

Planning and Getting Started

By Dennis Wolter

CPA Member write:

“Just finished your exemplary piece in September’s CPA magazine. What sound & well thought out advice !

I think I know why you share your expertise and secrets. There is, with all true pros, that desire..... Really looking forward to the series. Your expert workmanship & superior materials still defy the tortures of time, and look great, after 22 years & 4400 hours.” Best regards, Dick & Bette Bicknell

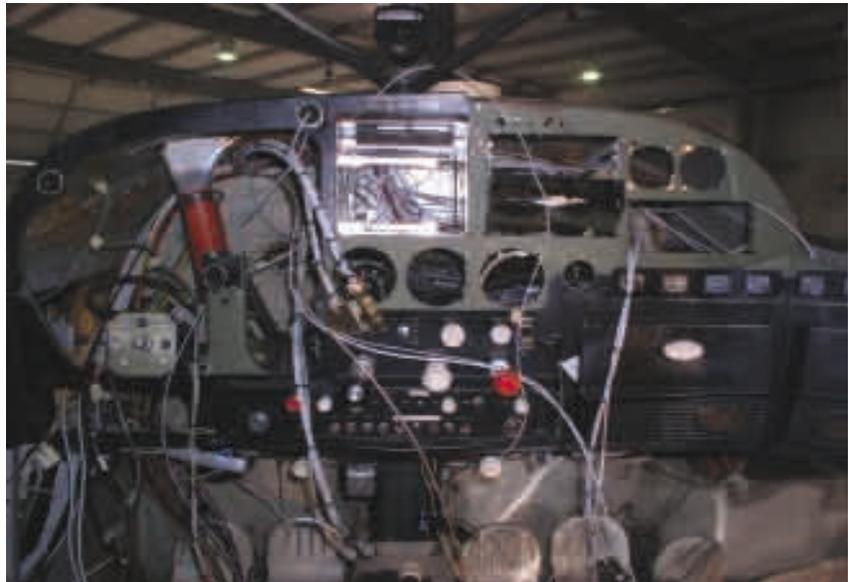
When someone retires after several decades in a profession, an acquaintance always seems to ask, “In all your years of doing what you did, what was the most often asked question you had to answer?” For me, ranking up there with “How much does it cost?” and “How long will it take?” is the ever-important “What should I do first: paint, interior, radios, engine?” Here’s my answer: There’s no easy answer. Each renovation project is unique, so it just depends. Some airplanes need it all, some need only radios and paint. One major rule is to avoid doing something today that will be put at risk by a future project. Sounds simple enough. But you’ll need to put a plan in place.

Basically, the safest approach is to do the cosmetic stuff last; I’m referring to the paint and interior. Think of the potential for damaging new paint or interior when a new engine is being installed or a fuel cell is changed. Over the past 33 years we have been involved in about every sequence possible, some planned, some not. So to best put the planning sequence into some reasonable perspective, I’ll try to go through an ideal sequence for renovating an airplane that needs everything. You be the judge; if you think through each process you’ll be able to put together your own plan based on your specific needs.

The very first thing to do with a new-

ly acquired, seasoned but solid airplane is to fly it. Use it for a year, keep a notebook and record such things as maintenance issues, interior short-comings,

With the mechanical problems resolved, you’ll want to move toward the wish list side of things. Keep the notebook readily at hand. It’s amazing to see



Panel mod, painting and new radios being installed during an interior renovation

lighting and instrument panel deficiencies, ventilation problems, etc. Write it all down; your notes will serve you well when the time comes to take care of the problems and make the improvements.

The main focus of that first year’s operation should be to identify mechanical problems and put a correction plan together to resolve them. Even though you paid for (and got) a thorough pre-purchase inspection, the punch list generated in twelve months of using the airplane can be substantial. Be prepared to spend up to 10% of the purchase price for general maintenance items during the first year of ownership and the first annual inspection. Keep working on the squawks during this first year or so. The idea here is to repair and put behind you all of the mechanical problems so you find yourself staring down the renovation road (or runway if you will) with a mechanically sound and dependable airplane.

what a new owner thinks he needs or wants upon buying an airplane and what he actually decides to do to the airplane after a year or two of ownership.

The wish list doesn’t necessarily get smaller but it usually goes through some changes. Sometimes an unexpected need arises that necessitates a redirection of the plan. If the engine is close to or at TBO, or suddenly starts making metal, safety dictates immediate action. Despite the fact that your plan called for a new interior next, you may have to sit on that uncomfortable and/or unattractive seat a while longer.

To help size up the scope of a complete renovation I think it’s helpful to list the major projects involved in an ideal sequence. In upcoming months we will cover in detail everything listed here, not necessarily in this order, but then again you may not take care of these items in this order either.

- 1 Initial mechanical evaluation and correction
- 2 Corrosion proofing
- 3 Engine overhaul or conversion
- 4 Fuel system maintenance, new fuel cells, auxiliary systems
- 5 Radios, auto-pilot, panel modifications & renovations
- 6 Windows
- 7 Speed mods (gap seals, wheel fairings)
- 8 Exterior paint
- 9 Interior renovation and upgrades
 - Corrosion removal & prevention
 - Insulation & soundproofing
 - Seat conversions
 - Passenger restraints
 - Ventilation
 - Instrument & cabin lighting
 - Baggage extensions
 - Storage systems

(One important note on the above: you must wait 24 months between the last corrosion proofing treatment and a new exterior paint job.)

