
Renovation Overview

By Dennis Wolter — Air Mod

There's nothing like the look, smell, and feel of a new airplane. For most of us, that experience is limited to visiting the Cessna display at Oshkosh or checking out a new Cessna that might happen to be at our local airport. The financial commitment involved in acquiring a brand new airplane does not always represent a sound decision for some, and is not even a remote consideration for the vast majority of pilots. This means we must face the realities of owning and operating a seasoned airplane. Don't think of it as a lesser option. It is in fact an opportunity to end up with something that is better than new.

With the equipment, materials, and talent available today, owning and renovating a used airplane can be very exciting, rewarding and, if properly done, a financially sound option. To put it bluntly, after ten years a new airplane is just another used airplane. If you buy a good used airframe and embark on a well-planned progressive renovation, in five or ten years you can have an airplane that is the envy of your peers, and one that has been renovated to fit your own mission, taste, ergonomic requirements and budget.

And speaking of budget, let's compare the money side of buying a new airplane versus renovating a used one. Assume you want a 182. A new one goes for around \$300,000. Most people finance a purchase of this magnitude. That means a substantial amount down plus ten or fifteen years of payments with interest. By the time you're finished with all that principal and interest, you've paid out almost twice the retail price of the airplane, and at ten years old, it's worth half of the original price.

Now consider this: a good undamaged, un-corroded, no-hail-damage 1979 182 with a mid-time engine, decent radios and cosmetics can be ac-

quired for about \$110,000. With a good renovation plan in place (more on that later) you can fly the airplane, save your money and try to do one major project a year. Every dollar you spend goes into improving the airplane, not to depreciation and interest. The best part is that

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with proper planning you will have an airplane that has the interior, radios, engine, fuel system, and paint that are precisely what you want – no canned packages here! All pure custom. If you choose the right places to do the work (or even do some of it yourself if you possess the time and skills required) you will exceed the quality of interiors, paint and amenities found in most new airplanes.

Here's a reality check! This work does increase the value of the airplane. However, if you totally renovate a used airplane, you will undoubtedly exceed the immediate average resale value by some margin, so don't do this to an airplane that you do not intend to keep for a long time. Over the course of 15 years, I invested a total of \$130,000 in my 1973 172. I did it all: big engine, flint tanks, radios, custom panel, autopilot, new paint, state-of-the-art interior. If I had to sell it today, I would be lucky to get \$90,000 for the airplane. On paper it looks like a bad deal. But I've had the 172 for almost thirty years and, God willing, hope to use it for another twenty. Divide 50 into \$130,000 and you get my drift. The only real problem I have is getting away from the gas pumps because people gush over it wherever I go. Most don't even look twice at that 2005 182 sitting over there!

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This will be a no-holds-barred exposé on every aspect of each of these specific subjects. I will give away all of my secrets in an attempt to educate my fellow airplane owners so you all can make better choices. I will include the little tricks, materials and processes

of choice, and source information to help those who may choose to do some or all of this work themselves. I particularly want to address the unseen side of interior renovation, dealing with corrosion, broken parts, dried hoses, wiring messes, and other hidden issues not seen during normal inspections when the interior and insulation are not removed.

My motivation here is to do my part, through some education, to keep people in the private flying game. Having been in this business for 33 years, I've seen the good, the bad, and the ugly. Fortunately, I think most of you have had good experiences upgrading your airplanes. Sometimes, though, bad things can happen. Armed with the information presented in these articles, owners will be better equipped to avoid the pitfalls, whether you do the work yourself or have it all done by a professional.

For me, this is an easy and enjoyable thing to do. Like many of us, my passion for airplanes goes back to my childhood in the 40s and 50s when, for reasons unknown to me, all my heroes were pilots, and the sight of any airplane captivated me and held my attention until the last faint throb of those (then radial) engines faded over the horizon – man, do I miss the sound of those radial engines! I started learning to fly in the late 50s, and worked my way through an industrial

design degree at the University of Cincinnati, largely supported by the money I earned washing airplanes, helping mechanics, and flying mail and freight at night. Learning the concepts of form and function, as taught to all industrial design students, created a great deal of frustration for me. On occasion, I was lucky enough to get to ferry a new airplane from one place to another. Droning along in that new plane gave me a lot of time to think about what I was sitting in and on. A lot of what I was learning in that design program certainly wasn't being applied to those new airplanes (to say nothing of the older ones). They were loud, poorly ventilated, and devoid of almost any ergonomic design in the seats and instrument panel.

