

# INTERIORS

## THE INSIDE STORY

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There is a lot more to a good interior than a pretty cover-up job. If doctors could do for your body what owners and technicians can do for an airplane, we'd be young and beautiful forever.

**T**he process of education is definitely a rewarding and, at times, frustrating experience. As a kid, I was always kind of a creative type. My hobbies were all about building, fixing or changing things. Fortunately, in the early '60s a mentor directed me to a five-year industrial design program at the University of Cincinnati.

As luck would have it, the space race was on, and UC's design department was deeply engaged in preliminary design projects with NASA. Having had a pilot's license since high school, I loved this involvement with aerospace design. Since human factors

were always the focal point of these projects, that love at times became frustration as I soon realized that the airplanes I was flying, even new ones, were an ergonomic disaster.

Let's face it. You spend most of the time in your airplane relating to it through its interior. From a human-factors perspective, the flying experience is backwards, with the easy part usually coming first.

You start out in the morning feeling fresh after a good night's sleep and a nutritious breakfast. And we all know the takeoffs are easy. Then we climb to an oxygen-deprived altitude, sit in the

glaring sun, endure a noise-polluted environment where the ventilation could be better, and sit in a seat that is right out of the last millennium (the first half of it). And then, when our bodies have really had enough, comes the hardest part: the approach and landing.

The point is, there is a lot more to a good interior than a pretty cover-up job. Here's a great opportunity to use modern materials, good design concepts and skilled labor to make the space between the firewall and aft bulkhead as safe and comfortable as possible, with the added benefit of making it durable, easier to maintain and aesthetically pleasing.

Walter Beech was an intuitive human-factors design guy before anyone else in the aviation business. I don't think he saw the genius in what he was doing when he did it. He quietly surveyed the pool of design engineers working at Beech and chose four whom he determined were of average size. Then he sat them down in card table chairs—two in front and two in back (see where we're going here?)—and said, "Gentlemen, I want you to design a retractable-gear, low-wing, semi-mono-coque, all-aluminum airplane. It is to be powered by Continental's new 165-hp engine and, most importantly, it will comfortably house these four people and their baggage." The rest is history.

What a stroke of genius: Build the machine to fit the mission of comfortably carrying four adults seated in normal chairs. Until then, engineers would figure frontal area, coefficient of drag, horsepower, etcetera, and come up with an aerodynamic shape into which they stuffed people. (Mooney pilots certainly know a little about this.)

Since the average person has become taller over the past 50 years, by today's standards early Bonanzas (late ones, too) have their human-factors deficiencies. But the basic cabin dimensions and geometry were remarkable for their day. This being said, with contemporary techniques and good ergonomic design, Bonanza-derivative airplanes can still set the standard for comfort and safety.

In the coming months we will go through every aspect of how to design, fabricate, install and maintain the interior of your dreams. Friends have cautioned me against giving away my secrets. To that I say, it's time to educate the consumer.

If Beech owners are made aware of the potential of what can be done in their airplanes, as well as all that is involved in this process, they will begin to understand why cost and downtime are what they are, and can better decide what is the optimum interior for them in both value and comfort.

The best solution is not always the

most expensive. There are good companies producing quality and value on many levels, and it is my hope that this series of articles will help you find that value.

My interior "inside story" will help an owner distinguish between who is pushing hype and who is providing substance. The reality is that an interior installer is like a dry-waller who can easily cover myriad electrical, plumbing and structural problems. On the walk-thru, the place looks good, the lights come on and the plumbing seems to work. So you write the contractor a check only to find out later about the corners that were cut.

This situation with airplanes is compounded by the fact that we are disassembling a 30- to 50-year-old machine that has some substantial aging issues, easily covered up by someone who merely wants to get done and get paid.

Think of it! This airplane is going to be stripped out to a point that will expose its inner structure and systems in a way that has not happened since it was built. Here's your opportunity to go the extra mile to ensure that this machine can safely remain in service for generations to come, and not die a slow and unseen death because someone covered up corrosion or structural defects with new insulation and beautiful upholstery.

Since this is the intro article, details will follow in later issues. Here is a very general outline of the focus of the upcoming installments on this subject:

### Common pre-project questions

- Project sequencing
- Doing it yourself – what you'll need
- Selecting a professional shop – questions to ask, things to look for

### Designing the interior

- Pre-design checklist based on customer's notes
- Color coordination & aesthetic design
- Material choices
- Types of foam
- Standard vs. later seat style
- Taller seatbacks vs. headrests
- Ventilation, passenger restraints, lighting, sound-proofing, etc.
- Instrument panel modification & upgrades

### Doing the interior

- Full ergonomic study with customer in airplane
- Pre-project check—radios, lights, door latches, etc.
- Tear down & evaluation of interior components
- Evaluation of aircraft wiring (remove unused)
- Customer conference
- Build new ergonomic foam; sew & mount seats
- Modify, repair & upholster side panels
- Install customer-requested enhancements & modifications
- Component modification & repairs
- Corrosion clean-up & prevention
- Remove floorboards, evaluate for repair
- Solvent-clean belly, landing gear transmission, etc.
- Insulation & soundproofing
- Plastic repair & reinforcement
- Interior painting & placarding
- Glareshield & instrument panel
- Door & window seals
- Door rigging & adjusting
- Final installation & assembly

### Paperwork & FAA approvals

- STCs, field approvals, etc.
- Materials testing, approvals & documentation
- Logbook entries
- Weight & balance & equipment list changes
- Owner-performed maintenance entries for the do-it-yourselfer

### Interior maintenance

- Damage prevention
- Cleaning
- Mechanical component maintenance
- Materials preservation

Even if you're not planning to have an interior done in the near future, this series will be valuable if you need to make a repair, plan to install a modification or upgrade, or choose to do only part of an interior.

These articles will be written to give you an insight to many of the aging-airplane issues. We will show you where to look for problems, how to fix them and how to avoid future degradation.

Until next month!

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*ABS member Dennis Wolter started Air Mod in 1973 to bring innovative design and high-quality renovations to the general aviation market. Dennis, his wife Cynthia and 10 dedicated employees complete about 40 renovations each year at their facility on the east side of Cincinnati. Dennis has a degree in industrial design from the University of Cincinnati. He is an A&P, IA and a 3,000-hour instrument pilot.*