Combining related projects can save downtime and money. If you think about it, it just makes sense. For example, installing new radios or an autopilot while the interior is being done is a great idea. The installation of an antenna or a wiring harness is facilitated once the interior shop has "cleared the way". The radio technicians have complete access to your airframe and cabin while the interior is removed, and you save the cost of paying for a radio technician's time to remove and reinstall the interior components. Time is money!

Windows are another issue. They are a perfect project to do in conjunction with either interior renovation or exterior paint. Think of what must be removed when new windows are installed. If done at interior time, those components are all coming out anyway. Another benefit of blending two or three projects into an interior renovation is that the technician is doing his work at one facility and at one time, eliminating the expense and inconvenience of having to move the airplane (and you) two or three times. If exterior paint is on the horizon, the windows in your airplane should definitely be carefully assessed before you apply that paint. It makes absolutely no sense



New windows being installed after the cabins is cleaned & chromated

to go to the expense of a beautiful new paint job only to compromise the quality of its finish with a window installation the following year.

A good plan is a definite win-win situation, saving money, downtime and frustration, and it can definitely enhance the overall quality of your project and make it a more enjoyable experience. As stated earlier, the scope of this series is to cover in

(See: Renovation, pg. 40)

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RENOVATION

(Continued from pg. 39)

detail the various projects involved in aircraft renovation. However, since interiors are the major focus of our work here at Air Mod, I'm going to take the liberty of starting with that subject.

There are some detail items and options that need to be considered when planning a new interior. Since everything is going to be upholstered or refinished, here is your chance to add, move and improve interior-related components. You can change lighting, install more efficient or additional air vents, install better sound-proofing, improve passenger restraint systems. You can have your instrument panel repaired, painted and replacarded with better-looking more legible graphics, refinish or leatherize control yokes, modify glareshields for easier installation and removal, and install upgraded glareshield lighting. Intercom jacks can be conveniently located and properly coordinated with the upholstery installation, armrests and side panels can be re-designed ergonomically and aesthetically, additional pull-up or fold down armrests can be added to seats, dimmable reading lights can be installed for passengers and crew, and countless storage features can be built into the interior for all that stuff you have. Modifications can be made to basic interior components to make them fit better and be much easier to install and remove for maintenance. Seats can legally be built taller and wider to allow for proper ergonomic build, ensuring optimum comfort



Covering up all the new paint during interior installation



Typical small parts storage containers - Note the camera to help document how complex components are to re-assembled

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and safety. Heating systems and outlets can be modified for more optimum flow, and window and door seals can be replaced and adjusted to ensure a quieter and warmer interior. Make certain that your interior shop uses only materials that meet the flame retardant specifications of FAR 25.853, greatly enhancing fire safety.

The most often asked question that I hear related to planning is, "What should come first, paint or interior?" Would you be surprised if I said it really doesn't matter? I would suggest you do whatever

project you think the airplane needs most. If there are surface corrosion issues, a paint job should take priority. Properly done, a complete strip, etch, prime and paint job will stop the corrosion (more on this subject in a later article on corrosion). What is important is that a professional painter will take the necessary steps to ensure that the stripping and painting chemistry does not migrate into the cabin and onto interior components or doorjamb. Conversely, a quality interior shop will properly protect new exterior paint with masking and padded covers. Sometimes your decision can be totally emotional. If you just can't stand those orange and brown plaid seats another minute, tackle the interior first.



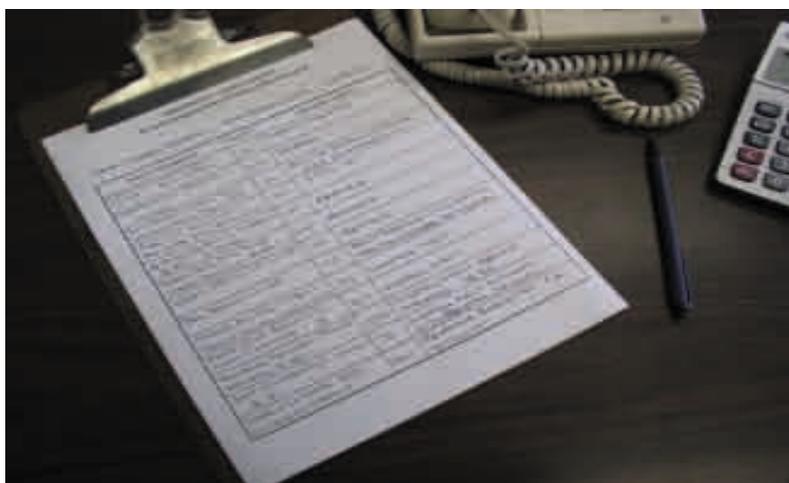
All the interior components laid out & being evaluated

With the planning done, and decisions made, it's finally time to get out into the hangar and get started on the project. The job doesn't start with tools, it should start with organization. Whether it's a professional shop, or you are doing this work yourself, the organization of parts, information, materials, and paperwork is critical. *(Yes, your interior CAN be upgraded and installed by you, under the provisions of owner performed maintenance as outlined in Appendix A (c) of Part 43).* It is imperative that you have a proper secure

involved in the disassembly.

