

INTERIOR RENOVATIONS - PART FOUR

by Dennis Wolter, Founder and Owner, Air Mod, Inc.



Dennis Wolter, founder and owner of Air Mod, recently received the 2020 FAA Maintenance Technician of the Year Award.

The tear-down and inspection procedures described in last month's article involve four to five days of work and documentation. Armed with digital images and notes concerning any aging airplane issues that need to be addressed, it's time to prepare a detailed tear-down report.

This comprehensive report will be sent to the customer. It is accompanied by a photograph of each area of concern, and an estimate of what it will cost in labor and materials to resolve the issues.

As mentioned earlier, of greatest interest when evaluating the condition of a now 40- to 60-year-old airframe is corrosion. Due to the existence of so many different moisture retaining, hydroscopic materials - all concentrated inside the cabin - the cabin area never truly dries out in many cases. Carpet, foam, fabric, and insulation all absorb and retain moisture. As the airplane climbs to cruising altitude it can experience a 30-40 degree temperature drop.

This change in outside air temperature causes moisture-laden materials and insulation that are up against the cold aluminum skins to produce condensation on the inner surfaces of the cabin skins. This subtle moisture cycling of the cabin accelerates the corrosion process on the bare aluminum cabin skins and structure. Add leaky windows and doors to the mix, and older airplanes have



Tar-covered cabin skins and structure.



Typical oily mess found in the belly of a 40- to 50-year-old piston Twin Cessna.

become flying humidors. (You can store your cigars in the glovebox.)

There are a number of Twin Cessnas that were not zinc chromated when they were built. Zinc chromate and other corrosion-resistant coatings perform two corrosion-controlling jobs. First, these coatings are dielectric. In plain English that means they have non-electron-conducting properties. When bonded to a metal surface, these coatings stop the flow on the surface of the metal, destroying electrons and reducing oxidation on the surface.

The other corrosion-fighting property is that these products create a moisture barrier, stopping condensation from coming into direct contact with the surface of the metal. This eliminates some major corrosion-causing issues in aluminum airframes. This is why, about 15 years ago, our company committed to thoroughly clean and chromate every unchromated airplane that comes through our facility.

We begin the corrosion clean-up process by pressure-testing door and window seals. This simple process involves having someone inside the cabin blow compressed air at the edge of a window or into a door jamb, while a person

outside is brushing soapy water at the same area. The presence of bubbles indicates leaks. Problem areas are then photographed and noted on the tear-down report.

If significant window leaks are detected, it may be necessary to remove the window, inspect for corrosion, and properly reseal and reinstall the window. In the majority of cases, the leaks we find in non-pressurized Twin Cessna twins can be sealed by neatly masking and applying a clear bead of LP Aero aluminum-compatible silicon seal around the entire perimeter on the outside of the window.

Now the fun begins. We thoroughly remove all old glue, corrosion, and dirt from every inch of the cabin, floors and below the floors, in preparation for the application of zinc chromate, which is

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Skin damping tar partially removed by careful heating with a heat gun and scraping with a plastic scraper.

applied to all cabin skins and structure below the lower edge of the cabin windows.

We bill this tedious clean-up work at 3/4 shop rate. In an effort to reduce project costs, we don't normally chromate the cabin tops as we rarely find corrosion in the upper cabin areas of low wing

airplanes.

The tools required to complete the pre-zinc chromating process are wire brushes, heat guns, plastic scrapers, Scotch Brite, 3M Roloc aluminum-safe abrasive cleaning wheels, lacquer thinner, mineral spirits, compressed air, toothpicks, aluminum foil, personal protection equipment, and most importantly, a lot of patience and tenacity.

The process begins by removing all the old fiberglass residue with handheld wire brushes. Then we carefully use heat guns and plastic scrapers to remove the bulk of old skin damping tar. Next comes the tedious process of using a mix of lacquer thinner and mineral spirits to remove all the remnants of tar residue. Now it's time to use Roloc rotary abrasive wheels and Scotch Brite to remove any corrosion from the bulkheads, stringers, and cabin



One section of a 310 cabin side skin, thoroughly cleaned with Scotch Brite and lacquer thinner.

skins. Next comes detail cleaning deep into tight spots where bulkheads and stringers are riveted to skins.

A particularly important step is to use compressed air and toothpicks to remove any contaminants trapped

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Corrosion often seen on a cabin side skin once the tar is removed.

between mating structural components. This entire process takes several days. Antiseptically cleaning the cabin from forward to aft bulkheads, top to bottom, and deep into spar areas allows the zinc chromate to help protect the entire cabin area from future corrosion.

With the inner cabin shining like a new airplane, we use aluminum foil to mask all the stuff that shouldn't be sprayed with zinc chromate. Aluminum foil is great for this, easy to apply, conforms to any shape, stays in place, and is easy to remove. This protection means we won't have issues with wires being pulled out of plugs.

We also use this process in those leaky wing lockers. We have found some serious corrosion in these lockers due to the fact that Cessna glued the liner material to the bare aluminum surfaces. When we reinstall the new floor mats in the wing lockers, we always back them with closed cell foam and secure them in place with velcro. This allows for easy removal and drying of the mats if they



A 310 cabin, antiseptically cleaned showing partially masked wiring, cables and servos, almost ready for the application of zinc chromate.



All chromated and finally ready to proceed with the interior renovation.

become wet from water leaking into the lockers.

After everything is sprayed with zinc chromate, we will carefully apply Corrosion X or ACF50 to hard-to-reach places in both the main and aft spar areas as an extra precaution in our fight against corrosion. These airplanes are not replaceable, and it's rewarding to see the passion that folks put into their ownership.

Is this investment of time and cost to take the clean-up process to this level worth it? I definitely think so. At delivery we provide customers with a record of all pictures taken throughout the entire renovation process. Over the years, we've been told by many of our customers that the images of the clean-up were of great interest to a

prospective buyer at resale time.

Next month we will start with a licensed technician inspecting cabin systems, structure, and components. Then we'll actually get into the process of renovating the interior of your Cessna Twin. Until then, fly safely!



DOUBLE M AVIATION

I have never had a better, more honest, and more capable maintenance go to source in all my aviation career. Mike Naab (Owner of Double M Aviation) is especially well versed in the twin Cessna series, and 400 series pressurized aircraft specifically. We literally ended up with the proverbial "squawk-free" aircraft!

We get an amazing sense of security not only flying a super well maintained airplane, but also knowing that if a problem comes up on the road, we have a great go-to guy in Mike that can help bail us out.

-Kevin Jordan, Business Jet Enterprises, Texas



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