

Falco Builders Letter



Above: The Chilean Air Force Falco

Sequoia Falco F.8L

This article appeared in the April 1987 issue of Pilot magazine in England.

It's probably hard for a European to understand how baffling the handling qualities of a Falco are for American pilots brought up on our Buicks of the airways. Stolid, steady Cessnas and predictable Pipers... admittedly remarkable airplanes in the artfulness of the compromises their designers have chosen to make in pursuit of all-things-to-all-people utility, safety and economy. But outside the ranks of pure-aerobatic machines, we have no winged Ferraris, no aerial Porsches, not even any MG TCs. Oh, people make a fuss about Mooneys being sporty, and 310s were once thought of as hot rods, and I'm sure there are homebuilts that handle daintily.

But the Falco is a bolt from the blue for a pilot with yoke-shaped hands and chair-contour buttocks, a totally new set of sensations for the aviator who wants a good roof and preferably even a wing over his head, a shock for the airman who soldiers along with bobweights and bungees, springs and wing levelers lending a hand.

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Goings On at Sequoia Aircraft

This builder letter is going out several weeks behind schedule because of my trip to Europe.

My intention was to spend much of the last few months working on the next chapters in the construction manual, but we are in a re-order cycle and other things keep pulling me off the manual. I had also intended to have a package of new drawings to send out at this time, but I want to do more. Let me tell you what I have done and if you need any of these drawings or other things, drop me a note and I'll get you an early copy.

Pawel Kwiecinski put the arm on me to put together a fuel system kit, and I agreed it was about time. Even though I had already done all of the drawings—

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Around the Falco Patch

All four U.K. Falcos came to our afternoon tea at Meppershall, and we had a group of about 50 builders and potential builders. And, to the relief of all in attendance, Charles Wagner even behaved himself!

Meppershall Airstrip is what happened when young Andrew Brinkley got tired of farming, mowed a strip in the barley, built a hangar to one side and began working on airplanes—which keeps him in beans better than raising the things. Andrew likes working on wood airplanes and by happy coincidence he lives in the same village as Derek Simpson, who imported a Series 2 Falco from Belgium several years ago.

Andrew Brinkley did such a beautiful job of restoring Derek's Falco that all U.K. Falcos are now maintained by him. Bob Willis bought a Series IV Falco from Germany, and Andrew gave it a complete going-over with a red paint scheme and leather upholstery. The latest addition is Brian McBride's beautiful white Series 2 recently imported from Italy. This Falco is an immaculate airplane that is so smooth it looks positively *ceramic*. Brian bought the Falco for about \$55,000 from an Italian Aero Club and flew it for six months under a temporary certificate of airworthiness—and earned a reputation for doing "beat ups" on runways and loops down on the deck!

The Italian government subsidizes the Italian Aero Clubs, but when a plane is sold to another Italian Aero Club, the 'debt' is assumed by the new club. Since the clubs are never required to pay off the debt, it appears no one thought to mention it when Brian bought the Falco. Unfortunately, the Italian Government would like to have all past subsidies reimbursed before they release the Falco from the Italian Registry—that's required for a British title, which Brian needs to fly the plane. The solution to this problem has yet to be found, but

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Around the Falco Patch

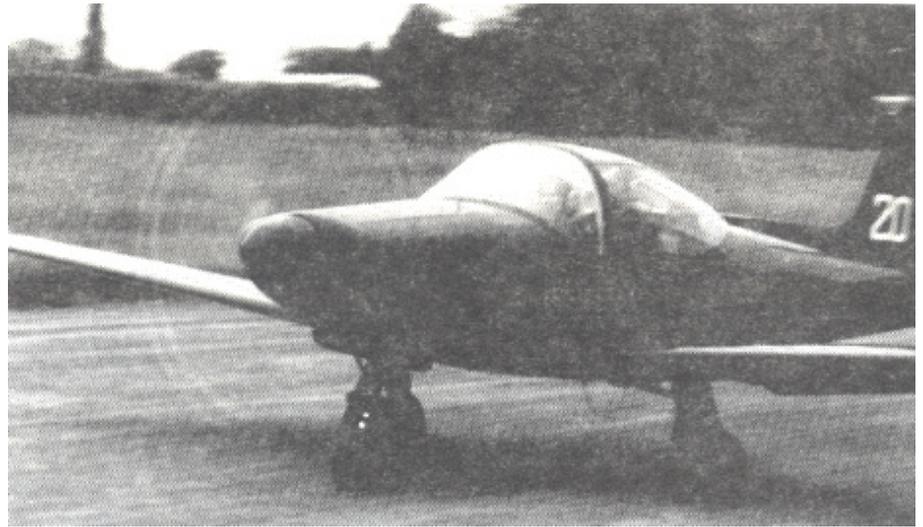
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some have suggested that since Andrew Brinkley is so experienced with the airplane that he could probably build an identical homebuilt Falco in almost no time at all!

U.K. Falco owners all seem to share a passion for racing. The King's Cup is a series of handicap races—the idea is that each airplane will take off at a different time, first the slowest Tiger Moths are given a head start and then faster and faster airplanes are released. They fly around a closed course and—if the handicappers have done their work well—all of the planes will cross the finish line at the same time.

While it's intended to be a race won entirely by piloting skills, there is also the matter of getting the better of the handicappers. When the Falcos were first built, a group of English owners engaged in a bit of conspiracy. For two years they flew at part throttle to establish a high handicap for the 'poor Falco', then they all firewalled it and walked away with the trophies. Since then, Falco pilots have been regarded with sinister suspicion.

When Derek first got his Falco, it had a top speed of 175 mph. Wheel well doors brought this up to 185 mph. After Derek's airborne embrace with a seagull last summer, Andrew rebuilt the cowling with a more bird-resistant NASA flush inlet for the carburetor, which brought the plane to 196 mph. Hinge fairings on the bottom of the wing brought the top speed to 205. A cracked cowling



Above: Bob Willis takes off at Meppershall.

nose bowl had Derek's Falco grounded on that day at Meppershall, so we didn't see it fly.

Peter Hunter has added wheel well doors to his Falco and now has the same NASA flush carburetor inlet. Only Peter Hunter knows how fast his Falco is, and he's not telling! But when he talks about *speed* Peter gets this wild, happy look in his eye. Several times during the afternoon, Peter put on a display of speed with the plane. After taking off, Peter circled to the east and then dove at the field, crossing a hill of wheat so low that only an inspection of his propeller convinced everyone that he had not actually touched. I'd judge Peter's Falco to be capable of about 220 mph in level flight, and he admitted to indicating 240 mph as he crossed the strip.

It was a sight to behold, too. The grass at Meppershall was a lush, rich green; the wheat in the field to the east was a deeper, dark green—and the sight of

this swift, snarling, red Falco streaking across the runway inspired me to hold forth on the merits of the airplane to the assembled group in the hangar!

Bob Willis gave a display of loops and rolls, and concluded with a demonstration on how-not-to-land-a-Falco for the benefit of all of the future Falco pilots present. The Series 4 Falco is presently offered for sale at \$85,000.00—inquiries please to Bob Willis, 13 High St., Clophill, Bedfordshire, England.

Thanks to Andrew Brinkley for his hospitality and to Derek and Chris Simpson for all they did to get supplies of chips, tea, soft drinks and assorted junk food. It was as pleasant a way to pass an afternoon as you could ask for, and a most expensive day for those potential Falco builders who liked what they saw and made the plunge.

Gotta tell you about England. It's exciting. Oh, England has always been a wonderful country, and London is a marvelous celebration of obsolescence, but on previous visits I had come



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Above: Bent Mickelsen and Per Brüel.

away slightly depressed by the state of things. It seemed to be a country going nowhere—where even the police were buying Japanese motorcycles instead of Triumphs, BSAs or Nortons. Here in the U.S., it's not possible to drive down a street without seeing a truck belonging to an electrician, plumber, floor sander, brick layer, painter, or some other construction trade. Meredith and I were in England in 1975, and we spent a week-and-a-half driving from Scotland to the Isle of Wight and back to London. In that entire time, I only saw *three* such trucks! On this trip, I had not even gotten into the taxi at Heathrow when I saw a truck loaded with scaffolding, and everywhere I went in London I saw construction workers hard at their trades. Hey, world. England's back!

We had dinner with James Gilbert, publisher of *Pilot* magazine. If you want to blame your Falco addiction on anyone, blame James! If it hadn't been for his articles on the Falco, I would never have heard of it. James said he sometimes wondered if perhaps he hadn't praised the Falco's handling too highly, but he was happy to see that other writers are now saying essentially the same thing.

From London, we went to a family reunion of Meredith's German ancestors in Mainz and then to Copenhagen to visit her step-mother. On one fateful rainy day we visited all of the step-mother's brothers and sisters, each of which insisted on feeding us. At the final stop, I made the mistake of mentioning that I was really too full to eat anything else.

This caused our host to rush for a bottle of "digestive" liquor which he made me drink. I've never tasted a more bitter, horrible solution. The French company that makes it—from coal tar, I suspect—will not divulge the ingredients. Small wonder, if the health authorities knew what went into the bottle they'd probably shut down the plant.

Copenhagen is also home for OY-BKC, a Series 4 Falco owned by Per Brüel and Bent Mickelsen. The Falco had just been re-painted using the original paint scheme of metallic grey and dark red. There is a new instrument panel, too, with very small German glider radios. Because of difficulties getting nose gear tires, they will shortly be switching to our nose wheel and tire.

Mr. Brüel and I went for a short flight over the lush, green countryside of Zealand and then over the city of Copenhagen. The Series 4 Falco was built with a muffler, and although it was my second time in this Falco, I was surprised at how quiet it was. I spent most of the flight without wearing headsets. Like all Series 3 Falcos, the "Corporate Disgrace" has a silly extra bellcrank in the aileron controls, which only contributes to slop. The Series 1, 2 and 4 Falcos have the arrangement we use. It's far superior, and I was struck by the difference with my Falco. There was no play in the ailerons of the 20-year-old Series 4.

George Neuman reports that the flight test program on his Falco has been progressing more slowly than he would

like. The plane has been plagued with lots of little glitches. The instrument panel was transplanted from a Beech Musketeer, and there were some mismatched gauges and senders. An oil leak proved difficult to find, and it turned out to be in the oil cooler.

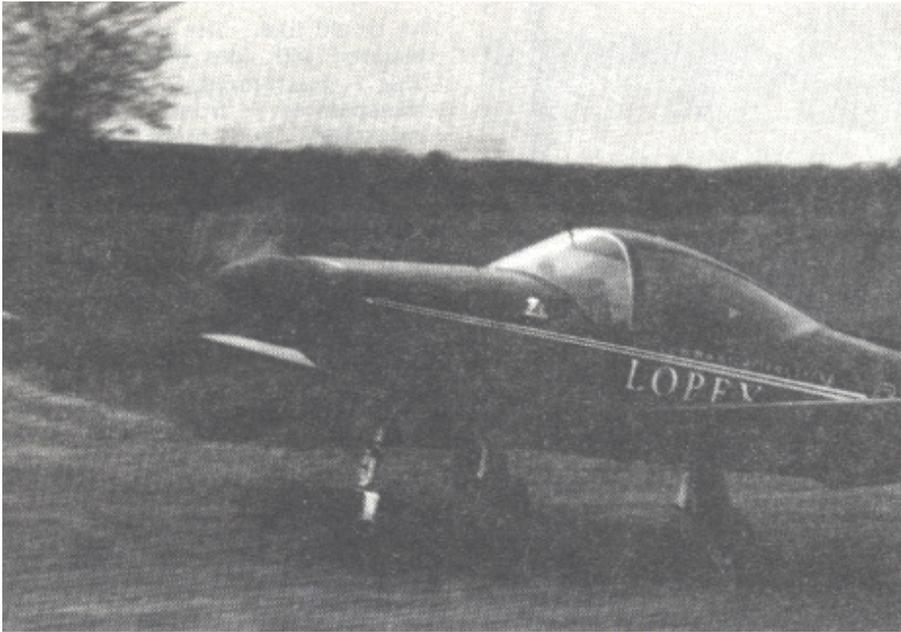
Problems, too, with the test pilot. Gogi could only fly on Sunday and a series of little accidents, like falling off a motorcycle and dropping a hammer on his foot, kept Gogi out of service. The plane now has about 6 hours on it, and George got his first ride a couple of weeks ago—"It's something else again!" George had built up some time in an Archer and found that experience essentially useless in preparing for the Falco. He plans to get Gogi to check out a local instructor in the Falco so he can build up time more rapidly.