Small parts are kept in three or four plastic tubs; one for floor components, one for side panel components, another for headliner parts, and usually a fourth one for instrument panel and pedestal pieces. Imagine trying to reassemble the interior a month later if all of these small parts had been thrown into

(See: Renovation, pg. 42)



Teardown report with customers instructions

environment in which to work. It must be well-lit, dry and temperature controlled, and that can be a challenge at certain times of the year if you're in a T-hangar. The adhesives and finishing products used in this industry are very temperature and humidity sensitive.

Now that you're organized, first order of the day is to empty out the airplane. On most jobs, this would involve removing seats, side panels, headliner, carpeting and insulation. Before opening the tool box, a plan must be in place for proper identification and storage of the interior components. At Air Mod we use various types of storage containers to hold everything in-

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RENOVATION

(Continued from pg. 41)



Side panel being stripped of its finish materials

one big box. We also use lots of zip lock bags to store small sub-assembly parts. Let's say that during teardown you discover a door lock mechanism with a broken spring. One must disassemble the entire lock mechanism, order the spring and reassemble everything a week later when the part comes in. With all those special parts safely stored in a separate clear bag

marked "co-pilot door lock", and placed in the side panel tub, everything will be at your fingertips at reassembly time.

Larger parts, such as metal side panels and seat frames, must be stored in proper containers under a work bench or in an appropriately sized box. We use a 4'x 8' roll-around box, one for each project in our shop. Delicate plastic trim pieces and large headliner panels are best stored on a high shelf. This will keep them out of harm's way both before and after they are repaired and refinished. An ounce of prevention is worth a pound of cure.

Remove the old carpet and save it for use as rough patterns when laying out the new pieces. Remember, everything you take out of the airplane was originally installed to (hopefully) fit very nicely. We may as well take advantage of that earlier work done at the factory.

It's very important to evaluate all components, large and small, as to what is undamaged, what is repairable, and what must be replaced. We track this information on a teardown report with an accompanying parts order list. About one week into a job, I call the customer with the information contained in the teardown report, and we discuss resolution options and how to proceed. It's only at this point that a fairly accurate final cost estimate can be calculated. If you're doing the work yourself, the need for tracking paperwork and having a good

storage system may be even more important. Most owner-performed projects are done on a spare time basis, and the time between start up and completion can be measured in months. The longer the project takes, the greater the likelihood of mistakes due to memory loss, confusion, and misplaced parts.

Here's one of the most important things I'm going to say with regard to organization and teardown: don't throw anything away until the job is totally completed. I can't tell you how many times we've found some "widget" and wondered where it had been located on a side panel or in the headliner. The old stuff with all of its holes and footprints is a roadmap telling where odd components were located and how they were mounted.

With everything removed, it's time to strip the finish materials or upholstery off the backing panels or seat frames. Here's a cool trick that saves time and possible damage to the metal or plastic side panel backing. Using a sharp razor knife, cut through the finished side of the mounted upholstery about 1" from the edge around the entire perimeter of the piece. This allows one to easily pull the finish mate-

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Removing the old glue

rial off the backing panel with very little risk of damaging the thin material, particularly near the edges – works great. Once stripped, all material residue and old glue can be quickly removed with a stainless steel rotary wire brush. Old glue can cause bonding problems when the new upholstery is being mounted to the original backing panels. Never use ferrous steel or brass brushes on aluminum, as it will cause corrosion in the future.

With the interior components both removed and stripped,



Checking the oxygen system for leaks



Deteriorated vent hose - Note the presence of substantial surface corrosion on the cabin structure - A must clean up situation

it's important to look beyond the interior and check out things that are easily observable now that the interior and insulation have been removed. Inspect fresh air and heating ducts and outlets, fuel line coupling hoses, oxygen systems, control cables and guides, cabin lighting, wiring, door locks and stops, and of course check for cabin corrosion. This is the perfect time to do those “while we’re in here” projects that will make your job be as perfect as it can be. For those of you doing your own interior work, now is the time to call on your A&P IA mechanic to come in and inspect everything, including seat frames and mechanisms. If your airplane is in the hands of a professional shop, this is about the time you should be receiving that “tear-down status” phone call. No stone should be left unturned. Not a bad thing to do every twenty-five years or so to something that means so much to you.

We are obviously going to elaborate on each area of interior renovation in the ensuing months, but this looks like a good time to clean up, put away the tools and turn off the lights. Until next month, fly safe!



Badly cracked fuel coupling hose

Dennis Wolter is the owner of Air Mod at the Clermont County Airport in Batavia, Ohio.

This article is the next installment of a full series on Cessna renovation, covering interior, paint, glass, ventilation, passenger restraints, lighting, instrument panels, related issues and, last but not least, FAA approvals and paperwork.