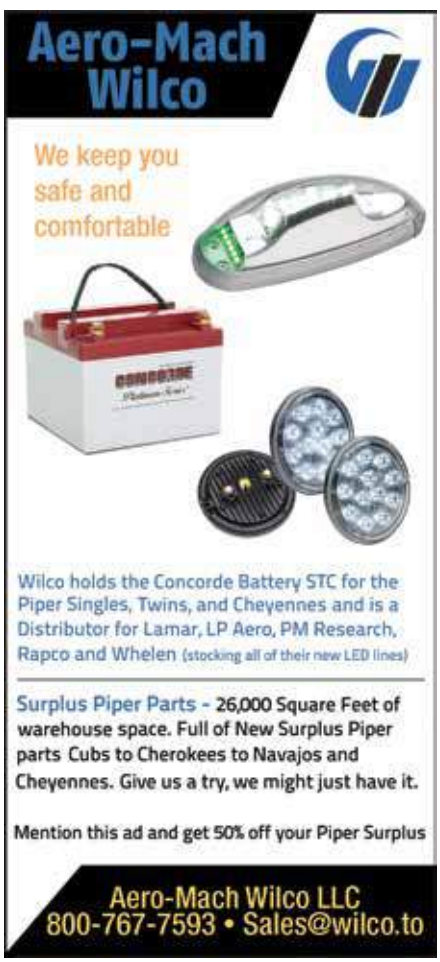














Continued from Page 16

Single-engine airplanes also do not need full-feathering propellers or multiple hydraulic and electrical systems, nor do they pose problems with lateral weight and balance.

Money matters

The cost of training for a multiengine rating is a turnoff for some pilots. I had to borrow the money to get my multi rating when I was in college and decided I wanted to be an airline pilot. It seemed very expensive, but it opened up a great career and paid for itself in short order when I got my first multiengine flying job at the local airport.

Here is the bottom line on the question of single or multiengine. If you want (and feel you can afford to operate) a multiengine airplane, twins are great and will take you far and wide in comfort and safety: if you commit to the training and accept their limitations.

I currently own and operate a light single-engine airplane. It is fun and relatively inexpensive to operate, and the aircraft fits my mission profile which is to fly around locally and search out airport pancake breakfasts. I advise you to think of what you will use your airplane for before running out and buying one based on emotion.

The choice between having a single or twin-engine airplane is up to you. I would love to own and operate a twin and am currently looking at possible airplanes I might buy. Of course, before I bring my multiengine plane home, I will need a larger hangar, more tools and equipment, and I will have to pay more for insurance and fuel, but maybe someday you will see me roaring over your home looking stylish and fast in my twin.

Kevin Garrison's *aviation career began at age 15 as a lineboy in Lakeland, Florida. He came up through General Aviation, retired as a Boeing 767 captain in 2006, and retired from instructing airline pilots in 2017. Garrison's professional writing career has spanned three decades. Send questions or comments to editor@piperflyer.com.*

Continued from Page 22

I flew a couple of different flight profiles to see if a full-throttle climb or leaning to peak made any difference in the numbers. When I switched from one fuel to the other, I didn't see one iota of variance in the EGT numbers.

Your Dakota with that engine is eligible for the STC. I've provided a link in Resources. The STC sells for $100.

I wrote an article about UL94 for *Piper Flyer* magazine if you want to learn more. The article is linked in Resources.

If I were you, I would buy the STC and always fuel with Swift UL94 if it is available.

Happy flying,
Steve

IMPORTANT: This article describes work that may need to be performed/ supervised by a certificated aviation maintenance technician. Know your FAR/AIM and check with your mechanic before starting any work.

Steve Ells *has been an A&P/IA for 45-plus years and is a commercial pilot with instrument and multi-engine ratings. Ells also loves utility and bush-style airplanes and operations. He served as associate editor for* AOPA Pilot *until 2008. Ells is the owner of Ells Aviation and the proud owner of a 1960 Piper Comanche. He lives in Templeton, California. Send questions and comments to editor@piperflyer.com.*

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MARVEL-SCHEBLER AIRCRAFT CARBURETORS
msacarbs.com

OTHER

"PAPA'S GOT A BRAND NEW FUEL" BY STEVE ELLS
piperflyer.com/maintenance-technical/1187-papa-s-got-a-brand-new-fuel.html

