STINSON SR-5

• Champ Comparison
• CE 120 Turns 67
• LA Air Show 1910
The Privilege of Partnership

EAA members are eligible for special pricing on Ford Motor Company vehicles through Ford’s Partner Recognition Program. To learn more on this exclusive opportunity for EAA members to save on a new Ford vehicle, please visit www.eaa.org/ford.

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Built Ford Tough® means never resting on one’s laurels. And the 2015 Ford Super Duty is no exception.

This is a truck that works hard no matter what road you’re on or what conditions you’re facing. And because it’s impossible to predict when your job will go from tough to toughest, we went ahead and made the engine that drives you through the workday, even better. The available 6.7L Power Stroke® V8 Turbo Diesel (standard on F-450) now features a larger turbocharger for more power and performance, a new fuel pump for improved efficiency and an upgraded temperature control system that helps maximize everyday performance. And best-in-class horsepower, torque and towing capacity* mean Super Duty is ready to handle any job, any time.

It’s engineered to work hard, but that doesn’t mean you have to. The available driver-configurable LCD productivity screen, for example, puts you in touch with fuel economy data, towing and off-road information, plus much more – connected with life on the road in ways that are both enjoyable and productive.

2015 Super Duty from Ford – America’s Truck Leader!

*Heavy duty, full-size pickup segment.
Straight & Level

GEOFF ROBISON
VAA PRESIDENT, EAA 268346, VAA 12606

Oshkosh 2014 is now fast approaching

By now, most of you have learned that EAA and the FAA have entered into a long-term agreement for the FAA to provide ATC services at Oshkosh. On first blush, I was honestly pretty disappointed. After all, the legal arguments we filed in the federal court were all on our side, so I can only imagine that this ultimately led to the FAA agreeing to negotiate with EAA and therefore signed a long-term agreement with us. As I read through the details of the agreement it rather suddenly became mostly rudimentary. The simple truth is that we cannot and do not want to host this monstrously convention without the professional services of these FAA controllers.

This is clearly a “safety first” initiative in my mind, and we cannot allow for it to be compromised in any fashion. Had we not come to some sort of agreement with the FAA, what assurances would we have? The leadership at EAA has done an excellent job here in getting us to where we all want to be! Many thanks to our many GA partners in this endeavor, for their assistance and support throughout the past 12 months. Special thanks has to go out to the HAI and ICAS for the amicus briefs they filed in the federal courts supporting our position. To quote Jack J. Pelton, “Our goal was to bring certainty and stability for AirVenture, for all of EAA and our fellow members. This has now been professionally accomplished.”

It’s late March, and I just returned from B-17 training in Oshkosh. Your board of directors and many of our committee chairmen have been quite busy for several months now carefully orchestrating the myriad of details necessary to provide our visitors and the membership with a positive and memorable experience at AirVenture Oshkosh 2014. The lineup of visiting Antique treasures is growing swiftly, and if you ever found yourself pausing to admire the front yard of the VAA Red Barn during EAA Oshkosh, you will find yourself mesmerized with the 2014 display.

It’s still a little early and at least one or two of these treasures remain on the “somewhat tentative” list, so I don’t want to reveal too much detail here as yet. We do plan to send out a pre-convention update of activities and displays prior to the event. I can assure you, though, your excitement is guaranteed! I hope to see you all there!

It’s that time of year again when we remind our Friends of the Red Barn supporters to once again give strong consideration to supporting this important initiative. Many of you long ago discovered the VAA Red Barn. This is where the mystical Camelot for old airplanes exists. It only happens once a year, and it’s all right here in the Red Barn area in Oshkosh, Wisconsin. Come pull up a bench in the shade of the front porch of the Red Barn, have

continued on page 64
Comparing the Classics
Aeronca Champ
Budd Davisson

Stinson SR-5
Not a Gull Wing but still a Reliant
Budd Davisson

My Cessna and I Both Turn 67
Fifty-one years of flying together
Jim Hanson

First U.S. Air Meet
January 10, 1910
Walt Wick

The Other Member of Our Family
Part 2, Aeronca 7AC Champ NC1585E
Richard “Dick” Pedersen
COLUMNS
1  Straight and Level  Oshkosh 2014 is now fast approaching  Geoff Robison
6  Vintage News
8  Vintage 2014 Election
10  How to?  Fabricate a wood wing bow  Robert G. Lock
13  Ask the AME  Parkinson’s disease  John Patterson, M.D., AME
14  The Vintage Instructor  Attitude—attitude—attitude  Steve Krog, CFI
18  Good Old Days
59  The Vintage Mechanic  Airworthiness, Part 3  Steel Structures  Robert G. Lock
64  Vintage Trader

COVERS
FRONT COVER: Stinson SR-5 photographed by Phil High.
BACK COVER: Photographer Adam Glowaski shoots Jim Hanson in his Cessna 120 from a Cessna 206 flown by Doug Rozendaal.