The airspeed indicator has not been calibrated but the indicated stall speed is 52 mph at 1600 lbs. The plane indicates 160 mph at 2300 rpm and the top speed is an indicated 175-180 mph.

John Harns reports that he now has 268 hours on his Falco and just returned from Denver, and on that flight picked up an eighth of an inch of ice. John continues to be amazed that the Falco doesn't seem to be affected by a moderate load of ice. On that flight poor Pat Harns got "indoctrinated to electrical storms"—actually they skirted the storm but the G-meter indicated +3/-2 after passing through the turbulence. John continues to file IFR flight plans at 160 knots point-to-point and usually beats it by a little. He says "I enjoy passing Bonanzas!"

There have been no major problems. For some reason the engine has started to run rich, but no cause has been found. John does a lot of aerobatics and reports that he gives the gear-crank an extra half-turn before doing high-g stuff so his gear-up light doesn't blink. Recently he found and patched a small crack in the fuselage skin at the aft right corner of the nose gear bay. The crack radiated about 1/2" to the starboard side and 1" aft. John attributes this to aerobatics and reports no movement in the nose gear screwjack support.

Karl Hansen has adjusted his gear doors for a tighter fit in preparation for the CAFE 400. Karl did a speed check and reported 169 KIAS at 10.1 gph at 25/2500, 90°F and 4000'



Above: Peter Hunter takes off at Meppershall.

pressure altitude. That seems to be a little faster than previous checks. Karl plans to install aileron gap seals for the race.

Karl also checked his ailerons with the protractor and found his left aileron goes 19° up and 10° down and the right goes 17° up and 15° down. It looks like Karl needs to sand on both of the aileron stops. All other builders reporting in have reported that their ailerons have essentially the design travel of 16° down and 24° up. Karl is coming to Oshkosh but will be leaving the Falco at home since he wants to give son Steve a helping hand at flying the Cessna twin.

Karl has now switched to Aeroshell 17 grease on the screwjacks and finds that the gear goes up and down a little faster. You may remember that Jim DeAngelo had problems with the gear not retracting in the winter. This led to my investigation of greases. Jim has used Aeroshell 17 for more than a year now, and he reports that the landing gear retracted as quickly this past winter as it does in the summer.

Ray Purkiser did not put any vent holes in his aileron and flaps with the result that the fabric pulled loose from the ribs on a flight to 14,000 feet—*now* you know why they were so smooth! Ray has just finished making new all plywood-skinned ailerons and flaps. These added a pound a piece to the weight of the plane.

Ray now has 148 hours on the Falco, and he will be bringing it to the Dayton

Air Fair where it will be displayed in the Shopsmith tent, and Shopsmith is sponsoring him at Oshkosh as well.

No first flights to report, but there are a number of Falcos that are getting close. Dan Garn and Wendell Taylor could fly in the next week or so in Salt Lake City. The Falco, N69WD, is painted red and a white stripe is planned. This will be the first 180 hp Falco to fly. The plane weighed in at 1,250 lbs. If they get the time flown off, there is some possibility they will bring it to Oshkosh.

Pawel Kwiecinski and friends continue to make excellent progress, and Pawel hopes to fly in the middle of July. That would make it 10 months to build the plane, but there have been a lot of hours put into the plane. For most of the time, one man has worked full time. Pawel puts in about 4 hours a night, and for the last three months two men have been on it full time. Pawel says his Falco is being built in front of an audience of three or four men who spend the whole day sitting and watching the process. They don't help, and Pawel asks them not to interrupt the work with chitchat. Some of the regulars even have normal jobs and take a day off to watch.

The Falco will be red with white stripes and with a black leather interior—to match Pawel's Porsche 928S. In his rush to get the plane flying, Pawel bought two electric boost pumps so if you need one give him a call at (312) 283-1881. There isn't much time left before Oshkosh, but let's hope he makes it.

Jim and Gail Martin should be next, and I expect them to fly in August. Neville Langrick in England is very close as is Jan Waldahl in Norway. Joel Shankle just finished a month's vacation during which he did nothing but work on his Falco, and he reports if he had another month of solid work he would be flying. Syd Jensen continues to be held up by medical problems. Richard Clements, Steve Bachnak, and Perry Burholm at all getting close. There are others closing in as well.

Just as we were getting ready to go to press we got the final results on the CAFE 400. Karl Hansen did spectacularly well, finishing 5th in the two-place category and 12th overall. Only three planes were faster. Karl started 27th and passed the first two Bonanzas before the first checkpoint about 60 miles away. The day was very hot, varying from 93° to 100°, but Karl averaged 184.0 mph @ 24.9 mpg vs 172.6 mph @ 26.06 mpg last year. All of the leaders landed long and hot, but Karl landed and made the first turn. This put him first in line for the final weigh-in—quite a surprising sight for John Harns, who flew down to watch and help.

Karl says he "beat about every airplane that we should." In the two-place category the order of finishing was: Varieze, Q200, Varieze, Lancair, Falco, Glasair III, RV6, Glasair FT, Celerity, Longeze and Varieze. The first three planes are highly tuned CAFE racers. The Lancair only beat Karl by a slim margin. Because of the race rules, the Falco is at a disadvantage since as a two-place it is not allowed to use all of its gross weight. If Karl could fill the plane to the full gross of 1,880 lbs, he would have a chance at winning in the two-place and overall categories.

Three airplanes developed problems in the race. The Harmon Rocket—an all-metal homebuilt with a Lycoming 180 hopped-up with 13.1 pistons to give 233 hp—blew a valve and landed in Petaluma. Mike Smith blew a piston and put his Bonanza down on a mountain road. The road dipped and Mike went down and then back up, only to find a metal gate. He went through this at about 60 mph, totalling the plane, but amazingly no one was hurt. Another Bonanza that landed right after Karl developed a flutter in the tail for about 6 seconds that nearly twisted the tail cone off. They were, Karl said, "only seconds from eternity."

—Alfred Scott

Sequoia Falco F.8L

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I remember the first time I ever drove a sports car—it was a TC, in 1955—and my first flight in the left seat of a Falco was much the same. The same narrow, dark scuttle into which your legs disappear, the same high-arched panel in your face, the same sudden feeling of a vehicle cuddling you in a sparse cockpit while at the same time opening an unaccustomed 360 degrees of airiness all around. The same unbidden skittering until peace was made with the unaccustomedly sensitive controls, the same total disruption of all your old kinesthetic cues, the same shocking realization that an entire world of new sensations waited Out There.

Few homebuilders get the privilege of first flying the same kind of airplane they're building, unless it's a common type such as a Pitts. The rest of us buy kits and plans based on hearsay, hangar stories, emotion, wishful thinking and the enthusiastic pilot reports in home-builder magazines that never met an airplane they didn't like. (In part because many of their reports are written by the people selling the very airplanes they're describing.) Thanks to James DeAngelo, however, I'm one Falco-builder who was able to get an early taste of the banquet to which I'd already committed a considerable amount of money and effort.

DeAngelo is a Wallingford, Connecticut baker, a maker of fine Italian pastries, breads and wedding cakes, who admits that he was drawn to the Falco because it was Italian. His was the fourth kit-built Falco to fly, and *Pilot* chose to test it because it's a representative airplane: competently built but not compulsively over-detailed. Made on a budget—older avionics, a nearly run-out engine—rather than being a cost-no-object show-piece. And an airplane that utilizes virtually every available Sequoia Aircraft Corp. kit component rather than being the product of some innovative homebuilder's deviations from stock.

In other words, it's the airplane you or I would build. DeAngelo even did it in a one-car garage, the walls of which he progressively knocked out as the airplane spread its wings. (His first glimpse of the entire airplane, in fact, came only after roll-out. He'd even managed to paint the near-faultless sweep of the fuselage stripe piecemeal, spraying one section through a garage window,

the next through a door, never seeing the entire arc). Other Falcos claim to be faster, and there will doubtless be some slower—there's a candidate under construction in my barn at this very moment—but the DeAngelo airplane is a realistic example that shows the inevitable compromises, minor faults and vast virtues of the modernized version of Stelio Frati's classic design.

Much of the emphasis in recent Sequoia kit advertisements has focused on the Falco's speed, partly because of competition from increasingly popular composite-airframe kit homebuilts such as the Glasair and Lancair—plus the big-engined aluminum Swearingen SX-300—making a wide variety of 200- to 250-mph speed claims. The contest seems a bit like electric and acoustic guitar makers arguing about whose instrument is louder: ultimately pointless, for the builder attracted to the instant-airplane fiberglass designs or the King Kong Swearingen will have little in common with the heretic mesmerized by the prospect of converting spruce to sawdust.

And it is handling that is the Falco's strong suit, not simply speed. Handling so sweet it makes you wonder why you've spent twenty years heaving yokes and stomping on pedals when the opportunity to instead tickle a Falco's stick existed. On takeoff, you wait for the controls to heavy up—"to come alive", they call it over here, as though life were a dead weight—but unless you're gauging the pressure with a single finger, you'll wait forever. The Falco slips into the air subtly—not hesitantly, but nor is there the rotation-and-lunge of other lightplanes. Take-off torque is surprisingly strong, for this little 160-hp, 1880-pound wood-chip wonder's power-to-weight ratio is lower than that of almost any production U.S. single.

On climbout, strict attention to the rudder is needed to keep the airplane straight. Takeoff flaps (fifteen degrees of the total 45 available) can be retracted right after the wheels are in the wells with imperceptible sink and hardly any change in pitch attitude, and initial climb is strong and stays that way: DeAngelo and I averaged a stopwatch-timed 1,210 fpm from a near-sea-level takeoff to level-off at 7,000 feet, 120 pounds under gross weight on a standard day (fifteen degrees centigrade on the ground), and we were flying it at a cruise-climb rate of 105 knots to retain

over-the-nose visibility. (No builder has yet completed a Falco with the optional 180-hp Lycoming installation, but that engine should make the climb even more dramatic and give a Falco the ability to quickly reach and comfortably cruise at oxygen altitudes and bust through lower-level icing without the complications of turbocharging—to me the prime advantages of over-powered/underweight airplanes.)

In cruise and even doing aerobatics, the only way to fly a Falco is to rest a forearm on your thigh and literally hold the stick between thumb and forefinger. A firmer grip overwhelms the control system, and instead of the pilot reacting to what the airplane is saying the controls will be responding to the weight of your wristwatch or the unconscious angle of your hand. Unfortunately, the Sequoia Falco's sticks are not the ideal shape for such delicacy, though future kits will apparently correct even this tiny fault. Transplanted largely intact from the 1960s Italian production version, the sticks end up about two inches too tall in the kit-built version which has thinner seats and utilizes a different stick grip. The result is that you finger them just below the rubber handle.

Whether or not it's typical of kit-built Sequoia Falcos—and I'd guess it will prove to be—Jim DeAngelo's airplane is a 155-knot cruiser: 180 mph on 160 hp at 7,000 feet and at a rational power setting (23 inches/2,400 rpm). The real-world speed was confirmed by a 112-nautical mile run between two VORs, half of it upwind and half downwind, during a glass-smooth, clear, temperate (+6.5° C at altitude), relatively, windless New England autumn day with the airplane at a mid-cruise weight. True airspeed computed from the ASI insisted that we were going 158 knots, but the ground going by doesn't lie.

One U.S. Falco kit builder, Karl Hansen, claims a speed of nearly 230 mph at 6,000 feet and says he typically cruises at 195 to 200 mph at 60 to 65 percent power settings, and the well-known Luciano Nustrini full-race Falco is supposedly capable of over 240 mph. Perhaps... though I find the concept of a fifty- or sixty-mph speed difference between identically configured airplanes ostensibly of the same horsepower difficult to accept. Nustrini's modified but factory-built 1956 Aviamilano has ram-air induction, a lightened interior with a tiny instrument panel, full landing-gear

doors, aileron and flap-gap seals, no wing walks and a wax job glossier than Tina Turner's lips.

