

**BETTER
THAN NEW**

172

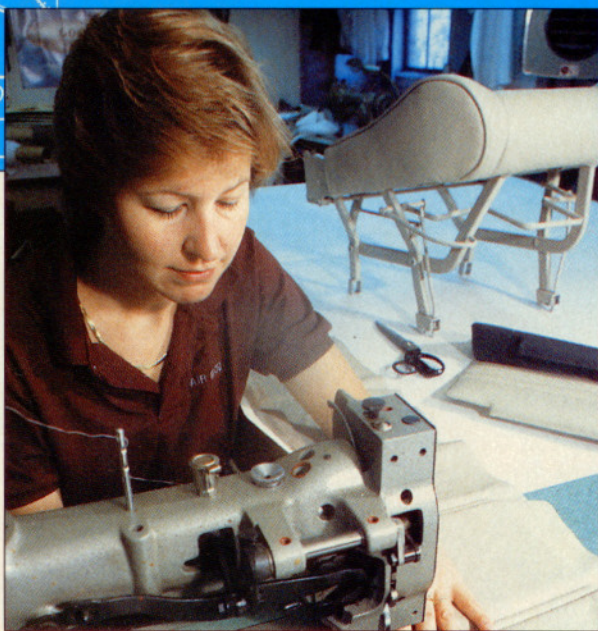
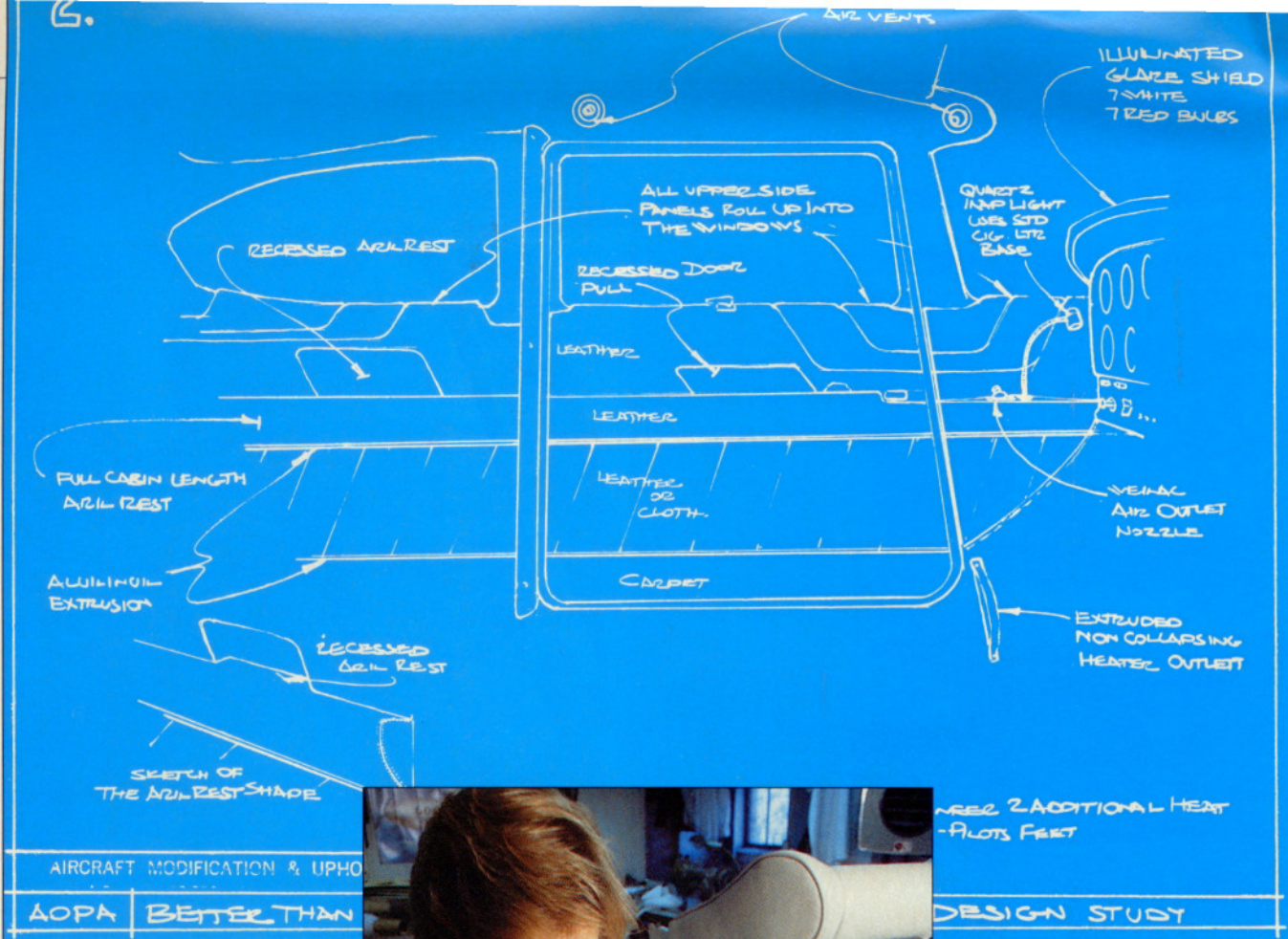
ON THE INSIDE