ANY COMMENTS?  Send your thoughts to the Vintage Editor at: jbusha@eaa.org

For missing or replacement magazines, or any other membership related questions, please call EAA Member Services at 800-JOIN-EAA (564-6322).
VAA members like you are passionate about your affiliation with vintage aviation, and it shows. You’re the most loyal of all EAA members, renewing your VAA membership each and every year at a rate higher than any other group within the EAA family. We appreciate your dedication! Each year we give you another opportunity to strengthen your bond with the VAA by inviting you to become a Friend of the Red Barn.

This special opportunity helps VAA put together all the components that make the Vintage area of EAA AirVenture a unique and exciting part of the World’s Greatest Aviation Celebration. This special fund was established to cover a significant portion of the VAA’s expenses related to serving VAA members during EAA AirVenture Oshkosh, so that no dues money is used to support the convention activities.

This is a great opportunity for Vintage members to join together as key financial supporters of the Vintage division. It’s a rewarding experience for each of us as individuals to be a part of supporting the finest gathering of Antique, Classic, and Contemporary airplanes in the world.

At whatever level is comfortable for you, won’t you please join those of us who recognize the tremendously valuable key role the Vintage Aircraft Association has played in preserving the irreplaceable grassroots and general aviation airplanes of the last 100 years? Your participation in EAA’s Vintage Aircraft Association Friends of the Red Barn will help ensure the very finest in EAA AirVenture Oshkosh Vintage programs.

To participate in this year’s campaign, fill out the donation form by visiting our website at www.VintageAircraft.org/programs/redbarn.html to make an online contribution. And to each and every one of you who has already contributed, or is about to, a heartfelt “thank you” from the officers, directors, staff, and volunteers of the Vintage Aircraft Association!
### CONTRIBUTION LEVELS ↓

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All donors at all levels will have their name listed in *Vintage Airplane* magazine, on *VintageAircraft.org*, and at the VAA Red Barn during AirVenture.

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### VAA Friends of the Red Barn

Name_________________________________________________________ EAA # _______ VAA # _______
Address____________________________________________________________________________________________
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Please choose your level of participation:

- [ ] Diamond Plus $1,500.00 or above
- [ ] Diamond Level Gift - $1,000.00 - $1,499.00
- [ ] Platinum Level Gift - $750.00 - $999.00
- [ ] Gold Level Gift - $500.00 - $749.00
- [ ] Silver Level Gift - $250.00 - $499.00
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☐ Payment Enclosed (Make checks payable to Vintage Aircraft Assoc.)
☐ Please charge my credit card for the amount of: ____________
Credit Card Number _____________________________ Expiration Date _________
Signature_________________________________________

Badges for Bronze Level and Above:
- [ ] Yes, prepare a name badge to read:
- [ ] No badge wanted for this year.

First           Last  (Please print just as you wish your badge to read.)

Certificates:
- [ ] Yes, I want a Certificate
- [ ] No, I do not want a Certificate for this year.

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The Vintage Aircraft Association is a non-profit educational organization under IRS 501c3 rules. Under Federal Law, the deduction from Federal Income tax for charitable contributions is limited to the amount by which any money (and the value of any property other than money) contributed exceeds the value of the goods or services provided in exchange for the contribution. An appropriate receipt acknowledging your gift will be sent to you for IRS gift reporting reasons.
Postwar boom: The Classic revolution, September 1945 through March 1947

by Steve Krog

Seventy years after the apex of the “postwar boom” the Vintage Aircraft Association (VAA) is extending an open invitation to all who own these wonderful air machines. All vintage aircraft are naturally invited to attend EAA AirVenture Oshkosh 2014, but special treatment is in order for anyone arriving in a “boom era” airplane.