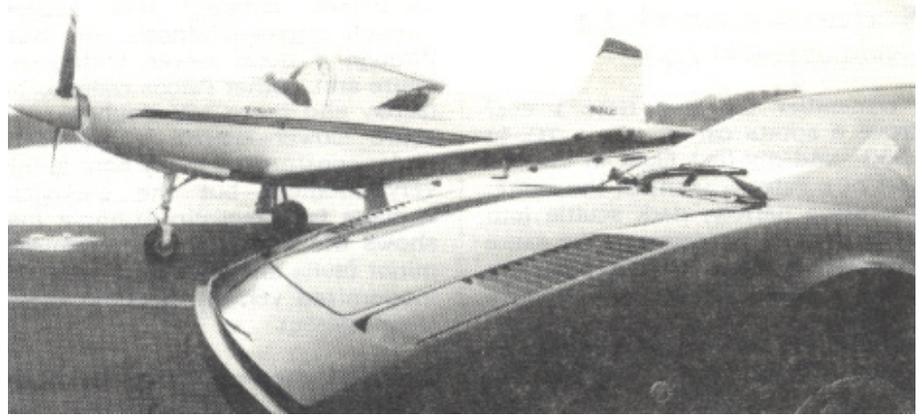
Hansen has also installed full gear doors, and Sequoia's Alfred Scott insists the doors are worth as much as ten knots in speed alone. Hansen is also using a no-filter induction system that he says gains him another 2-1/4 inches of manifold pressure at altitude, as well as a wide variety of aerodynamic tricks.

All three of these airplanes also make use of the most obvious of Nustrini's speed mods: the "Nustrini canopy", offered as an option with Sequoia Falco kits. With a lowered roofline, aftswept canopy bow, steeply raked windshield and gently faired runout from canopy trailing edge to tailcone, the Nustrini canopy looks infinitely better than it works, and it seems odd that many of the same enthusiasts who worship Falco designer Stelio Frati should appear so ready to ignore the cockpit canopy that he postulated as correct for the airplane. (Sequoia's Scott estimates that fully half his current builders plan to install Nustrini canopies.)

The lower half of the laid-back Nustrini windscreen shows enough distortion to confuse the issue of exactly where the runway is when the nose comes up in a flare. The relatively fat windshield frame, a beefy spruce lamination, leans aft to a point where it becomes especially obtrusive in the pilot's range of vision. And worst of all, there's no room under the canopy: I'm five feet eleven inches and had to fly with my head cocked to the right to keep me from constantly rapping the Plexiglas. The Sequoia Falco's moderately reclined, thin-cushioned seats numb your coccyx after about 45 minutes, and though the ache might be eased by a slight shift in position, the Nustrini canopy to your left and the passenger's shoulder on your right literally lock you in place.

Having ridden in a production Falco with the stock canopy and having now flown one with high-speed version, I find the latter a triumph of sex appeal over good sense. Unless a builder is seriously knots-crazed and plans never to spend more than an hour at a time in a Falco, the original Frati canopy should be retained.

The Sequoia Falco has a splendidly modern and effective instrument panel that Scott somehow managed to fit within



"...handling so sweet you'll wonder why you spent twenty years heaving yokes when the opportunity to tickle a Falco's stick existed."

the confines of the haphazard 1950s/60s panel. (The space is tight enough that the front fuselage tank includes a large notch into which the radio racks nestle.) Resembling the panel of a tiny turbo-prop rather than the Royalite-trimmed displays of many singles, it in some ways anticipates the no-nonsense panel of the Piper Malibu.

Power controls are now smooth-acting quadrant levers rather than plungers, and the instrument layout is neat and coherent, with room for a surprising number of wallet-flattening toys, some undreamed of when the Falco was first designed: electric outside air temperature; a panel-mounted, voice activated intercom unit (headsets are a virtual necessity in any Plexiglas-canopied airplane, and the Falco is no exception); an electronic fuel-flow indicator/totalizer; an ammeter and voltmeter *and* an alternator analyzer.

There's also a battery of little miniature-bulb warning lights that some—especially those who have managed to make do without blue and white bulbs to indicate that their strobes, fuel pump, master switch, landing light or nav lights are on—might argue are excessive especially while they glow mindlessly at night. (One logical school of cockpit design holds that nothing should ring, beep, peep, whistle, wink or illuminate unless there's something terribly wrong.)

The only other change I'd make would be to relocate the landing-gear switch to the center of the panel, near the power quadrant. As configured, a takeoff, missed approach or go-around requires the left hand to be on the stick while the right sets and guards the engine controls, then you switch hands to raise the gear, then dance back again to bring up the

flaps with the switch below the power quadrant. (DeAngelo's Falco has an optional left-hand-throttle installation for aerobatics, but even that requires switching hands to reach the flaps.)

I'd expected something close to a neutrally stable airplane, probably because the Falco's controls are so light that ham-handedness makes the machine at first feel unstable. Also, the elevator trim is easily the least-used control in the airplane, largely—I think—because the minor trim changes caused by gear, flap and speed changes are more conveniently dealt with through almost-inadvertent stick pressures than through trim-wheel-cranking. But surprisingly, the Falco is decidedly stable in pitch and after displacement returns to level flight with only two well-damped and moderate phugoids. The airplane also snaps back to normalcy after an extreme cross-controlled skid without any tendency to fall off on a wing, though it's subject to spiral displacement due to the slightest lateral weight inequities. Nobody should consider flying this airplane hard IFR without a wing-leveler (installation of which is fully accounted for in Sequoia's phenomenally complete Falco blueprints).

Instrument flying will be a bit of a challenge in a Falco—at least for those unaccustomed to making tacan approaches while juggling charts and joysticks in F-4 cockpits. A control stick is a dynamically unstable device: it wants to fall over, especially when it's part of control circuitry as light as a Falco's. A yoke would just as soon stay centered, aided not only by its symmetry but by the intermediate plumbing, bicycle chain and bushings between it and even the beginning of the control cables. A Falco on the ILS will doubtless go exactly where you tell it go exactly when you tell it, but I'd just

as soon trundle down the glideslope in a machine that doesn't need to be told quite so often.

Another problem for instrument pilots will be the considerable range between letdown airspeeds of 160-plus knots and the 108-knot gear-extension speed. With power back to twenty inches, it only takes a 500-foot-per-minute descent to put the airspeed right up against the yellow arc (161 knots), and 1,800 fpm down is all that can be managed without exceeding Vne (208 knots). In the real world of instrument flying, that's going to mean occasional engine-chilling descents with power back to idle and the prop at full fine pitch for braking—the only speed control a Falco offers—followed by some interminable deceleration to gear speed that makes you need to plan well ahead for marker inbound. Especially if it's your own loving labor that crafted the landing-gear doors.

(Some would say this is irrelevant for a homebuilt, but Sequoia's Falco promotion does depict an instrument panel replete with dual King Silver Crown navcom, glideslope, ADF, transponder, DME and marker-beacon lights a standard panel fitment.)

The Falco stalls relatively benignly for the high-performance airplane it is. The beautifully harmonized controls—easily the best-matched pitch/roll yaw combination I've ever flown—remain effective right down to the stall, and there's no need to mop the cockpit with the stick to stay in control. There's only the slightest burble before the stall—DeAngelo chose not to mount the leading-edge stall strips that assumedly would give greater warning—but the pitch-down is moderate and straight ahead, power off or on. I'm told the Falco can easily be pulled into a secondary stall, doubtless as a result of overeager recovery combined with the light stick-force-per-g, but normal recovery causes no such problems.

DeAngelo also chose to install non-aerobatic gyro instruments, and as a result of their increasing lethargy has stopped doing aerobatics. Timing a roll resulted in a relatively moderate seventy degrees per second, but a better aerobic pilot could probably improve on that with a more precise, less barrel-y procedure. Construction technique could have an effect as well. A rate of 140 degrees per second was routinely claimed in the late 1950s

for Frati's F.14 Nibbio, a scaled-up four-seat Falco, and Scott consistently clocks his own arrogantly ratty production Aeromere Falco at just under 130 degrees per second. He also points out that each of the two new kit-built Falcos he has flown seemed slower in roll than in his elderly airplane. The Falco's wings and ailerons are subtle shapes, and there may be more than a little legerdemain in the relationship between them—a synergy determined by precise control-hinge placement, correct aileron-gap depth and exacting aileron construction. Still, it was obvious that the light stick and rudder forces, the precisely mated controls and the reassuring solidity of this +6/-3g airplane—it has a main spar the size of a tree trunk and a monocoque melding of the airframe that makes it a super-rigid little splinter—would make occasional aerobatics irresistible even for those of us who find that (as an airline-pilot acquaintance once put it) straight-and-level pays better.

And finally—every pilot's cake-icing whether you're an Italian pastry-maker or not—the Falco's approach characteristics are predictable and its touchdown satisfying. Eighty knots is the approach speed DeAngelo uses, and it not entirely coincidentally puts the ASI needle straight up and down. Though I'm told it's not uncommon on European airplanes, that's a configuration 90 degrees opposed to U.S. usage, which generally has the needle roughly horizontal on approach. Scott's intent, in specifying the design of the instrument face, was to have the fast/slow indications of the needle during an approach analogous to a car's speedometer rather than maintaining the aviation convention of having the nose pushed down when the needle goes up and vice-versa.

Though 80 knots might seem fast (seventy knots would be 1.3 Vso), the airplane decelerates surprisingly rapidly for a machine apparently so slippery. In fact, gear extension alone requires a goodly power application—throttle up to about 21 inches—to maintain level flight on the downwind, and DeAngelo considers normal landing flap to be only 20 degrees of the rather large slotted flaps' full 45 degrees; the latter he reserves for power-on short-field approaches, for he feels it too often leads to a hard touchdown if treated as a standard landing configuration.

The Falco's brakes are relatively small and shouldn't be called upon to save a hot landing halfway down the strip. DeAngelo says he approaches every touchdown as the beginning of a no-brake landing. (Unless builders choose to install the optional pilot's side footwell rather than the standard flat floor, they'll have to remember to steer with their heels during the rollout while keeping their toes from making unwanted brake applications. Most of us who fly roomy domestic iron have gotten in the habit of working them with the balls of our feet, moving toes up to the brakes only when necessary, so this takes a bit of self-discipline in the Falco at first.) The airplane does seem to need nimble feet on rollout, perhaps because the trailing-link landing gear that does such a good job of absorbing touchdown loads also imparts a self-steering action rather than a dead-center tendency.

Is DeAngelo happy with what he hath wrought, now that he has just over 100 hours on the airplane and knows where his \$35,000 went? (You'll spend a lot more than that on a kit-built Falco today, but Jim bought when prices were lower.) "I'm not trying to overglorify the Falco," he says, "but it's a terrific little plane. A helluva lot better than some of the professionally made airplanes I've flown. Down low, it feels like a sports car, and up at altitude, it's a totally different, smooth-acting cross-country airplane. And on the ground, it's a sporty-looking aircraft that everybody likes to look at. Frankly, I enjoy the attention."

And how about me? Did I assume I was building a placid, quiet, ordinary cross-country machine? In that case, I'd be busy writing a 'Falco parts for sale' ad instead of this article after flying DeAngelo's airplane. Was I a low-time pilot for whom stepping up to a Piper Arrow meant the big time? I'd now be convinced the Falco would eat me up, were that so. Was I depending on the Falco to be an idiot-proof IFR sedan? I'd best start practicing patting my head and rubbing my belly while folding a chart.

No, the Sequoia Falco is not any one of these things but a remarkably special airplane that offers a fair measure of the virtues for which American production machines remain unsurpassed—cross-country, VFR/IFR capability—but that could also have me doing something I've never done before: driving to the airport to go flying simply for the fun of it.—*Steve Wilkinson*

Goings On at Sequoia Aircraft

Continued from First Page

so I thought!—it still took three weeks to complete the fuel system drawings and to get the kit going. So we now have both drawings and kits. The fuel system turns out to be real money, much of it going to things like fuel selector valves, gascolators, and hose assemblies—none of which are cheap. But the list of parts goes on for a page-and-a-half. I'd just as soon not have the honor of putting all of this together, but the kit does save you from buying one-of-this and six-inches-of-that.