How some leather, wool, and attention to detail can transform a Skyhawk interior

BY THOMAS B. HAINES

Aftermarket aircraft interiors come in two basic flavors: do-it-yourself kits and custom. In keeping with our theme, we elected to go all-out with a custom interior for our Better Than New 172 project. The leather and wool interior and accessories make for a unique and comfortable airplane, which promises an exciting sweepstakes prize for new and renewing AOPA members in 1994. The drawing for the airplane is scheduled for mid-January. ■ While this is a luxu interior to the max, many of the steps apply no matter what materials you choose or who does the work. ■ At full retail, this interior easily tops out at more than \$12,000, far more than your average Skyhawk needs. A very nice interior with fine wool carpets and seat covers can be had for \$4,000 to \$5,000. Ratchet up the plastic and vinyl factor and do some of the installation yourself, and the price can be brought down to about \$2,000. It's somehow ironic that prices increase rapidly the farther you venture away from plastics and vinyls made from nonrenewable resources and toward renewable resources such as wool and leather. ■ An owner may install a simple interior under preventive maintenance rules outlined in FAR Part 43, provided the job doesn't require





A custom interior with lots of options may begin with a sketch. The detailed stitching of seat covers comes later.

work on any aircraft systems. Several companies offer interior kits for many popular models of aircraft. Check the classifieds in the aviation tabloids for their ads.

Our goals for the Better Than New 172 project are to increase the performance, comfort, and safety of the 1978 Cessna 172N that we bought last December. As we've outlined in articles earlier this year, we've swapped out the stock 160-horsepower engine for one of 180 hp that yields extra climb and cruise performance, added a STOL kit and gap seals to improve slow-speed and runway performance, extra fuel tanks to improve endurance, and a superb panel stuffed with the latest avionics and safety features.

The airplane carries a new white, green, and platinum paint job that we'll write about next month.

Interior modifications to improve the airplane's comfort seem obvious—rebuild the seats and add insulation, for example. Methods to improve safety may not seem so obvious. Among the ways N172B provides more safety than when it left the factory are the BAS,

Incorporated, inertia-reel harnesses for the front seats. Unlike the stock fixed shoulder harnesses, the inertia reels allow freedom of movement under normal circumstances but lock up when subjected to G loads, keeping the occupants safely in the seats. The four-point harnesses also keep the occupants better restrained in the event of an accident (see "Exercising Restraint: Buckle Shopping," October *Pilot*). A black pair of the BAS harnesses for late-model Cessnas retails for \$770; colors cost \$15

extra. Earlier models are slightly cheaper.

The FAA didn't require aft shoulder harnesses when the 172N was produced, but we added them to N172B for about \$300. Another inexpensive but important safety improvement is the secondary stop on the pilot's seat. The extra latch keeps the seat from sliding too far aft in case the main stop gives out. The secondary stops cost about \$175.