The postwar boom, September 1945 through March 1947, saw well more than 30,000 civil aircraft produced within the United States. It was truly a “boom” time for virtually all light airplane manufacturers. Newly manufactured airplanes could be purchased for under $1,000!

Unfortunately, all of the civil aircraft manufacturers grossly misread the targeted audience for these airplanes. Rather than coming home from the war and buying aircraft, veterans preferred to settle down, marry, start a family, get an education, and begin a working career. Things that all had given a great deal of thought to while serving in the military thousands of miles from home. Gone was the vision of all veterans wanting an airplane.

Thousands of these airplanes, almost without value, were destroyed as the cotton fabric covering rotted or they were left to the elements to rust away.

Thankfully, there were still a number of aviation enthusiasts who at that time began collecting the now-derelict airplanes and storing them away in barns, granaries, garages, and almost any place where a fuselage and removed wings could be stored.

As time moved onward, a renewed interest in these airplanes slowly evolved. Veterans who had an interest in aviation were now in a position to renew that interest. Organizations such as EAA had become well-established helping pique aviation interest. Sons and daughters of the vets were also being introduced to the pleasures of aviation.

Projects, as they became known, came out of storage and were restored to flying status for the pleasure of inexpensive flight. None were truly restored to the levels we see today at the EAA fly-in, but rather they were rebuilt for utilitarian purposes, practicality over beauty. It wasn’t until the late 1970s or early 1980s where these great old classics really caught on and their resurgence began.

Today we see Cubs, Champs, Porterfields, Luscombes, Taylorcraft, and numerous other makes and models restored, flown; several could easily compete for Grand Champion status in addition to many of these airplanes being restored well above average for pleasure and fun. And all are invited to Oshkosh!

In addition to air show center parking (remember Cubs 2 Oshkosh?), we’re working on a host of other aviation events to help entice attendees. As these details are being finalized, watch for announcements in the next issue of this magazine, on the VAA website, and in the VAA e-newsletter.

Cubs 2 Oshkosh broke a record for the number of participating aircraft with more than 181 Cubs parked in one area. There is no reason that this number couldn’t be doubled or more with the addition of the many other makes and models produced during the “boom” years!

Join your pilot friends and plan to fly to this historic event. Spend a few days, or more, talking airplanes with fellow owners. It will be a memorable experience.

EAA AirVenture 2014 is stacking up to be another premier international fly-in. Join us and help make it the best show ever!
**Sneak Preview 2014**

**On your arrival by air**, look for the VAA Welcome Wagon as you are parking your aircraft. We will try to meet as many arrivals as possible and present you with complimentary bottles of ice water, a complete program of activities in the Vintage Area, some freebie items as they last, and a very brief survey which, when completed, will earn you a dollar discount on a great breakfast at the Vintage Tall Pines Café near the Ultralight runway.

**In the Vintage Red Barn** you’ll find the VAA Information Center for answers to all of your questions, just try us! VAA merchandise plus toys, gifts, souvenirs, and more are available for adults and children. Also, ice cold bottles of water, popcorn, coffee and more.

The Ice Cream Social will be back again this year on the Red Barn Porch. Cool off with a sundae and a big smile. Donations will be accepted.

**In the Vintage Hangar**, Paul’s Vintage Workshop will again be manned by A&P mechanics to demonstrate many “How to” maintenance and restoration methods. See programs and speakers as posted on the hangar door during the week.

Metal shaping will also be demonstrated in the Hangar by Experts who will amaze you with their talents.

Visit the many Type Club representatives in the Vintage Hangar, Monday thru Friday. Get the answers you need on many technical questions and sign up to join or renew your membership in the Type Clubs.

We will be also introducing a New VAA Members Activity Center in the Hangar as well. Come and check it out.

Learn how to safely hand-prop an aircraft from the experts. VAA volunteers have taught over 1,000 people how to do it and still be safe.

**The Now-Famous VAA Interview Circle** will be conducted again by Ray Johnson in front of the VAA Hangar at 11:00 a.m. Monday through Friday. Outstanding and unique aircraft will be displayed while their owners describe them and their preservation or restoration.

**VAA Tall Pines Café** will be open all week from 6:30 a.m. until about 9:30 a.m. A large variety of breakfast items are prepared by Vintage volunteers located near the Ultralight runway.