Following graduation in 1969, my first job was at UC's medical school making medical training films, among other things. I was intimately involved in the human body in a way that proved to be very beneficial to my as yet unstarted career in aircraft renovation. The more I was exposed to the ergonomic and physical needs of our human package, the more I saw the need for some design changes in light airplanes. I had a subsequent job as an instructor in the aviation maintenance program at a community college, but I ultimately decided that the mediocrity and politics of working for a large organization wasn't for me. During these years I had always maintained a side business designing paint schemes and interiors for local airplane owners. It was so disappointing to see the quality that these owners were getting in the field, so I sold my Piper Colt in 1973 and started Air Mod with the intention of bringing high quality, well-designed interior renovations to the general aviation community.

Almost anyone with some sewing skills can reupholster the components in a Cessna, but I knew all that stuff I learned as an industrial design student could be incorporated to make it something really special. These light airplane interiors could be made to be safer, easier to maintain, better looking, ergonomically correct, and more durable. I'm not trying to blow my own horn here; I just think it's important for you to

know a little about the person who is telling you what to do in your airplane.

That said, let's get into the meat of the subject. The first thing to ask yourself should be, "Is aircraft renovation right for me?" Renovating an airplane can be a very practical and satisfying experience; however, as with all good things in life, it does have its issues.

Totally renovating an airplane from

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spinner to tailcone can take a year. Perhaps no one has experienced this more than the folks at AOPA – we all enjoy following those articles on their sweepstakes airplanes. They assign a full-time, knowledgeable person to monitor and expedite the process. Check out the timeline of how their projects flow through the different phases. For an airplane owner experiencing this process for the first time, the timeline should be expanded to allow for unexpected delays and unforeseen issues. Improvements and upgrades can often be quite time-consuming due to the fact that the companies doing this work are usually small firms operating with limited resources. Given the high overhead cost of working in a general aviation environment, and limited sources of needed components and materials, almost all of the companies who are doing this kind of work struggle to keep work flowing as smoothly as they can. One of the biggest challenges is keeping skilled staffing levels up with the workload. If a key employee gets sick, quits or retires, a delay in project delivery is inevitable.

There is also a new challenge facing aircraft renovators. I refer to aging airplane issues. Since the average age of the airplanes being renovated today is 30 to 40 years old, they are often in need of a thorough inspection, clean-up and repair in the cabin area before a new interior or paint job should even be considered. The days of pulling out seats, side panels, carpets and headliners, and simply recovering and reinstalling them are over. There are good shops out there

that do it right; many of us communicate frequently among ourselves regarding renovation issues. But be careful to avoid those who say they do the required work but really don't, do only part of it, or think it is unnecessary to tackle the problems at all. These old airplanes are more than overdue for having the insulation removed and a licensed person perform a thorough condition inspection, clean-up, and corrosion proofing of everything that isn't seen during traditional inspections.

Let's say you find corrosion that requires repair and/or replacement of structural components. That type of repair work requires a highly skilled person, and most shops have limited qualified staff members, and usually those employees are already busy with scheduled projects. Even if it's only a two day project, it may be several days before that qualified person is available to do the job. The unexpected two-day repair can delay delivery by six or eight working days. Get my drift here? Expect the unexpected. We generally quote five to six weeks to do a straightforward interior in a four-place airplane such as a 182. If we encounter corrosion, excessive broken plastic or other problems, an additional week or two on the project is not uncommon.

Our shop is partnered with an outstanding paint shop, Dial Eastern States Aircraft Painting, and they usually take three to four weeks to paint a 182. Dick Guenther, who runs that shop, has often stated how much more difficult it has become lately to meet this schedule, due largely to the age of the fleet. This "aging airplane issue" has affected how both of our shops operate today; things are dramatically different from how we operated twenty years ago. (Dick is going to help write the painting segment in this series, so you will get a blow-by-blow account of that process later.)

When choosing a shop to do this work, it's important to discuss how they will deal with these possible delaying issues. Our policy is based on fairness. If a customer brings us a clean airplane and doesn't add a lot of detail items, we will move that job through in the predicted time. If a customer decides at job start-up to add all new windows and a

metal instrument panel, and on top of that we find evidence of corrosion, their job will have to wait for our qualified technicians to be available to do these unplanned, additional jobs. Put a good plan together and factor in some additional downtime. You will avoid disappointment with the timing of things if you are realistic at the outset.

One final downtime reality. Until the airplane is disassembled and inspected, the actual work scope is unknown. The big issue here is corrosion. Several times a year we get an airplane that initially looks to be corrosion-free. Then, after the interior and insulation are removed, we are surprised to find extensive corrosion in the cabin. It's our policy to call the customer after the first week with a teardown report, at which time we discuss unexpected problems, generate solutions, and estimate cost and time requirements.

Start doing your planning and research well in advance of doing your upgrades. As you fly the airplane, keep a notebook in the airplane and record the problems you've encountered as well as ideas you may have regarding specific

details to include in your new interior. Also keep a disposable camera in the airplane. If you see an airplane you like, snap a picture. Look at interiors and paint schemes, either in magazines or in person. Those big resale rags are a great research source for paint and interior design ideas. Cut out the pictures, make notes, and add everything to your research portfolio. This data will help you and the people doing the work to more accurately design the paint and interior of your dreams.