It is also a mistake to call it a fuel system kit, since I threw in the Aeroduct tubing for the alternator cooling and cabin heat. We do not have the cabin heat muff as part of this kit yet, but I hope to do that at some point. While we were buying Aeroduct, I included the induction system as well. We do not yet have the NACA scoop or "funnel" out of the induction filter, but you've got the rest in the kit. The whole thing is just a stupid little kit of a lot of parts, all of which you need to finish the plane.

I have also finished a drawing for an induction system for the O-320-B engine, which has the carburetor on the bottom. This is a design I roughed out some time ago for Jimmy Shaw and recently completed for Neville Langrick. The design borrows from the Swearingen SX-300 induction system. It is a RAM air system with a straight-in three-inch tube with a bypass valve for filtered air which is taken from somewhere below or behind the engine. It isn't the easiest thing to make, but it is easier than the carburetor box used on the old production Falcos. The result is also rather good looking.

I am working on some new drawings for the control stick, control stick support, and rudder pedal torque tubes. The control stick will have a slightly tighter bend so the top of the stick grip will be about 2-1/2" lower than the old one. On the previous stick used on production aircraft as well, you grip the stick at the curve. I don't mind this, but it places the microphone button on the top of the stick a little too high so you have to move your hand. The only change in the rudder pedal torque tube is covered in Revision G7c1. The other drawings involve no changes and are just better drawings for production of the parts.

As you can guess from this non-standard revision number, some of the sheet numbers are in transition. As I have done in the past, I am "overhauling" the drawings for greater clarity. I also move things around. I intend to put the rudder pedal torque tubes on the same sheet, but I have already finished a new sheet G7d which shows the fuel system components. I suspect that I will not have the next package of drawings ready to ship until after I have all of the fuselage drawings overhauled since I plan to move many of the installation details there, just like on the wing.

We now have new drawings for the two dynafocal engine mounts. These drawings just record a number of very minor changes we have adopted over the years in our production. Some of you have noticed that there were some little things that were different about the engine mounts. These were all intentional. Now the drawings have caught up with the parts.

I have also overhauled the nose gear drawings. There aren't really any changes but the various parts are shown in a more logical way and all past revisions are incorporated in the drawings.

I hope to finish two more drawings shortly, one for the nose gear door which attaches to the trunnion and one for the nose gear bay doors.

We are also putting together a gear doors kit, again at the encouragement of Pawel Kwiecinski. At this time, the kit does not include any of the fiberglass doors, but it does include all of the hardware—the hinges, pushrods, brackets, and other little pieces. I hope to add the doors after I can figure out a way of making wheel well doors that will fit everyone's airplane. The basic kit includes the parts for the

main gear doors, and all three nose gear doors. The wheel well door kit includes the parts for the main gear wheel well doors only.

I recently wrote a guide on purchasing an engine, covering the subject all the way from buying a new engine, buying an overhauled engine, right down to doing your own service limits overhaul with the help of a mechanic. This is intended to make a knowledgeable purchaser of you and to eliminate any questions as to what you should expect to get with your engine. In the past there has been some confusion, and this will make it easier. You can, for example, just send a copy of our specification for an engine for the Falco to an overhauler and ask him to quote on *that*.

In the process of doing research on the guide, I talked to Mattituck, one of the largest and best overhaulers in the U.S. Mattituck is now part of Aviall. As an aircraft manufacturer, we get a 20% discount on the overhaul. We are not soliciting such orders, but we will handle orders for Mattituck engines for our cost plus \$300.00. We have done this for two builders now, and it's a good way to get a top quality engine at a reasonable price.

I have recommended High Performance Engines in the past. Recently an article appeared in *The Aviation Consumer* regarding some problems that were reported to the magazine. The controversy centers around John Youngquist, owner of Graphics Engines Monitors. Mr. Youngquist took delivery of six cylinders for the Continental IO-470 engine in his Bonanza. After 22 hours, all six cylinders were burned up. Associates of Mr. Youngquist now admit that Mr. Youngquist was engaged in a race with another aircraft (he lost) and ran the engine as hard as he could. Continental





engines are rated for full power for only five minutes. Mr. Youngquist demanded new cylinders. High Performance agreed to replace the cylinders if Mr. Youngquist would return the damaged cylinders, since they wanted to know what had gone wrong. Mr. Youngquist refused to return the cylinders and High Performance reports that he said "If you don't do exactly what I want you to do, no matter who's at fault, then I will use *Aviation Consumer* to ruin you."

I have talked to the reporter at *Aviation Consumer* regarding this. His conclusion is that over a three-month period in 1986—when Terry Capehart had just sold the business to John Watkins, while they were short of help, and while the new owner's wife was dying of cancer—High Performance Engines let their quality control slip and shipped a few bad engines and had the distinct misfortune to ship a few marginal cylinders to the hard-charging, abrasive Mr. Youngquist, who was already angry with High Performance over the late delivery of the cylinders. The reporter also feels that in porting the cylinders High Performance may have exceeded its legal limit to modify the engine without obtaining an STC. He reported that the cylinders were examined by George Altgelt (Altgelt invented the process of chrome overhauls and is the acknowledged expert on aircraft cylinder design) who reported that at least one of the cylinders had not been honed and thought that too much metal had been removed from around the intake valve on the one cylinder he cut in two. He also said that *The Aviation Consumer* has received a few letters from owners of Continental engines who reported some problems with their cylinders ported by High Performance.

The reporter had talked to many people who have bought engines from High Performance and noted that most report a high degree of satisfaction. One Mooney speed merchant has bought 25 engines from High Perfor-

mance and was happy with the engines with the exception of some chrome cylinders, all of which were "furious oil burners". They report that High Performance very willingly replaced the cylinders and were much easier to deal with in this regard than the Lycoming factory. The *Aviation Consumer* reporter also mentioned that he had not heard of any similar problems with Lycoming engines overhauled by High Performance.

In ordinary circumstances, an engine that has been ported will run about 10°F cooler due to the higher flow of air, better exhaust scavenging and since the flow of fuel in an injected engine is limited as well as metered. My take on the Youngquist brouhaha is that High Performance may have been a little too aggressive on porting and thinned down the cylinder head, but that this had nothing to do with six equally overheated cylinders. Okay, so maybe some of the cylinders were not honed but this would not have caused all six cylinders to have burned up.

It sounds like Mr. Youngquist overheated his engine and wants to blame someone else. Remember, Mr. Youngquist is the proud designer of an engine monitor that is supposed to warn against overheated cylinders. It couldn't possibly be his fault—not if he wants to continue to sell the monitors! And when you consider that High Performance consistently gets praise from its customers for fixing problems and replacing parts, Mr. Youngquist comes across as having been unreasonable.

Continental has always gotten a little more power out of their engines than Lycoming, and as a result they have been a little less tolerant to abuse. High Performance is in the process of getting an STC for the porting and as part of this has developed a method of checking the thickness of the metal. They have found a surprising variation in the thickness of the metal on the cylinders they receive. High Performance has over

2,000 cylinders and a few problems with Continental cylinders is not surprising.

From all of this, my conclusion remains that a Lycoming overhauled by High Performance Engines is the ultimate engine for a Falco.

I don't know what happened to Mike Lamb, the one-man tire company who supplied our nose wheel tires. He seems to have disappeared, but the tires are available from Desser Tire and Rubber Company at a slightly lower cost. The tires were always made in Taiwan and the only difference is that the tire now have Desser's name on them. It will be a little easier to order since Desser has an 800 number and takes credit cards. See the new entry for Desser in the price list.

Some builder have reported that the 2-64 threads on the upper drag strut were a little tight and they had to tap them out for the screws. It turns out that the screws supplied with the microswitch have 2-56 threads instead. I don't know where I got the idea the threads were 2-64, but they sure ain't. You can just run a 2-56 tap in the threads and it will be all right. The difference is only 8 threads in an inch, and the screw will hold fine with the reworked threads. The screw doesn't go in that deep, and there will be plenty of good threads.

Karl Hansen is beginning to think about building another Falco, but only if he can come out of his present Falco with enough of a profit to make it worthwhile. In real estate, sellers always do better when they list houses with an agent, and those who try to sell their own property frequently don't get full price for the property. I think the same will be true of selling a Falco, and Karl agrees.

Frank Strickler at Fox 51—of "Denton, America"—has been extremely successful at selling the SIAI Marchetti SF.260. With the price of a new SF.260 at something like \$225,000.00 and hard-to-get from the uncooperative factory even at that price, I think Fox 51 is the place to go when you want to sell your Falco. Karl and Steve Hansen have not yet completely made up their minds, but it looks like they will take it to Fox 51 after Oshkosh and see what Frank can do. And if they don't get a pile of money for it, it goes back to California. Either way, Karl plans to keep himself in Falcos—building or flying, both of which he enjoys.

—Alfred Scott

Respirators

This article is by Falco builder Steve Wiczorek, who is Senior Engineer for Finishes, Materials and Processes at Sikorsky Aircraft.

I want to persuade all Falco builders to use air filtration respirators during sawing and sanding of wood, and during painting. I can hear the complaining already. Yes, a few of you out there have built several airplanes and have gotten away without using any type of breathing protection. So, why should I use something that is heavy, tight-fitting, cumbersome, and a general pain-in-the-neck to wear?

Doctors trying to stop the spread of AIDS face a similar problem with African tribesmen, who don't believe that you get it from sex because they never got AIDS before.... So it is with painters who have sprayed for years without any serious problems, but epoxies and polyurethanes are very dangerous. I know a painter who didn't believe in masks and started shooting polyurethanes. One day the man collapsed, was rushed to a hospital and today this 45-year-old man is on life-support oxygen—he carries a bottle at all times. The condition is permanent and will never improve. Do I have your attention?

First let's take a look at wood dust. Wood dust has been considered to be an unpleasant but unavoidable aspect of building a wood airplane. In industrial/commercial facilities, vacuum filters are often connected to power saws and sanders. But in our home workshops, where in most cases we don't have these vacuum filters, we still find ourselves breathing more wood than we like, producing symptoms of sneezing, coughing, runny nose and phlegm. To some degree these are natural reactions, as the body traps and moves dust up and out of the respiratory tract. But the body's defenses can be overloaded.

Just how hazardous is this dust? Inorganic dusts from coal, silica and asbestos have long been known to provoke serious lung damage. Recent research strongly suggests that the relatively large-sized particles generated by sawing or sanding wood also pose a threat, not to the lungs but to the upper respiratory tract. A report in the *British Medical Journal* described an unusually high rate of nasal cancer among furnituremakers in the Oxford

area. This disease occurs in only 6 out of 10,000,000 people among the general population each year, compared to 7 out of 10,000 among the furnituremakers, often in factories lacking dust-collection systems. The disease was not found in wood finishers, who typically work in separate shops, suggesting that nasal cancer is linked to dust rather than to chemical exposure. Neither were high cancer rates found among carpenters, who worked mostly outdoors where dust doesn't persist. I'm not suggesting that you will get cancer if you don't wear a mask, but you should be aware of the potential danger.

There are three ways to reduce your exposure to dust. In some situations you can choose another tool that produces less dust—a plane, for example, can be substituted for a belt sander. Second, you can trap the dust at the source, using vacuum collection. Adequate ventilation is the best defense against respiratory dangers, but for those who won't or can't spend the money for a dust-collection and ventilation system, the third alternative is to wear a mask.

Many woodworkers use "nuisance dust" masks, which are designed to trap large diameter, non-toxic particulates. These masks offer fairly good protection for general woodworking, but they are inadequate for dusts released from home insulation, chemically treated lumber, or allergenic species of wood.

Given the new-found danger of wood dust, it is better to use what the National Institute of Occupational Safety and Health (NIOSH) approves as a "toxic-dust" mask, which provides about twice the filtration efficiency of nuisance dust masks. NIOSH-approved disposable toxic-dust masks include 3M's model 8710 and Norton's model 7170, which can be purchased locally from a building supply retailer.

To provide yourself with the best possible protection, I recommend you use a NIOSH-approved toxic-vapor respirator. One of the best—and most comfortable—toxic-vapor respirators is the 3M 7200S (small-medium)/7300S (medium-large) Dual Cartridge, Half-Mask Respirator, Facepiece-Silicone. This respirator is designed to be used with several different types of pre-filters and disposable filter elements. This is the mask we use at Sikorsky, and I recommend that you use it, too.