**The Aeromart** is now operated by the Vintage volunteers. Come in and grab some things you can’t live without for your project.

**The Vintage Charging Station** for cameras, cell phones, lap tops, etc., is located next to the Red Barn. Please bring your own charging accessories. Donations will be accepted.

**The Judging Awards Ceremony** will be held in the Vintage Hangar on Saturday at 6:00 p.m. All Vintage members, friends, and vintage airplane lovers are welcome to attend. Refreshments will be served at the conclusion.

**ATTENTION AUTHORS:** VAA will be hosting an Author’s Corner (book signings by the author) at the Vintage Red Barn during AirVenture 2014. Signings will be held on Monday, July 28, through Saturday, August 2. There are two slots available each day on these dates. The morning slots will run from 10:00-11:30 and the afternoon slots will run from 1:30-3:00.

Authors interested in participating in this event should contact committee chairman Susan Dusenbury at sr6sue@aol.com before April 1, 2014.
GEOFF L. ROBISON - President
New Haven, Indiana
Geoff began flying in 1982 and received his private single-engine land certificate in 1983. He attended his first EAA fly-in in 1983 and immediately became active in the Vintage Aircraft Association (VAA). He began volunteering with the Aircraft Parking & Flight Line Safety Committee in 1983 and served as the co-chairman of this committee for about 15 years. Geoff also served as the chairman of the VAA Security Committee and on the VAA Convention Committee during that same period. Geoff served as an advisor to the VAA board of directors for seven years and has served as a director since 1996. Geoff is currently flying a Cessna 120 and a Cessna 170A and is engaged in the restoration of a 1940 B Model Funk aircraft. Geoff also currently serves as a tour coordinator for EAA’s Aluminum Overcast B-17 Tour and has participated in this EAA program since 1998. After spending three years with the U.S. Army in Europe as a military policeman in the early ’70s, he returned from military service and became a police officer and later the police chief in his hometown of New Haven, Indiana. He now serves his community as a city court judge and has done so for more than eight years.

STEVE NESSE - Secretary
Albert Lea, Minnesota
Steve was born in Albert Lea, Minnesota, and grew up on a farm near there. Having a deep interest in aviation, he received his private certificate in 1967. In 1975 he purchased a 1946 Navion from his father. After joining EAA in 1967 at Rockford, Steve has attended 46 consecutive EAA conventions. A charter member of VAA Chapter 13, he has served as vice president and president of that chapter. Currently he serves as chairman of the Metal Shaping Workshop and Tall Pines Café at AirVenture. After serving two years as an advisor and later as a director, he has been serving as secretary of the Vintage Aircraft Association since 1991.

RON ALEXANDER - Director
Griffin, Georgia
Ron Alexander learned to fly at age 16 in his hometown of Bloomington, Indiana. He went into the United States Air Force in 1964, completing pilot training in 1965. He served a total of five years in the Air Force including a combat tour in Vietnam. After military service he was hired by Delta Air Lines in 1969 as a pilot. He retired as a captain in 2002 after 33 years of service. Ron has been involved with antique airplanes since 1975 when he first began restoring a PT-17 Stearman. In 1979 he founded Alexander Aeroplane Company, which was later sold to Aircraft Spruce. Ron also developed the SportAir Workshop program that is currently being presented as the EAA SportAir Workshop program. He lives in Griffin, Georgia, where he has several antique airplanes including a Stearman Model 6 and a Curtiss Jenny that is under restoration. He is developing an antique airplane museum that replicates the original Atlanta, Georgia, airport.

STEVEN L. KROG - Director
Hartford, Wisconsin
Born and raised in southwestern Minnesota, Steve “migrated” to Wisconsin in 1982 and continues to reside in Hartford, Wisconsin. He has been interested in airplanes since he was old enough to know what they were, and family friend and mentor Carroll Bressler introduced him to the pleasure of aviation by giving him his first ride when he was 12 years old. Steve has been “hooked on aviation” ever since. He earned his private certificate in 1969 and completed his training in 1972, obtaining commercial and flight instructor certificates as well as instrument and multiengine ratings. Steve retired from and sold his marketing communications firm in early 2007 and established Cub Air Flight LLC, a primary flight school for sport and private pilot students who want to learn in a tailwheel airplane. He also provides tailwheel training for vintage aircraft owners. Steve and his wife, Sharon, who also flies, own several aircraft including
a 1941 Piper J-5A Cruiser (currently being restored), 1938, 1945, and 1946 Piper J-3s, a 1946 Piper PA-12 Super Cruiser, and a 1947 Luscombe 8E. Steve and Sharon have been AirVenture volunteers for well more than 12 years. They also own and manage the Cub Club, the Luscombe Association, and the Taylorcraft Owners Club, three very active type clubs.