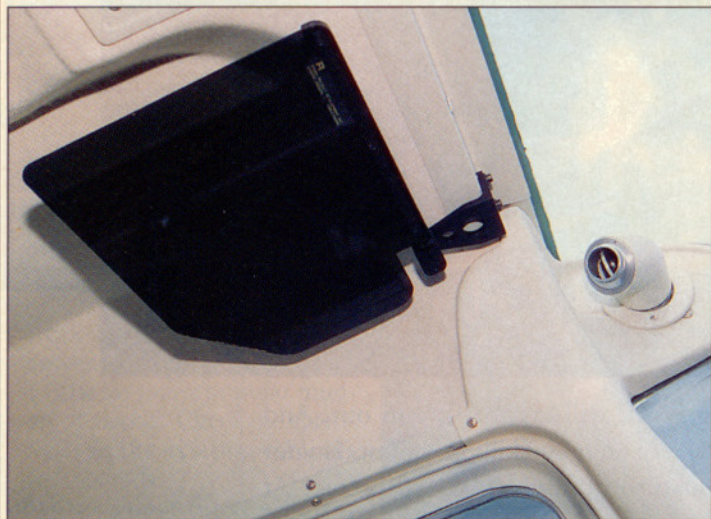
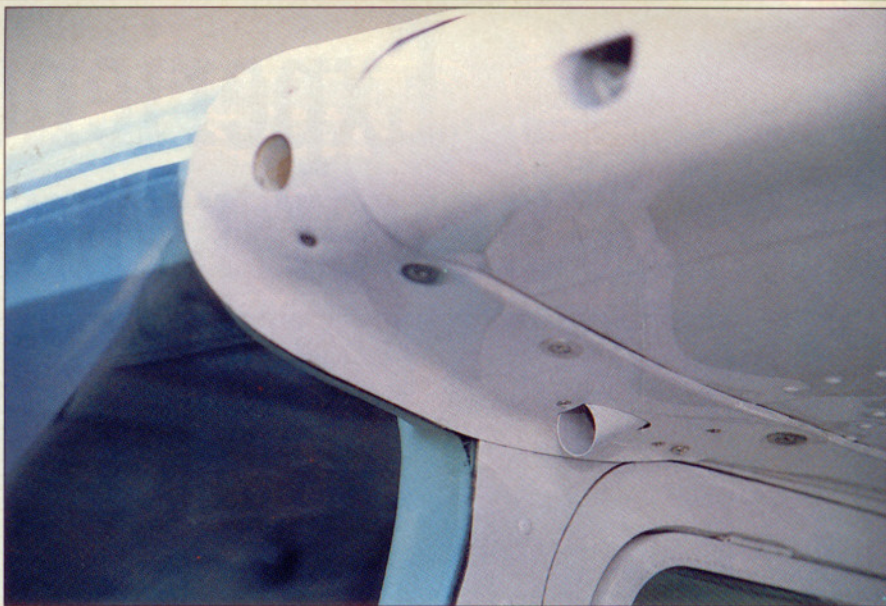
Though it may look stock, changes to the glareshield also offer additional protection. A soft metal construction that allows the glareshield to collapse when struck and extra padding combine in an effort to reduce head injuries in the event of an accident.

More tangible improvements to the interior are the redesigned seats, improved ventilation and heating systems, and extra soundproofing. The interior was designed by Air Mod, Incorporated, near Cincinnati. Proprietor Dennis Wolter specializes in interiors and avionics panels. He also built N172B's panel (see "Better Than New 172: A Blank Canvas," September *Pilot*).

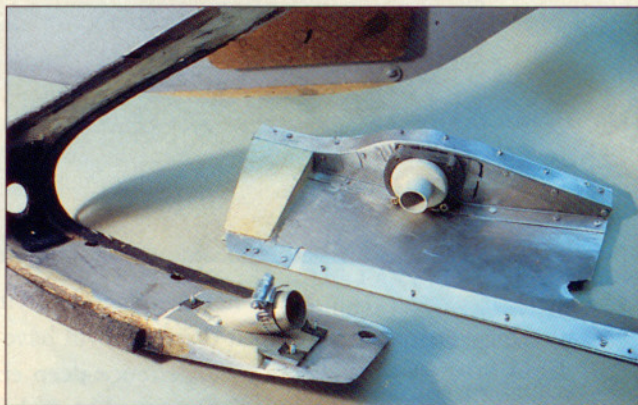
Our Skyhawk contains several com-

ponents that Wolter has been mulling over for several years. He agreed to do the work on those components for the price of the materials in exchange for us allowing N172B to be somewhat of a testbed for his ideas. Chief among the changes are the improvements to the ventilation system.

The primary ventilation on Cessna 172s comes from the infamous "orange juice cans" located in the upper windshield on each side. The pilot pulls the tubes inward, and ram air from openings in the leading edges of the wings comes screaming in. It's fairly effective in flight at cooling the cabin—year-round, no matter the temperature outside. Even in the closed position, the tubes leak air, water, and snow. Since the incoming



Parts of the new ventilation system include scoops (below) that install forward of the door frames at the wing root (above). New windshield vents with Wemac nozzles (left) receive air from leading edge inlets as before. Rosen sun visors articulate in nearly all directions.



air must turn 90 degrees to enter the cockpit, the tubes are also noisy. Back-seat passengers are supposed to be cooled by overhead vents fed from separate leading edge inlets. Mostly those passengers are simply annoyed by the noise.