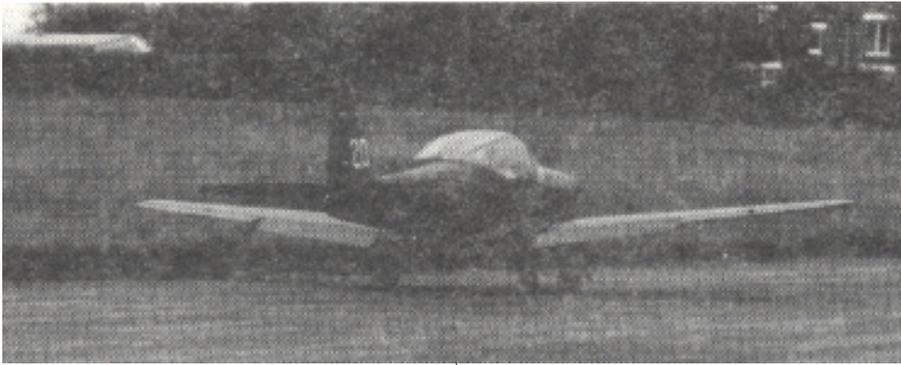
For sanding and sawing of wood, sanding of polyurethane, epoxy, lacquer, enamel, organic vapors and dusts, fumes and mist, use the following filter arrangement: 3M 7200S/7300S Respirator with 7255 High Efficiency Filter, 7251 Organic Vapors Cartridge and 7287 Cartridge Retainer. This filter/cartridge arrangement is to be used for sanding and sawing of the above materials only, and is *not* to be used for spraying of any paints or topcoats—those filters are discussed below.

Painting is one of the most satisfying and rewarding aspects of building a Falco; however, the use of a respirator is absolutely essential for your good health. Many paints, thinners, and cleaning solutions you use are poisonous, and you can get sick unless you take adequate precautions to avoid breathing the vapors. Some spray painters neglect to wear proper respiratory protective equipment because they have never noticed immediate bad effects from exposure to vapors which they have been told are harmful. This practice could permanently damage your health before the effects become noticeable, then it is too late.

Isocyanates, which are used as a solvent in some primers and most polyurethane topcoats, may irritate the respiratory tract of individuals coming into contact with the vapor or spray mist. To prevent this, always use a respirator. Symptoms of this irritation may include watering of the eyes and a burning sensation in the nose and throat. The severity of the irritation depends on the individual and the degree of exposure.

Isocyanates may also cause a sensitization response in some individuals. The sensitization response can range from a mild wheezing to a severe asthmatic type attack. You are considered to be sensitized to isocyanates if you respond to airborne isocyanate levels much lower than those which cause an irritation response in most people. You may become sensitized after a trouble-free period of exposure. Sensitization is a permanent condition, so sensitized individuals should be permanently removed from all further contact with isocyanates.

Volatile organic solvents, used in some primers and most polyurethane topcoats, may also cause irritation of the respiratory tract or acute nervous system depression characterized by headache, dizziness, staggering gait or confusion.



Exposure to extremely high airborne solvent levels such as those found in confined spaces may lead to unconsciousness, coma or death. Some reports have associated prolonged and repeated occupational overexposure to solvents with permanent brain and nervous system damage. Effects include concentration difficulties, diminished manual dexterity and memory loss. It should be noted that the above comments apply to organic solvents in general, not only to those used in aerospace coatings.

I should explain that epoxies and polyurethanes attack your body in two distinct and separate ways. Sensitization is a condition whereby the chemical compounds enter your system through your lungs or skin—*isocyanate* solvents penetrate the skin quite easily—and cause a change in the cells of your body which brings about the allergy-like reactions. With epoxies, the onset of sensitization is often very sudden. With *isocyanates*, some of the symptoms, like a change in personality, appear gradually.

The other is what I will call *lung-coating*. Whenever you work with epoxy or polyurethanes, microscopic liquid particles settle on the membranes of the lungs, attach themselves and harden. These particles are not bio-degradable, and they remain with you for the rest of your life. They physically block the absorption of oxygen. This *lung-coating* occurs even when you are working with epoxy resins with a brush although very little damage occurs from occasional use. The serious *lung-coating* damage comes from spraying epoxy primers and polyurethane topcoats and breathing this mist. (Dust from sanding cured epoxies and polyurethanes is chemically inert and is expelled by your lungs like ordinary dust of wood, soil, etc.)

With *lung-coating*, some damage occurs every time you breath the paint spray. Some people develop a shortness of

breath before a complete collapse, but most often the onset of the symptoms is sudden, like that of my friend who now carries an oxygen bottle. Thus, the damage is progressive, and you can be tricked into thinking you're fine until suddenly it's all over.

People who get into trouble with epoxy resin usually become sensitized. This means they can no longer work with epoxies, but otherwise can lead normal lives. Painters who get into trouble usually do so from *lung-coating*, and this permanent damage remains with them until their life's end or lung transplant. Painters may also be sensitized and their personality may be permanently altered, but this is a minor inconvenience compared to the damage created by *lung-coating*.

For spraying polyurethane, epoxy, lacquer, enamel, or working in an environment of organic vapors, dusts and mists, use the following respirator and filter arrangement: 3M 7200S/7300S Respirator with 7256 Spray Paint Pre-Filter, 3M 7251 Organic Vapors Cartridge, and 3M 7287 Cartridge Retainer. Note that this is exactly the same respirator but with only one change in the filters. Again, this is what we use at Sikorsky.

For the name of a distributor near you, contact Occupational Health & Safety Products Div/3M, 220-7 W 3M Center, St. Paul, MN 55101. Telephone (612) 733-8029. 3M says that Sears sells their painting respirators, but unfortunately I don't know what the equivalent part numbers are.

I hope I haven't painted a gloomy picture for you. I do hope I've impressed upon you the necessity of using safety precautions when working with modern state-of-the-art materials. Remember, we ultimately want to enjoy for many years the fruits of our labor... and the way I spell that is F-A-L-C-O!

—Steven C. Wiczorek

Brenda's Corner

It's Oshkosh time! As usual, I will be driving to Oshkosh to bring the Falco exhibit, and if anyone would like to pick up a kit we will try to make room for it in the van. The last few days before I leave are very hectic around here, so please give me a couple of weeks notice. There will be no one in the office while we are at Oshkosh, so if you think you are going to need anything between July 28 and August 7 keep that in mind.

The annual meeting of the PTF Club (formerly known as the Falco forum) will be on August 4 in forum tent number 6 at 8:45 AM and will last until 10:00 AM. Come prepared to praise the Falco! Reverend Alfred will be asking you to make "sacrificial donations" to the air-conditioned dog house fund!

The Falco/S.F.260 dinner will be held on August 4, at Martini's Restaurant in the Midway Motor Lodge in Appleton again this year. Our private bar opens at 7:30 and dinner will be at 8:30.

We will have prime rib, since the kitchen cannot handle ordering from the menu for a group as large as ours. They will do their best to see that everyone's prime rib is prepared like you want it, but if it isn't they will be happy to send it back to be cooked more. Also, if need be, they will accept orders from the menu. Family and friends are welcome to join us on this very casual evening.

If you need transportation, don't let that keep you away, just stop by the Falco exhibit and tell us, and we will arrange a ride for you. We need to let the restaurant know how many are coming, so please let me know if you plan to attend and how many will be in your party.

We still have a room or two available at the Paper Valley Hotel in Appleton for every night except July 31 and August 1. Please let me know immediately if you need one of them.

This year we will have a couple of newlyweds among our midst at Oshkosh. Actually, they are eloping (every father's secret dream) to Oshkosh. So far, their only disagreement has been who is going to fly their Falco first.

I look forward to seeing many of you at Oshkosh. Please be sure to let me know if there is anything I can do to help you.

—Brenda Avery

Construction Notes

Steve Wilkinson recently finished skinning his wings, and I asked him for his comments on what wisdom he could pass on that had not been included in the construction manual or Karl Hansen's notes published in the last builder letter. Steve's report:

There's really little I can add to the wing-building procedures outlined in the builders' manual. Certainly the vertical orientation of the wing is the way to go. I hadn't thought it would make much difference one way or the other in terms of ease of construction, but I sure would hate to have had to do much of that work leaning over the wide inboard portions of a horizontal wing (or worse, *under* one). Even carefully brushing glue on to a sheet of plywood in the horizontal position on the workbench can give you a backache after a few minutes of straining toward the far edge, so the benefits of sanding, stapling, gluing and doing everything else at normal height, as though you're working at a blackboard, can't be over-estimated.

The only thing I had trouble with was bending the plywood over the leading edge. It looks so easy, and seems so neat in the builders' manual drawings: two scarfed sheets lapping over each other in a firm embrace and all that. In real life, I was just as likely to get the sheet lapped over 80 or 90 percent of the leading edge... and then, lo and behold, a yawning quarter-inch gap where there should be a glue line, when I cut away the one-by-one board glued to the excess plywood for use as an anchor for the inner-tube rubber bands that snug down the prebent plywood.

The problem is that the location of that one-by-one is relatively critical: leave too *much* excess plywood and the pull of the rubber bands (or even of bar-clamps, which I also used) tends to bow the sheet. Put the strip too close to the area where you're going to be scarfing the finished plywood and you'll have a messy job cutting it free, for it too will be glued to the wing. It's also a help to use cabinetmakers' clamps cinched over two opposing one-by-two clamping strips, one on each side of the leading edge, once everything is in place. And you *must* staple down the plywood all the way up to and onto the beginning of the leading edge radius before initiating the bending, else it will lift from the forward portions of the ribs.

When applying the lower skins, the anchor points for the rubber bands (and/or bar clamps) that do the bending can be the exposed main spar. When you apply the top skin, of course the main spar is covered, so you need to use a two-by-four that bears against some adequately strong members clamped to—and perpendicular to—the main spar where it still is exposed. When I got to the last sheet—the outermost upper wing skin—I found that I was still able to use a 2x4 of moderate length by using as one of my clamping points the padeye of the jackpoint already installed on the wing. (There's not *that* much clamping pressure on the two-by-four—certainly not enough to strain the padeye longitudinally.)

Another caveat: After wetting and prebending 2.5 and 2.0mm sheets for the inboard wing sections, when I got to the 1.5mm sheeting I thought, "Oh *this* stuff is so flexible compared to those obstinate thicker sheets that I won't have to wet or prebend it... I can just whip this into place by hand." A mistake, I quickly learned, for yes, you can bend it around by hand in a trice, but it'll crack. The soaking and prebending is not only to make it *possible* to bend plywood around a small radius, but to make it possible to bend it without *cracking* it.

Drilling the Gears in the Retraction System

Despite my best efforts, when I drilled that shaft for the spur gear at the top, it somehow moved very slightly out of alignment—I can hardly believe it, it was so tightly secured—or the method of attaining gear-meshing by using a strip of grocery-bag paper, mentioned in a recent builder letter, didn't work for me.

Anyway, after all that effort, it seems to me the proper assembly technique ought to be to simply assemble and clamp the shaft so the miter gears in the box fully mesh (i.e. mesh slightly too tightly), then drill for the roll pin through the spur gear and shaft, *then* shim the spur gear (with AN960-816L washers) for the perfect mesh of the miter gears. This will spare builders a lot of worry about achieving and maintaining critical mesh before drilling, and a lot of hassle involved in clamping, securing, locking and building some kludge that's impossible to wrestle onto a drill-press table.

This will also give a better mesh of the spur gear with the retraction motor gear, if that matters. The method suggested

in the manual (i.e. mounting the spur gear so that it rides "snug against the bearing" in the box framework) actually can't be achieved: what you get is the spur gear riding tightly against the milled upper surface of the box framework, since there's no shoulder on the inside "bottom" of that spur gear to ride against the bearing. That doesn't seem to me entirely right, and by shimming the shaft and gear slightly—even though it's the mark of a "misdrilled" roll-pin hole—you at least get the spur gear up off the box framework and into full mesh with the motor's drive gear.

—Steve Wilkinson

Steve's problems with the spur gears are because a few spur gears were made without the shoulder on the "bottom" side. This is a perfectly usable gear but requires an AN960-816 washer as a spacer. I thought we had caught all of those. If you have such a gear, drop us a note, and we'll send you a washer.