ROBERT D. “BOB” LUMLEY - Director
Brookfield, Wisconsin

A native of Athens, Georgia, Bob is currently the vice president for a Milwaukee-based construction firm. He soloed in 1968 in a Piper PA-11 and holds a commercial pilot certificate. Bob is a lifetime EAA and Vintage Aircraft Association member. He’s also a charter member of VAA Chapter 11 in Brookfield, Wisconsin. As a volunteer Bob has, since 1984, designed and managed the construction of additions to the VAA Red Barn, the new Vintage Hangar, as well as the Vintage area entry arch and other Vintage buildings. His AirVenture responsibilities include the selection and purchasing of VAA logo merchandise and setting up the Red Barn sales area prior to the convention. Bob was also a volunteer at Pioneer Airport, participating in its Young Eagles program with more than 300 missions. He serves as Santa for the EAA AirVenture Museum’s Christmas in the Air program and is on the EAA Nominating Committee. In 2009 Bob was a recipient of EAA’s President’s Award.

JOE NORRIS - Director
Oshkosh, Wisconsin

Joe grew up on a cranberry farm in central Wisconsin. Several neighbors had light aircraft, and some had airstrips on their property, so it was always easy to be around airplanes and airplane people. A close friend of the family was ag pilot Jim Miles (EAA 158), who introduced Joe to EAA by taking him to Oshkosh for the EAA convention in 1970, where they camped under the wing of Jim’s Piper PA-12 Super Cruiser. Joe joined EAA in 1976 and became a lifetime member in 2002. Joe is also a lifetime member of VAA (VAA 5982).

Joe earned his private pilot certificate in 1978, and bought his first airplane in 1979—a 1955 Piper Tri-Pacer. He flew it for about a year and then converted it to PA-20 Pacer (tailwheel) configuration. During this time Joe helped form EAA Chapter 706 in Wisconsin Rapids, Wisconsin. Over time Joe has earned commercial pilot and flight instructor certificates with airplane and helicopter ratings, as well an A&P certificate with IA. Joe also acted as a DAR for experimental aircraft for a number of years.

Joe has been actively involved with EAA, serving as a technical counselor and flight advisor, and has been an officer in two EAA chapters. Joe has volunteered at the EAA convention for many years, and was one of the five original members of the EAA Homebuilt Aircraft Council.

In October of 2001 Joe was hired as a senior aviation specialist in EAA’s Aviation Services department, a job previously held by longtime EAA employee Norm Petersen. In 2008 EAA created the position of homebuilders community manager, and Joe was selected to fill that role. In 2011 Joe decided to get out from behind the desk and back behind the stick, so he left EAA and has been working as a flight instructor at Cub Air Flight in Hartford.

Joe currently owns and maintains three vintage aircraft—a Cessna 180, a Piper Super Cub, and a Waco UPF-7. He has previously owned a Piper J-5A Cub Cruiser and another Super Cub. Joe built and flew a Sonerai II homebuilt and also owned a homebuilt Pitts S-1C.

TIM POPP - Director
Lawton, Michigan

Tim joined EAA in 1988 and is now a lifetime member. He began taking flying lessons and attended his first EAA convention that same year. Tim earned his private pilot certificate in 1989 and later added a tailwheel endorsement and an instrument rating. He joined VAA in 1994 about the time he began volunteering with the VAA Contemporary Aircraft Judges and currently serves as the vice-chairman of the group. He owns a 1958 Cessna 172, which he purchased in 1994 and has slowly restored over the years. He is currently building a Van’s Aircraft RV-7. He is an active member and past president of EAA Chapter 221 in Kalamazoo, Michigan. He is an active Young Eagles program participant having flown more than 500 Young Eagles over the years. He earned his bachelor’s and master’s degrees from the University of Michigan and is an environment, health, and safety manager for a major pharmaceutical company. He has been happily married for more than 25 years to his wife, Liz, who also actively volunteers with the VAA.
A wing bow is actually a lamination of spruce wood, although some factory wing bows were made of steamed oak—pretty difficult to duplicate. Wood laminations are a series of thin strips piled together, formed and glued, thus taking a predetermined shape. Laminations are used to fabricate fuselage bulkheads or any other part that requires an intricate shape.