SWIFT FUELS (UL94 STC)
swiftfuelsavgas.com/stc/Piper/PA-28-236

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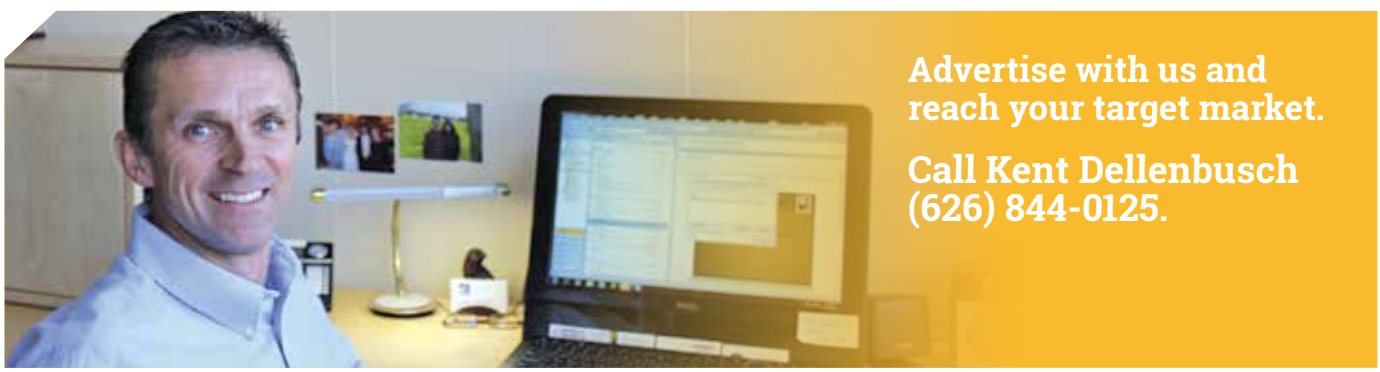
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Online Forums piperflyer.com/forum

Our online forum, located within the association website, is a great source for question-and-answer interaction and an excellent way to converse with other members, the PFA staff, and Piper Flyer's contributing editor, longtime A&P/IA, Steve Ells.



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Email kent@aviationgroupltd.com
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THIS MONTH IN AVIATION HISTORY



AUGUST 2

1911 — The first woman in the United States licensed as a qualified pilot is Harriet Quimby, a drama critic.



Harriet Quimby.

AUGUST 3

1921 — Lieutenant John A. Macready of the United States Army Air Corps finds a new use for airplanes when he sprays a patch of ground infested with caterpillars. This practice becomes known as crop dusting.

AUGUST 4

1959 — The first medical evacuation by helicopter from a Mobile Army Surgical Hospital (MASH) team takes place when a Sikorsky S-51 Dragonfly transports a casualty from a fire along the Pusan Perimeter.

AUGUST 8

1908 — Wilbur Wright makes his first flight in Europe by flying the Wright Flyer A from the racetrack at Hunaudières, 5 miles south of Le Mans, France.

1910 — The first aircraft tricycle landing gear is installed on the United States Army's Wright airplane.

AUGUST 12

1946 — President Harry Truman signs a bill authorizing an appropriation of $50,000 to establish a National Air Museum in the Smithsonian Institute in Washington, D.C. The small museum eventually becomes the National Air and Space Museum—the most visited museum in the world.

AUGUST 15

1922 — First delivery of an automobile by air. The Aeromarine flying boat Buckeye carries a Ford car from Detroit to Cleveland in 90 minutes.

1951 — Test pilot Bill Bridgeman reaches a record altitude of 79,494 feet msl in the No. 2 Douglas D-558-II Skyrocket (BuNo 37974, c/n 6568, NACA-144) rocket research aircraft, although this does not qualify for FAI (Fédération Aéronautique Internationale) recognition.

1958 — Congress approves a bill creating the Federal Aviation Agency (FAA) to regulate all United States commercial and military aviation.

AUGUST 17

1946 — The first person to be ejected from an airplane by means of its emergency escape equipment is Sergeant Lambert at Wright Field in Ohio.

AUGUST 19

1871 — Orville Wright is born in Dayton, Ohio. He is co-inventor, with his brother Wilbur, of the first airplane to achieve powered, sustained, and controlled flight, and the first fully practical powered airplane. Orville piloted the famous first flight at Kill Devil Hills, North Carolina, after winning a coin flip against his brother.

1929 — The first metal airship built for the United States Navy makes its first flight. The ZMC-2 is a 22,600 cubic foot helium balloon supported by transverse metal frames and longitudinal stiffeners with a thin metal covering forming the outer skin.

AUGUST 24

1956 — A United States Army helicopter becomes the first rotary-winged aircraft to fly nonstop across the United States.

AUGUST 25

1949 — National Airlines tells the Civil Aeronautics Board that "reduction in fares are essential to placing its operations on a sound economic base."

AUGUST 26

1959 — President Eisenhower replaces his airplane with a jet, a USAF VC-137A, which is a modified Boeing 707 jet airliner. The switch allows the President to cut his travel time in half.

AUGUST 27

1910 — Radio is first used to send messages between the ground and an airplane when James McCurdy both sends and receives messages from a Curtiss biplane at Sheepshead, New York, using an H.M. Horton wireless set.

AUGUST 29

1949 — The United States Senate OKs a 70-group United States Air Force.

AUGUST 30

1933 — Air France, France's national airline, is formed.

AUGUST 31

1932 — Air Corps pilots flew 5 miles above the Earth's surface to photograph an eclipse of the Sun.

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