Fire Protection for the Nose Gear Bay

At various places in the construction manual, I mention lining the nose gear bay with stainless steel. This was done on the production Falcos, although the nose gear bay cover was aluminum.

It's difficult to say where the firewall should stop, but in the event of an engine fire some flames would enter the nose gear bay. The idea of a firewall is to get you back on the ground without scorching yourself. The nose gear bay, then, is a proper candidate for some sort of fire protection, but stainless steel is probably an impractical solution for most builders. Stainless steel would do a good job of protecting the wood, but would do nothing to protect the fiberglass nose gear bay cover—the weak link in the chain.

You could use Fiberfrax ceramic paper to line the nose gear bay cover, but I think a more practical solution would be to use one of the flame blocking paints that have been recently developed. These paints look like a dull house paint but at about 200°F they blister up into a foam and this foam gives relatively good protection. I don't have any exact brands to recommend to you right now, but I know that Wicks sells a paint of this type. Quickie Aircraft used to sell "Liquid Firewall", which I understood to be a Fiberfrax-like ceramic insulation slurry in a paint. As this is Steve Wieczorek's department at Sikorsky, he is going to look into this.

Covering and Painting

Joel Shankle has just finished covering his Falco and reports "I can't say enough good things about the West System." Joel used epoxy and microballoons to fill any low spots in the plywood and then sanded the micro smooth—being careful not to scuff the plywood. Next he added the fiberglass cloth and squeegeed the resin out so that was no extra weight. This left a rough surface of the fabric. After the resin was hard, he mixed up a cup of dry micro—resin and micro but a very dry mix—and filled the weave. One cup did the entire wing.

Joel sanded the wing smooth and the next steps are Featherfill, sand, primer and paint. This is the normal process used on most fiberglass airplanes. Steve Wiczorek says that a better procedure is to first spray a very light coat of primer (1-1/2 to 2 mils—just a translucent haze) and sand this. This gives a better bond to the substrate. Then add a sanding primer like Featherfill, sand this smooth. Shoot the primer (do not sand this) and then shoot the final topcoat.

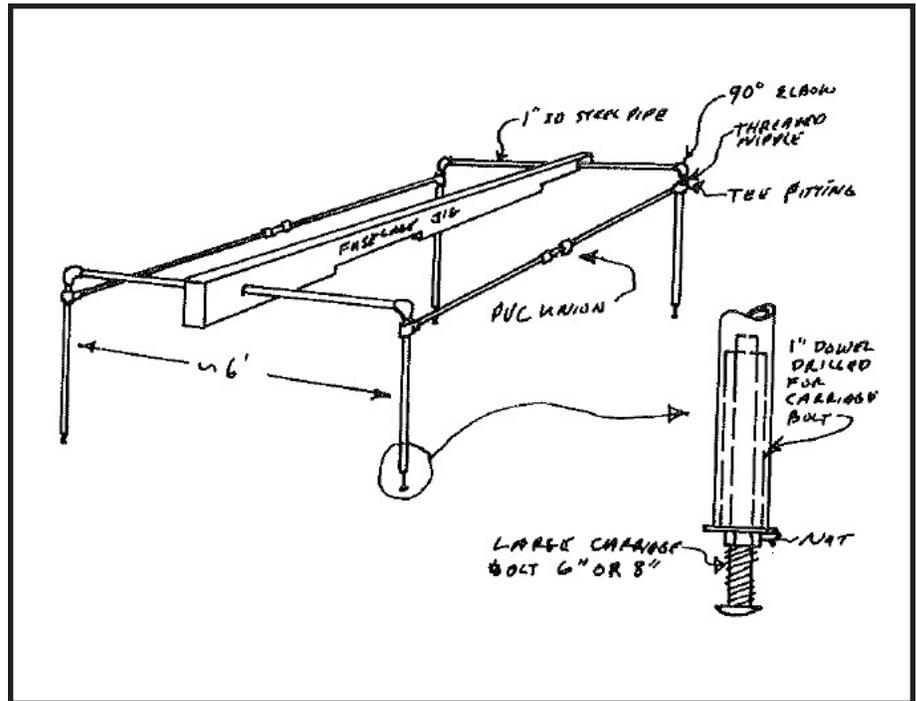
At Sikorsky they do not use Featherfill. Featherfill is a polyester, and polyester does not adhere as well as epoxy. Instead they use U. S. Paint's Awlquick, an epoxy sanding primer which sands as easily as Featherfill and has better adhesion.

Nose Gear Steering

I continue to get questions from builders about the function of the little bronze rollers on the nose gear steering arm. Builders put all of the pieces together and then are surprised to see the roller below the rocker arm on the top of the nose gear. This is correct. The rollers do not contact the rocker arm when the gear is down.

The rollers are there only to align the nose gear when the controls are crossed up. If you put in full right rudder while selecting gear up—and later hold full left rudder when you lower the gear—the rollers will kick the nose gear straight. It is a devilishly clever device and the best way to understand it is to watch it in action.

I also hear from builders who worry about the possibility of jaming the nose wheel tire against the nose gear screwjack. It is true that if you select full left rudder when you select gear-up, the tire will hit the screwjack, and this



will cause the circuit breaker to pop. (It is also true that if you put your foot through the windshield, it will break!) Because this will only happen as a result of a deliberate attempt to screw things up, and because a popped circuit breaker is hardly anything to be concerned about, you don't need to do anything about this.

And before you fix this "problem", get a ride in a Falco and try stomping full left rudder. The Falco has a powerful rudder! You will have a hard time finding a Falco pilot who would sympathize with the "problem".

Andy's Steam Jenny

When it came time to bend the plywood at the tips of the elevator leading edge, Andy Loncarevic "appropriated" a pressure cooker from his mother. On the top of a pressure cooker, there's a little weight on top of a tube that lets excess pressure out. Andy took the weight off and shoved a quarter-inch ID hose on the tube. He put some water in the cooker and put it on a hot plate. To bend the plywood, he just blew the live steam on the plywood and pulled it around as pretty as you please.—*Alfred Scott*

Steve Wilkinson's Black-Pipe Fuselage Jig

I am working on a chapter for the construction manual on building the fuselage. In it, I describe supporting the fuselage jig with two posts—one in the nose gear bay where it will be out of the way, and the other a "split" post of two boards on each side of the

bottom center longeron at the tail section. Obviously, you will need to brace this well.

But before I got him a copy of this chapter, Steve Wilkinson built a support with pipes, which considering the undulating nature of his barn floor was probably a good idea. So, if you have a ready supply of pipe and if your floor is like Steve's, you might want to consider his method. Here's Steve:

My wing rests on two Sears Jackposts and a one-by-two leg clamped to the rear of bulkhead #6. The stand for the fuselage jig is made of standard black steel plumbing pipe, threaded where appropriate, and ordinary hardware-store fittings. It's a very robust affair, adjustable at each foot, and requires no skill and universally available materials to construct. Just like the Falco, in that sense. I had virtually all the pipe and fittings already, so that made it especially cheap. If you start with nothing, however, it won't be: pipe ain't cheap, threading costs extra and the fittings are each \$2 to \$5.

But it's as solid a stand as I can imagine, and is easily adjustable to any flooring variations, levelable in every direction. If you've seen my barn, you'll know why I needed *that*. It'll move if you grab it with two hands and heave, but you aren't going to just bump it out of position. The "bedstead" of mine is wide enough that I work inside it, but I suppose one could also make it narrow enough to stand outside the frame and work "through" it.

—Steve Wilkinson

Tool Talk

Does everybody know about glue injectors? I find them quite helpful in one specific situation: when I've bent skin around something like the wing leading edge and didn't get it entirely glued, then need to get glue up into the crack between skin and leading edge in order to reclamp everything and get it fully fastened. (It happens.) Sometimes it's only a pocket a few inches long that needs to be touched up, but it's no problem with a good glue injector. Squirt some Aerolite well up into the void with one injector then some hardener with another.

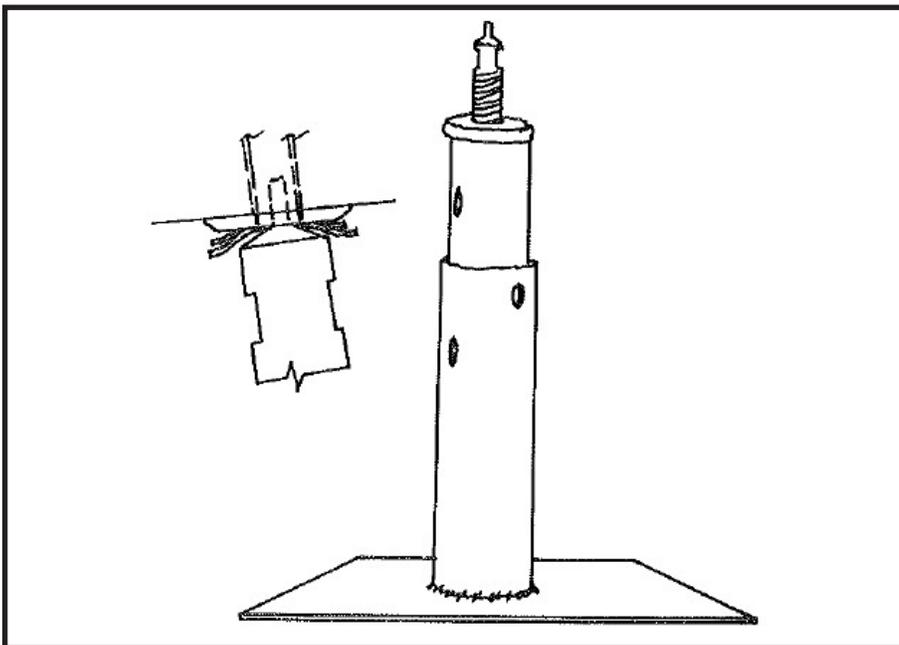
The only place I've ever seen them is in the Garrett Wade catalogue: they call them "glue syringes" and sell a package of three for a big \$3.75 (item #63J01.01). Garrett Wade's telephone order numbers are (800) 221-2942 and (212) 807-1757. The syringes are plastic with a very tight-fitting rubber piston and curved tips that come to quite a fine point—so fine, in fact, that I have to shave a little of it off in order to get a big enough orifice for the Aerolite to come out at a reasonable rate. The syringes are easily cleaned with water after each use. Obviously, you use one syringe for glue, another for hardener and keep the third for casual mainlining when you glue the last wing panel on and realize you've left your 5/16-inch box wrench inside the wing.

My wing rests on two Sears jackposts and a one-by-two leg clamped to the rear of bulkhead #6. Each jackpost is welded to a foot-square steel-plate base

and has a large threaded pin at the top modified as shown on the drawing. I had mine welded perpendicular to the footing plates and I shim the footings slightly so the jackposts sit at an angle to match the dihedral of the wing, but you could also take the trouble to cut the bases of the jackposts at an angle and weld them to their footings so they sit slightly cocked and thus enter the jackpad squarely.

They aren't something you'd want to go into the A&P business with, jacking half a dozen airplanes a day, but for the number of times I'm going to be jacking the Falco up and down, the price is right: \$30.98 for a pair of short Sears jackposts, \$9 for shipping and \$15 for the necessary welding. The jackposts come in a variety of lengths, from one foot on up to eight. The ones you want are the next-to-the-shortest, and the range of heights attainable is 20" to 36", with infinite variations in between attainable by turning the threaded rod and/or sliding and resetting the inner bore of the jackpost. They are Sears #64 F 99793C, \$18.49 apiece or \$15.49 each for two or more, and they will support 16,000 pounds *each*. Should be enough for a fully fueled Falco.

I know you said Dave Aronson knocked his airplane off his jacks, and I'm sure you could do that with this rig as well, but that's why they put signs all over airplanes that are sitting on jacks: you can knock a Bonanza off a thousand-dollar set of hydraulic jacks, too, if you jump up and down on the wing walk enough times.—*Steve Wilkinson*



What happened to Dave Aronson was that his home-made jacks failed and collapsed. When I was in his shop, the Falco was on a very sturdy jack under each wing and the tail was pinned in place to a pipe in a cut-down barrel filled with concrete. It was remarkably solid—Dave Aronson and John Holm would leap on to the wing walk from a run.