When restoring my Command-Aire, I was faced with laminating wing bows for both upper and lower wings. But the task was not as easy as it appeared, as the wing bows curve was not flat but rather followed the wing ribs negative camber. Forming these bows would require that I fabricate a complicated fixture to hold the laminations in a precise shape. I surmised that the original factory really did not do this. I decided to disassemble a wing bow on an old wing. Finding nails in each lamination I soon discovered that each wing bow was actually fabricated on the fully assembled wing, which made good sense. So here is how it was done.

First, when cutting strips of spruce for the lamination, plan on using just one piece of solid wood per bow. That way the moisture content will be the same in each lamination. It is important that laminations be within 2 percent moisture content with each other; therefore, I make sure that all strips are cut from the same piece of wood. I have found that 1/8-inch-thick strips can be bent into shape without soaking, so that is what I use. Soaking the strips to accomplish bending changes the moisture content of the wood, and there is a delay in gluing because said strips must thoroughly dry before bonding. In Figure 1, the spar ends are left square rather than being tapered so two nails could be driven into the spars to hold laminations in place. Here, the first lamination is in place, clamped to the leading and trailing edges. Both surfaces must be coated with adhesive, and then the next lamination will be laid in place.
The next lamination is laid in place, and the laminations continued until the desired thickness is reached. Figure 2 shows the first lamination coated with glue in preparation to receive the next spruce strip.

After the strips are built up, the lamination is securely clamped for a good adhesive cure, which is overnight. Figure 3 shows a number of small C-clamps applying pressure to the structure.

After allowing the wing bow to thoroughly cure (be sure to observe the minimum curing temperature for the adhesive being used as this temperature will vary between adhesives). Synthetic resin glue (Resorcinol) requires a minimum curing temperature of 70 degrees, while some epoxy resins will still cure at a temperature of 50 degrees. I never allow temperature to drop below 70 degrees no matter what type adhesive I am using, which is a good rule to follow.

Figure 4 shows the wing bow lamination cured and removed from the wing. The bow looks like a flat lamination, but it has a curvature to follow the negative camber of the wing ribs. When removed, there should be no spring-back in the lamination. At this point the spar ends can be tapered to the desired configuration after removing the four nails.

It is always necessary to use more adhesive on the strips so it will be squeezed out when clamps are applied. Figure 5 shows glue on the shop floor under the lamination, assuring that there was, in fact, excess adhesive squeezed out.

After the wing bow has been cleaned of any waxed paper that may have been used to keep it from sticking to the structure, it is carefully fitted to the wing-tip, care taken to assure proper fit. Figure 6 shows the wing bow glued to the wing structure.

Figure 6 shows the first step in initial shaping of the bow using a hand plane. The plane will take off wood at a rapid rate with less sanding dust than using a disc sander. However, once the bow has been rough-shaped, the next step will be to carefully sand using a 6-inch disc sander. Care must be taken not to remove too much material, as this mistake is difficult to repair. Figure 7 shows the intermediate sanding step.
Note that the spar ends are tapered before the wing bow is glued in place. It is just easier to cut, plane, and sand the spar taper before the bow is in place.

The final sanding is done by hand using emery paper strips as shown in Figure 8.

After this final sanding is completed, the wing bow is essentially completed. However, plywood gussets must be installed over the spars and onto the bow to assure strength of assembly. Negative camber of wing ribs can easily be seen in this photo.

Figure 9 shows the wing bow in place with all ribs in place and triangular gussets bracing the bow at critical attach points. The plywood gussets bridging the spars and ribs to the bow have not been installed at this point, as is the plywood leading edge. I’ll show that in another column.
MJF writes, “I have been diagnosed with Parkinson’s disease. Can I pass my medical?”