Consider flying your friend's airplane with that new radio package. Talk to other aircraft owners who have undertaken various upgrades and renovations. See if you like how all that snazzy stuff works – is it too complex for you or not? Talk with the owner or maybe even take a trip in a 182 with that bigger engine. See for yourself if the performance is really what it is purported to be. Most importantly, as you travel around the country, plan to stop in and visit the shops you are considering using. Just because someone buys a fancy ad in a magazine or puts up a glitzy display at an air show doesn't mean they have the

personnel, facility, knowledge and equipment to do the level of work you are expecting. Talk to customers to find out how the shop performed and, if you're lucky, you may find a customer who had a problem of some kind. How a shop handles a problem is a real clue to the kind of people you'll be dealing with.

With the decision made to go the renovation route versus new, it is obviously important to start with the right airplane. I think there are some important factors to consider – cost, condition and reliability, among others. Regarding cost, you need to factor in both acquisition and operating costs. Since you know your money situation best, I will only make one point on this subject. Don't be tempted to buy a cheap, bigger and faster airplane; it's cheap for a reason. If your budget is in the 182 range, you may want to avoid that older, higher time 210. It won't run on 182 money. We often meet an owner struggling with the costs associated with that faster airplane until the final reality of the situation forces a sale. Here's the crazy part: the 182 he passed up probably met his mis-

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sion profile, would have cost less to operate, and would not have had to be sold under distressed circumstances. Don't lose your head.

While on the subject of airplane types, here's something to consider. Think about the growth potential that STC mods (supplemental type certificates) can offer some airplanes. For example, take a '73 or newer 172 with a 180 hp conversion and 24 gallon flint tanks. Depending on power setting, one can go from 110 knot cruise to 120-125 knots, and from four hours of fuel range to 6 or 8 hours. Depending on altitude and power setting, climb goes from 200-300 fpm to 500-700 fpm. Service ceiling improves and, get this, with a 250 lb gross weight increase, 1000 pounds of useful load is common. So it seems you can buy an older 172 and keep it for life. Upgrade it to accommodate the kids when they come along, and have a very capable and affordable airplane during your retirement years. It's still a 172 with a Lycoming fixed-pitch powerplant, metal gas tanks, and fixed landing gear. About as simple as it gets (remember, bigger is not always better). Other Cessna models have similar modification opportunities, so you don't have to accept them the way they left the factory.

After cost, a second important consideration is condition. I probably wouldn't renovate an older airplane that is considered less desirable due to a basic design feature, ie: the older O300-powered 172s versus the newer Lycoming-powered airplanes. Excluding engine overhaul, the cost of renovating those two airplanes is approximately the same. But the resale value and performance differences can be noticeable. Learn the idiosyncrasies and values of the various generations of airplane in question.

Since most people choose to put the airplane on a "flying restoration program" (one project at a time), buy an airplane that initially is in reliable enough condition to do the job. That means enough functioning equipment to fly IFR, if that's your requirement, and enough engine time to allow you to decide what to do at TBO (you'll be needing some of that time to save your money for various upgrades).

Determining the condition of the airplane of choice can be the most difficult



challenge. Two no-nos here would be to try to exclude a heavily corroded airplane or one with hail damage. No matter how well these two issues are addressed, you still have a corroded or hail damaged airplane. An aircraft's age, airframe time, and even damage history (properly resolved with correct and thorough repair techniques) don't necessarily have a negative effect on the service life of these well built Cessna airframes. What is most important is to identify and quantify these issues with an objective and thorough pre-purchase inspection, preferably by your own mechanic as opposed to the mechanic at the home airport of the seller.

This inspection should be a minimum of an annual inspection with thorough paperwork evaluation. I also recommend that the original equipment list be procured from the Cessna factory. With this list in hand, thoroughly investigate every additional or deleted change to make sure that any item in question is properly installed and has appropriate approved paperwork. Pay a qualified radio shop to inspect behind the instrument panel for the condition of the avionics installation and related systems, pitot and static, circuit breakers, etc. Here, too, it's very important to verify that all electronic equipment is approved for installation both in the specific subject airplane and in conjunction with related equipment. We often get involved in helping folks (often new owners) straighten out a bogus mod or equipment installation. An ounce of prevention is worth a pound of cure.

Undertaking the renovation of an airplane can be quite daunting, but your advance homework and research will pay off. The various projects that are part of this involve countless decisions and considerations, but having the right people on your team will ensure the right results. In upcoming articles, we will plow through the whole airframe renovation process, from teardown through delivery, with lots of pictures and thorough descriptions of what's being done. Until next month, fly safe!