The top of the Sears jackpost comes with a flat top, which Steve filed to a conical contour and then welded a small pin/extension to the top center. He cut a couple of rubber pads from an inner tube to protect the treads of the jack pad fitting. The little finger on the top of the jack could damage the threads in the aluminum jack pad fitting. When you tie the airplane down, you use the eyebolts supplied, but when you jack the airplane, you should use a bolt in the fitting.

There are two schemes, depending on whether the top of your jack is a "male" or "female". In either case, start with a 7/16-20 x 1-1/4" hex head bolt (with threads all the way to the head) and a large hardware-store washer. Many people braze the washer in place. If the top of the jack has a depression, then you can just grind the head of the bolt to a nice spherical radius to fit. In some cases, I've seen where builders have enlarged the head with gobs of braze and then ground it to a spherical radius.

If your jack has a pin on the top, then you have to modify the head of the bolt so it is a matching cup. Again, you can enlarge the head with braze and then grind out a depression. I'm not sure if most FBO's jacks are boys or girls, but it is a good idea to make up some jacking bolts and keep them in the airplane in case you get caught far from home and need to jack the airplane.

In the wake of Richard Brown's accident, Jim DeAngelo came up with a common-sense suggestion for a dip-stick for your fuel tanks. Get one of those folding wooden carpenter's rules and cut it off so it's just long enough to dip the two tanks. Scrape the "inches" off the ruler—or just paint the thing white—and then when you fill the tanks for the first time, mark your folding dip stick at each gallon. One side of the dip stick is for the front tank and the other for the aft tank. Put it in your battery compartment and use it whenever you find yourself in doubt about how much fuel you really have in those tanks. It's a good idea—everyone should do this.—*Alfred Scott*

Sawdust

• According to *Air & Space* magazine, "Voyager pilots Dick Rutan and Jeana Yeager will be immortalized in a movie based more on their relationship than on their accomplishment." Heritage Entertainment president Skip Steloff foresees the plot as "an incredibly beautiful love story." *Whaaa?! This is the same jerk who hogged the wheel for 85% of the flight? The same bighearted fellow who wouldn't get out of the driver's seat for the first sixty hours, electing to sleep sitting up while his "partner" monitored the autopilot? After a terrible thunderstorm-filled night, they crossed the west coast of Africa and the male ego announces on the radio "I'm coming home." What's the matter, Dicky-boy, never heard the word *we*? Then after landing, this sweet fellow never even gave the girl a glance or acknowledgment that she was even part of the flight. What a guy! It was a tremendous flight, done with *two* lives at enormous risk, but gimme a break about the "love story".*

• Everything you ever wanted to know about wood and more: "The speed of sound in a structural material varies directly with the square root of the modulus of elasticity and inversely with the square root of the density. The speed of wood varies strongly with grain angle since the transverse modulus of elasticity may be as small as 1/20 of the longitudinal value. Thus, the speed of sound across the grain is about one-fifth to one-third of the longitudinal value. The speed of sound decreases with increasing temperature or moisture content in proportion to the influence of these variables on the modulus of elasticity and density. The speed of sound decreases slightly with increasing frequency and amplitude of vibration, although for most common applications this effect is too small to be significant. There is no recognized independent effect of species on the speed of sound.

Variability in the speed of sound in wood is directly related to the variability of the modulus of elasticity and density." Got that? It's all in the latest edition of the Forest Products Laboratory's *Wood Engineering Handbook*, available for \$49.95, plus postage and handling charges from Prentice-Hall, Inc., Professional Books Division, Englewood Cliffs, New Jersey 07632.

• Stelio Frati's latest design, the Jet Squalus made its first flight on April 30 and had accumulated about 40 hours by its appearance at the Paris Air Show. The two-place jet trainer is being designed for a consortium in Belgium. Frank Strickler reports that test pilot Jack Zanozzi spun the plane from less than 3,000' at the show. The flight test program is going very smoothly, and the airplane is flying better than expected. The jet is very quiet, and Frank Strickler reported that there was much interest in the plane.

• The Falco Club in Italy has scheduled the following fly-ins: June 21 in Rome at Autodrome de Vallelunga, June 28 in Ravenna at the airport, July 19 in Palermo for the Air Race of Sicily, and September 9 in Venice at the Avioraduno della Laguna. For information, contact Mario Panvini Rosati, Falco Club, Via Cesare Pavese 77, 00144 Rome, Italy. Telephone 514-6052, 501-6994 or 949-8671. While no date is given, there will also be a fly-in at Isola D'Elba at which there'll be a contest with the winner being the pilot who lands at exactly 11:00 AM. Hmm... possibly we have here some explanation for the dwindling numbers of Falcos in Italy.

• Jim DeAngelo's Falco was on the cover of the April issue of *Pilot* magazine in England, and Karl Hansen's was on the cover of *Fliegermagazin* in Germany. One photograph of Karl sitting in the plane was captioned "Sequoia President Scott." All of the German pilots who

called were very kind to me—good to know that people will still be nice to me when my hair falls out! Ray Purkiser's Falco was featured in an article in the June issue of *In Flight*. We had hoped to get Karl Hansen's Falco on the cover of an upcoming issue of *Homebuilt Aircraft*, but unfortunately the magazine has ceased publication.

• What the devil is going on at AOPA *Pilot*? This was arguably the dullest aviation magazine in existence—remember the weather forecast charts for each day of the month?—until Ed Tripp took over. Tripp did a great job with the magazine. Now he's gone, and the last couple of months have seen Jeff Miller and Mark Lacagnina leave, too.

• Plans for one of the oldest and best homebuilt designs, the Pitts Special, are no longer available because of the continuing problems of "product liability" lawsuits in this country. While lawyers tut-tut about abuses and explain the lofty legal "principles" involved, what is happening in the U.S. is obscene. Christen Industries, for example, is being sued by a pilot of a *plans-built*(!) Pitts who pulled the prop through while the mags were hot, the engine fired and the prop cut one of the man's legs off. Our sympathies to the unfortunate pilot, but this is not any fault of Christen Industries, which will have to spend about \$20,000.00 to get the suit dismissed. *Aviation Consumer's* Dave Noland told me with a straight face that product liability accounts for "only 7% of sales" for general aviation—tell that to Christen Industries who's last quote for the insurance was over \$600,000.00—they used to pay under \$30,000.00 for more insurance.

• The 500th set of Falco plans went out the door recently to Guido Perrella of Lachine, Quebec. An Italian by birth, Mr. Perrella now lives in Canada and plans to have a Falco built for him.

• The annual fly-in of Stelio Frati-designed aircraft and antique aircraft will be held on August 14-16 at the airfield at Schaffen-Diest in Belgium. The Old Timer Fly-In is organized by the Belgium Veteran Aircraft Federation, and former Falco owner Guy Valvekens long ago turned it into a gathering of Frati aircraft. Nowhere else can you see Falcos, Picchios, SF.260s, Rondones and Nibbios on the same field. For details, contact Guy Valvekens, Hasseltsestraat 49, B-3290 Diest, Belgium.



MailBox

In the last five minutes I received the plans for my Falco, and I must say that this is one of the great moments of my life! I must pat myself on the back for making a good decision, and making good decisions is very important to me as a pilot. From the moment I decided to build the Falco, I carried a feeling of trust and confidence in Sequoia Aircraft, the design, and the designer, so I was not surprised that the plans and the manual were of such outstanding quality (strange isn't it?).

Well, I've got some excellent support on this project, two ATPs—one does excellent work with wood—an engineer who's very picky, a cabinet maker extraordinaire, and a young aeronautical engineer. I'm sure they'll have a lot of fun helping me with "my" Falco. Well, this is all too much excitement and I'm tired of typing, so I think I'll go and look at my plans and start the project.

*Michael C. Head
La Quinta, California*

It is my considered opinion to apply for the Private Pilot course in the Sequoia Aircraft Corporation Training School. I must not fail to intimate you that I have got my student pilot license and as a result have much interest in aviation. I am looking forward to receive your brochure together with the tuition fees for PPL and CPL and will like to know your hourly ratings for solo and dual and also the requirements for admissions. Looking forward to hear from you as soon as possible.

*John Dowechehova
Nigeria, West Africa*

It has been three years since my first introduction to your plans. I must congratulate you on the superb quality of your drawings and manual. The clearness of details, and the easy-to-follow step-by-step approach is evident throughout the entire project. Have I started construction? No. Have I lost interest? Not at all, as a matter of fact this little aircraft has completely changed my daily life.

I used to be a happy engineer, faithfully doing my engineering work. Fifteen years with the same company, good salary, excellent benefits. I was travelling all over the world at company expense, how can anyone ask for more!! One evening, browsing through the pages of a *Flying* magazine, there it was—red, sleek, beautiful, mystique. It was love at first sight.

One year later I quit my job. My mind was not on company business anymore, even the exciting and frequent trips all of a sudden seemed to be interfering with my one and only meaningful project: start on the Falco. Fortunately, my intellect still governed over my heart and its emotions. Before quitting I understood that some kind of income was not just necessary to accomplish one's dreams, but essential for straight forward survival.

Tool Trend was born. Together with a long-time friend of mine, a store was set up to supply hand and power tools and machinery for the woodworker with distribution nationwide. Tools for the woodworker, believe me not a coincidence. Now almost in our second year of operation, the company is doing quite well. We are among the major distributors in Canada of Freud, Delta machinery and Makita products.

My leisure time is still at a minimum, but at least the Falco project is now within reach. By the way, I think that I have all the tools that I need now. Naturally, any Falco builder that requires assistance on his tooling needs, here at Tool Trend, will definitely receive a biased treatment.

I would like to take this opportunity to thank you for the excitement and happiness your work has brought to me.

*Maurizio Branzanti
Concord, Ontario, Canada*

For a catalogue, please write Tool Trend Ltd, 3280 Steeles Avenue West, Unit 14, Concord, Ontario L4K 2Y2, Canada, or call (416) 663-8665 or (800) 387-7005 and ask for the guy who's crazy about Falcos. —Alfred Scott

Tail assembly completed and hanging in top of garage. Just retired 3 months and finishing house construction. Just obtained bi-annual after not flying for 30 years. Would advise anyone in similar situation to turn in old license and start fresh—less costly and probably not as frustrating. Expect to get back to Falco construction by end of year. In the meantime, expect to see live Falcos at Oshkosh '87.

*William D. McKaig
Bishop, California*

Having gotten previous commitments out of the way, I completed a two-month trip to California and points west and completed the building of my wood

shop. I am now poised to begin work on the wood portions. I have completed all metal components and am looking forward to this next phase with undiminished enthusiasm.

I was most distressed to hear of Mr. Brown's fatal mistake/mishap. Your speculations concerning unporting of a fuel outlet brings to mind the thought that perhaps a complete rethinking of the fuel system might be in order. I'm sure you've already thought of that and, knowing your penchant for excellence, will come up with whatever needs a fix (if anything *does* need a fix). But, fixing the technology is only part of the problem. It seems to me that somehow we have to instill, or reinstill, the fact that a controlled VFR landing, forced or otherwise, is survivable in any terrain with very good odds. You pointed that out in the Builder Letter, and I guess it bears repeating frequently. I realize that you, as the Guru of the Falco Fleet USA, are not required to produce safety sessions but your continuance in that direction is encouraged. Falco USA does not need another accident.

*William E. Roerig
Kaukauna, Wisconsin*

Fuel system okay. Me not guru! —Alfred Scott

Keep the Builders Letter coming. I still hope to find the time to build a Falco. It's still the best looking homebuilt, and the one I have most confidence in!

*Stephen Turk
Los Angeles, California*

I like the newsletter a lot. I have been working on various phases of the Falco. Have rudder made, many small parts, controls hinges, etc. Don't have as much time as I would like, fly CAP towing gliders and have a friend building a Glasair, also one KR1. Lots of hangar flying, but it is lots of fun.

Did you ever get any better hats? I don't like the one you have now. Please let me know. I heard you were working on it last summer.