To fix the problem, Wolter replaced the sliding orange juice cans with fixed tubes bent at an angle toward the front seats. On the end he placed adjustable Wemac brand nozzles that can be turned tightly closed and adjusted in a variety of positions. Because the air needs to turn only about 45 degrees at the exit, the new arrangement is quieter. To add even more air flow, Wolter installed two new Wemac nozzles, one on each side of the front cockpit, beside the yokes. These nozzles are fed by the inlets that formerly provided flow to the aft seats.

The overhead vents in the back seats also were replaced by large Wemacs, but the air comes from new

scoops located just forward of the doors near the wing roots. Wolter put tufts of yarn near the wing root on his Cessna 172 and flew it to determine the location of high pressure areas and the best place to put the scoops.

The result is improved air flow and control all around, even on the ground. The new vents are quieter than the old system and less drafty when closed.

Wolter plans to offer the ventilation system to his customers and to sell the windshield nozzles as a stand-alone product for about \$400. The windshield nozzles are so effective that Wolter doesn't believe the new front outlets near the yokes are necessary.

To pump up the Skyhawk's anemic heater system, Wolter rerouted the heater ducting and added two new Wemacs in the front foot wells near the rudder pedals. Previously, the heat was ducted to vents on the floor just in front of the doors, sending most of the

comfort to the back seats.

Another Skyhawk improvement that Wolter pioneered on N172B are the arm rests. The wimpy pressed-foam, stock arm rests often fail and offer little comfort or utility. To replace them, Wolter designed an aluminum beam that runs from near the panel all the way along each side of the cockpit to the back seats. The result is a comfortable and sturdy shelf that houses the door latch and makes a convenient arm rest and handle for pulling the door shut.

Forward of the doors, the shelf is a place to put the new air inlets described above and a pair of extra lighter cigarette outlets that can power a number of devices. In N172B, the outlets are located next to the pilot and on the arm rest next to the back left passenger. Wolter bought a pair of flexible-necked lights from Sharper Image that plug into the outlets, making convenient chart and reading



An aluminum rail (below) forms a sturdy arm rest and ledge that runs the length of the cockpit (above) and houses the door latch, additional air vent, and lamp. Handy pockets between the seats carry charts (right).



lights for night flying.

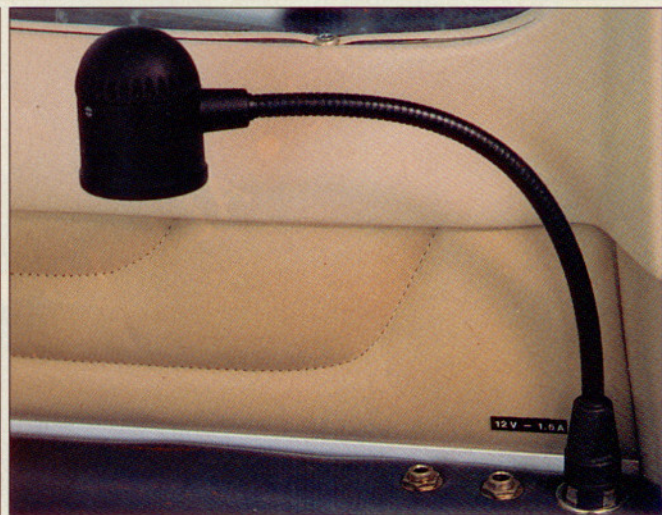
In fact, Wolter has filled the airplane with handy accessories. Between the two front seats are a pair of pockets just the right size for charts. Under the front passenger seat is an acrylic tray for carrying charts and manuals. Stretched across the baggage door and across the back of the aft

seat in the baggage compartment are pockets for carrying oil and other supplies. The stock Cessna chart pockets near the floor on either side of the cockpit have been rebuilt with stronger materials. The seat backs have also been rebuilt with sturdier materials and new pockets. Overhead, the flimsy and small Cessna sun visors

have been replaced with a pair of Rosen see-through visors. The large tinted plastic visors tilt and slide in all directions to block the sun and reduce glare, but allow the pilot to see through for better traffic monitoring.

To improve durability and looks, all of the cabin sidewalls have been rebuilt with aluminum and then covered with carpet for the first few inches up from the floor, followed by two-tone leather. The floor, carpets were replaced with new wool materials. The plastic headliner was covered with fabric to help decrease echoing.