*William C. Dixon
Decatur, Illinois*

No new hats in the works, but Brenda has been knitting a sweater lately.—Alfred Scott

The fuselage is 90% skinned, and I have removed the building jig. I had difficulty

screwing in the aft strap on the inverted fuel tank because of its proximity to the skin. I would suggest that the aft support be varnished and the strap installed before the skin is placed.

Terry L. Smith
Kingston, Pennsylvania

Slow, but sure! The little bits are growing into big bits! Hope to be at Meppershall May 30. Looking forward to meeting Alfred and family.

Keith Morris
Brecon, Powys
Wales

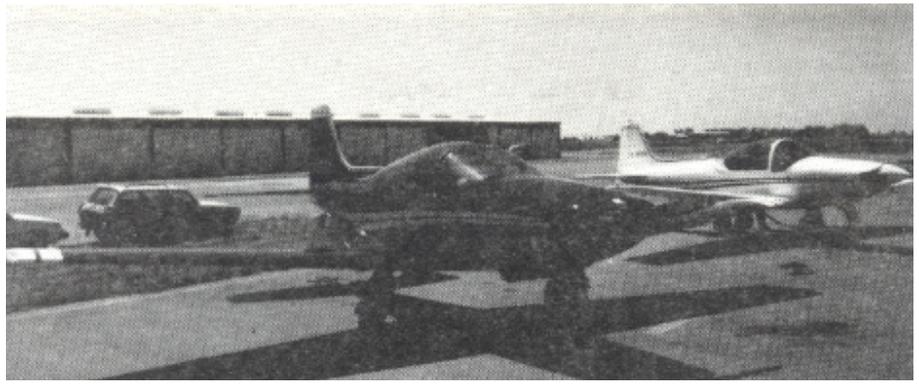
I received my complete spruce kit form Western Aircraft in June of 1986. Unfortunately, 20% of the spruce was severely damaged in transit. Re-estimating and verbal disagreement with the freighters took six months to agree on a settlement. I was surprised at the length of time it took to agree on a settlement. However, I must add that the quality and precision size of the material is remarkable. In the meantime, I had completed my tail group hardware which I had ordered from you. If only everybody acted as quickly as you do, maybe we will improve our freight services here.

I started my construction on the 25th of January 1987 with the fin ribs. At this stage all my tail group section is ready, including spars and will be assembling skin to the surfaces. I had to wait for the bolts and nuts from Aircraft Spruce and also the antenna kit from R.S.T.

I'm in the process of laying out wing rib contours and also fuselage formers jigs. I have had bad experience with laminations. I'm not very quick with it and also my preparation for the clamps was poor—resulting in slipped clamps or out-of-level laminations. Although Larry Black has left San Jose, I'm lucky to be overseen by Stan Weiss, who is more resourceful with ideas and my necessary plywood.

Although I have had the opportunity to help a homebuilder in England, who used Aerolite glue, I find that the ratios by weight (or even volume) for mixing water with the powder rather difficult. I find that I need a lot more water to make it "honey consistency". Is that right, or am I going wrong somehow? Please let me know if others using Aerolite are finding the same. All my test blocks are satisfactory.

Please find enclosed my check for the



wonderful newsletter, which I intend to subscribe forever as it is full of lots of interesting things.

Shahid Choudhry
San Jose, California

I'm afraid I don't have any wise words on mixing Aerolite. I think most builders add water until they get the consistency they want. It tends to thicken with time and then they just add some more water. The important thing is that the test blocks check out all right. As long as you are getting good joints, I would not worry about the exact water/powder ratio.—Alfred Scott

Finally, after a little more than 18 months of sporadic flying, I consider my Falco debugged. My annual inspection is due April 18. However, since I have been in the engine compartment so much and so often, there is little I have to do to satisfy the FAA requirement. Essentially, I am going to spend most of the time lubricating everything and anything that moves.

My Falco is no longer as fast as it was since I found out my tachometer was reading about 225 rpm too low. In other words, when I was pulling 2300 rpm, I was really getting 2525. My final check will be with a digital instrument to check the rpms at several levels. Tachs are notoriously inaccurate, and I am sure some of the other builders are enjoying similar discrepancies. I've also changed my CHT, EGT (now Alcor), oil pressure and oil temperature gauges. All the old ones differed but slightly from the new, and I consider them quite accurate now. My oil pressure hovers at 75 psi in flight—oil temperature about 180° F—cylinder head temperature at 352° F. This was last Saturday at 3,500 ft. with an air temperature of about 70° F at that altitude. With 22" MP and 2,200 rpm the airspeed indicated was jiggling about 145 knots. The air was so rough my G-meter hit +2.5/-2 during the flight (no, not after the landing).

Kind of scared me to see the wing tips jiggling, and I had to slow it down... funny though, didn't bang my head on the canopy even once. Maybe because it was already touching it anyway.

Tony Bingelis
Austin, Texas

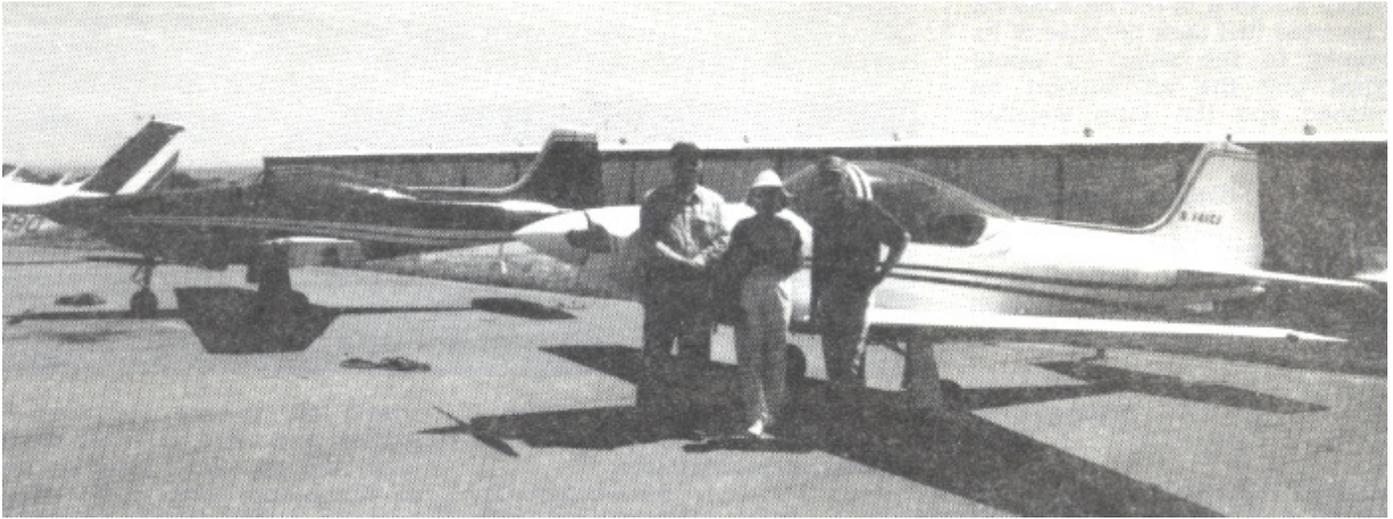
It seems that each time I receive information from you, the Falco becomes easier to build and a better airplane. I will find the time, sometime in the future, to build one, however, in the meanwhile all is not bad because I do fly at least twice a day, and that is rewarding—although a truck (TU206G)!

Barry M. Bowen
Belize, Central America

My current status: tail, instrument panel, firewall, landing gear and retraction are all done; last three skin panels are about to go onto the wing, fuselage jig is built, and I ought to have the entire airframe and its internal systems done this summer.

Stephan Wilkinson
Cornwall-on-Hudson, New York

I finally got to meet John and Pat Harns. He called on the way to San Diego and wanted to meet on the way back north at Lincoln. I had to pick up the Falco at Merced, so I left Merced at about 10 AM and met them at 10,000' over Sacramento. John tacked on to the right wing, and we made a big 360° down to pattern altitude for a Falco fly-by. John held it in nice and close so we got some good comments from the ground while we were passing over. It was really fun tying up with another Falco. I have a feeling our Falco is a bit slipperier than John's at the upper end. We let down fairly rapidly. I had pulled back to about 20" and the speed built up to about 200 KIAS. John said "Give me a couple of inches." I thought he meant add a couple. At that time I was running about 22" and about 4000', so I added a couple; he said "No, pull back", so I



Above: Karl Hansen, Pat Harns and John Harns.

pulled throttle. When we got on the ground, John said he was pulling about 27" trying to keep up. Of course, it's always harder for the wing man, I wasn't leaving him enough surplus.

We had a nice visit. I enjoyed looking at his airplane. He has a fine induction system with alternate air. I would like to have done that in ours. I showed John the gap seals on the flaps. Also my ailerons and flaps have only one millimeter end clearance which should act as partial gap seals. Also, I have made full covers in the flap/ailerons pockets which would reduce drag somewhat. John did not put the covers in one of the areas (aileron, I think). I found while setting up the ailerons and checking the travel during assembly that they were not reaching the stops. I had to grind some additional radius on the aileron pushrod ends and also on the stick tie rod where the aileron cable ends fasten. By doing this, the aileron travel is unrestricted stop-to-stop.

By the way, I did a bit of checking the other day on adverse yaw. It is practically non-existent. You can roll from 45 right to 45 left, feet on the floor and the ball is very nearly frozen. I knew there was little yaw, but you can hardly detect the ball movement.

One other difference between our plane and John's (he mentioned it) is the wing wash-out. While looking down the wing he said "you can sure see the twist." That is true. It is 3° each side as close as measurable. Looking down his wing, it 'looks' almost straight. That probably would change stall characteristics somewhat. With a pilot like John, the stall is not that important. He also noticed I had reflexed the flaps a bit more than

he has. That probably helps reduce high speed drag a bit.

We have entered the CAFE 400 this year so I've got to get with it on the drag and consumption profiles. I'll probably put the seals on the ailerons. By the way, when I was doing flutter testing, I had to push to get the Falco up to 190 knots indicated. Now, it will slip up to 200 kts pretty easy when the nose is low. On each side of the gear strut you have four square inches exhaust air, and the hole for the nose gear actuator is another four square inches for about twelve square inches of unwanted exhaust air into the nose gear well. We finally figured out the way we want to reduce that, so will get it done for the CAFE. We will also install the aileron seals for the CAFE per your suggestion. We have to get up and do some cruise and fuel flow checking, but with the improvement in the way the bird is flying, we expect to raise our average speed by about 15 mph, maybe more, depending on winds and a few other things.

I flew to the antique fly-in at Merced, California. We did not enter it, but had the Falco in Dr. Becker's hangar facing the show area. He said he had so many people looking at the Falco that at a dollar a head he could retire!

I want to put in a plug for Dick Waters and his son-in-law Don George, who was working for him when they made up our engine. We had the engine internally balanced and some chroming including specified chrome cylinders. The trip to Dayton, Oshkosh, etc. was about 30 hours. We used less than a quart of oil. I have used 20W50 even in break-in. They were very cooperative and listened when I asked for certain

things. Also everything, including injection system and mags, wiring, etc were in new condition. I talked to both of them several times and felt them customer oriented.

*Karl M. Hansen
Roseville, California*

I would like to congratulate you on the production of a great aircraft, the Sequoia Aircraft Falco F.8L. I first came across the Falco kitplane in an article in *Pilot* magazine in England, and I literally fell in love with the machine. Unfortunately, I cannot afford one of your kits.

I write to apply for permission to use the name 'Sequoia Falco' on a kit car I am presently building. It is a personal non-commercial project kit and in many ways resembles the features of the Sequoia Falco aircraft. The kit comprises a fiberglass body mounted on a VW chassis and equipped with a VW/Porsche engine.

*Dieter Pfeiffer
Manzini, Swaziland*

Sure, as long as you paint that African Spruce body to look like real wood, put Lycoming rocker arm covers on the engine and write "Designed by Stelio Frati" on the hubcaps.—Alfred Scott

With a typical "Brazilian delay", here you have our *Voar* magazine with my article. It has finally been published last week, and I have already received many phone calls about it. Like the Italians, Brazilians love beautiful things—mainly if they are fast! If my schedule permits, I will stop by to see you and other friends at Oshkosh this year. I have to be in Detroit in early August, consequently....

*Fernando Almeida
Sao Paulo, Brazil*