Extra insulation throughout decreases cabin noise. The insulation was placed on the firewall, above the new headliner, and along the sidewalls for about the first one third of the cockpit. Placing the material farther aft in the cockpit would add significantly to the weight and show little improvement in noise deadening, according to Wolter. The extra insulation adds nearly \$2,000 to the price of an interior but reduces cockpit noise



The back seat passengers live in comfort, with high-back leather seats, new shoulder harnesses, seat pockets, intercom jacks, and, on the port side, a reading lamp.

by about 8 decibels over the stock environment, Wolter says. The new interior is about 5 db quieter than a "regular" new interior that includes fabrics rather than the stock plastics, he estimates. Those who regularly wear headsets in the cockpit might prefer to spend their money elsewhere in the refurbishment.

Also helping to reduce the noise and vibration are the thicker-than-stock windshield and door windows. LP Aero Plastics, Incorporated, provid-

ed new windows all the way around. The windshield and door windows are each one-quarter-inch thick, compared to the stock one-eighth-inch windows. We had the windows tinted light green to match the exterior and to reduce ultraviolet damage inside. A complete set of windows for a Skyhawk costs about \$1,200; installation

labor about doubles the cost.

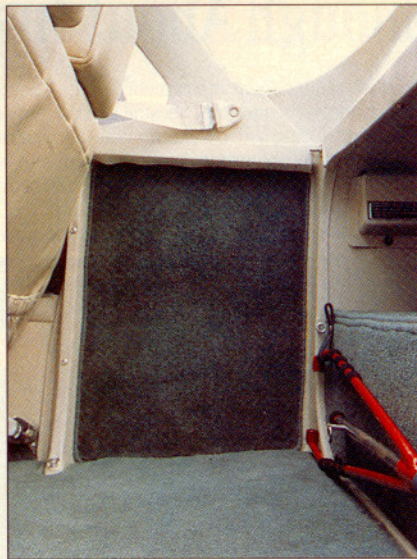
Back inside, all of the seats have been rebuilt using four densities of foam and all new materials covered in leather. The seat frames have been stripped, repaired, and repainted to match the interior. The seat slings have been reinforced to prevent sagging.

Normally, Wolter measures the customer and builds the seat to his or her specifications. Since we don't yet know who will win N172B, he built the seats to the dimensions known as "the

standard measure of man," meaning 90 percent of the population ought to find them comfortable. To increase the comfort over the stock seats, Wolter made the seat backs higher, installed lumbar supports, and changed the seat dimensions and design to offer better thigh support.

In the "don't try this at home" vein, remember that materials used in an aircraft interior must meet at least the fire resistance requirements of FAR Part 23. The foams, for example, must be self extinguishing. Those foams and fabrics from Vercel's Upholstery Shop down the street may not meet the criteria. The foams Wolter and many other interior shop owners use meet the more stringent FAR Part 25 criteria. They will burn if exposed to flame, but they extinguish themselves 15 seconds after the flame is removed.

In case you were wondering whether N172B might have any load-carrying capability after all these modifications, extra insulation, and thicker windows, fear not. The engine upgrade from Air Plains Services included a 250-pound maximum gross weight increase. With that, N172B can still carry about what a normal Skyhawk will haul. It now has a



max gross weight of 2,550. Empty it weighs 1,719 pounds, leaving 831 pounds for people and fuel, enough for two adults and 100 pounds of baggage with a full 64 gallons of fuel. Take off with the 24-gallon aux tanks empty and you can carry three adults and 85 pounds of bags.

Stats aside, the real gauge of an interior, of course, is the comfort of the seats. On the short trips we've

flown it, the seats have provided lots of comfort and support. The new seats look (and smell) great and offer up the detailed styling one expects in a luxury automobile. The real comfort test is to come, though. About the time you will be reading this, I'll be strapping N172B on and heading from AOPA Expo in Palm Springs, California, about 15 flight hours back to Frederick, Maryland. Trust me, by the time I get back, I'll know for sure whether this is one comfortable airplane. □

Air Mod, Incorporated, 2025 Sporty's Drive, Batavia, Ohio 45103; 513/732-6688.

BAS, Incorporated, Post Office Box 190, Eatonville, Washington 98328; 206/832-6566; fax 206/832-6466 (area code 360 effective January 15).

LP Aero Plastics, Incorporated, RD 1 Box 201B, Jeannette, Pennsylvania 15644-9730; 412/744-4448; fax 412/744-7372.

Rosen Product Development, Incorporated, Post Office Box 5386, Eugene, Oregon 97405; 800/2VISORS.