Answer: Yes, with special issuance in mild cases. Parkinson’s disease is felt to be due to diminished dopamine production in the brain. In its early stage it is difficult to diagnose as there are no standard diagnostic imaging or blood tests for Parkinsonism. It is based primarily on neurologic exam. One of the more common clinical manifestations of the disease is tremor of the upper extremity at rest. In the early stages of the disease the individual can stop the tremor by “intention” or initiating movement in the affected extremity. FAA approval may depend on the individual’s ability to overcome the “tremor at rest.” Other clinical findings are “cogwheel rigidity” in a limb or even stiffness in the neck. In severe cases this can result in the typical shuffling gait with little or no arm movement. There may be difficulty rising from a chair and starting to move, and then once moving it is difficult to stop. Facial expression may be emotionless, the so-called “flat affect.” Balance can be an issue. The normal response to being pulled backward would be to take a balancing step backward to prevent the fall. The Parkinson’s patient may not be able to do this. Reaction time is markedly impaired.

The causes of Parkinson’s disease appear to be both genetic and environmental. Fifteen to 20 percent of patients have a relative with the disease, and several gene mutations have been associated with dopamine cell function in the brain. The gene mutations alone however are not enough to express the disease.

Environmental factors appear to be much more common. Links to pesticide, manganese, and Agent Orange exposure have been implicated. Head injuries resulting in amnesia or loss of consciousness have been associated with the development of Parkinson’s disease.

Treatment is most commonly based on increasing dopamine in the brain. The medication carbidopa/levodopa (Sinemet) is the most widely used medication and can be approved by the FAA. Almost all other medications used for the treatment of Parkinson’s disease are not approved by the FAA because the medications themselves have unacceptable side effects for pilots. Most common of the meds are pramipexole (Mirapex) and ropinirole (Requip). Drug side effects are sleepiness, dizziness, blurred vision, and sometimes hallucinations.

In summary, airmen with mild Parkinsonism can be approved through special issuance on a case-by-case basis and will require a thorough neurologic evaluation. Currently only the levodopa/carbidopa combination is acceptable to the FAA for treatment of Parkinson’s disease; all other medications are disqualifying.
I had an opportunity recently to chat at length with Rob, a tailwheel flight instructor from the West Coast. We were discussing issues common to pilots transitioning to tailwheel airplanes and comparing notes on how to handle different situations. We agreed there is a lot of commonality in what we were each encountering. The issues are: attitude control, altitude control, airspeed control, trim control, rudder usage, and “listening/feeling” to the airplane. All of these issues are inter-related when flying an aircraft.

Many pilots trained in the past two decades were, unfortunately, never taught attitude flying throughout their primary flight training. How do I define attitude control? Flying the airplane at a constant altitude and attitude with reference only to the horizon. Why do I teach attitude flying? What would happen if you were flying your airplane and the artificial horizon and directional gyro failed? Or the airspeed indicator needle moved to zero? Or your brand new glass panel went totally black? Now what are you going to do?

You may think that it is no big deal, and for many of you reading this article you would be correct. But I speak from experience. Not everyone reacts calmly or properly in these situations. I mentioned in a previous article the story of checking out a new low-time flight instructor in a tailwheel airplane. As we added full power beginning our takeoff roll, everything was going well. The tail came up, and just before lifting off the new instructor looked at the airspeed indicator. It was registering zero, and that is when the fun began! Instant panic took over, and he let go of everything.
I was shouting “fly the airplane” while grabbing the controls, and he was screaming back, “It won’t fly; we have no airspeed!” Once in the air I suggested he look out of the window and take note that we, in fact, were flying even though the airspeed was showing zero. Needless to say, we were done with the lesson at this point, landed, and put the airplane away. He was quite shaken by the experience.

Attitude flying is very simple and may save your life, your airplane, or both someday. The method I like to use when teaching attitude flying is to have the student establish a straight and level flight attitude. Then note the altitude and cover the altimeter, airspeed indicator, and the artificial horizon if there is one installed in the plane. With this done, I have the student focus on the horizon and note where the horizon line is in relation to either the instrument panel or top of the engine cowl. Lock this image firmly in mind and hold this attitude for a minute or so before uncovering the altimeter. To his surprise our altitude is usually within plus or minus 20 feet. Next, I’ll have the student raise and lower the nose several times and then return to straight and level flight using the previously established sight picture.

Step two when teaching attitude flying is having the student practice shallow- then medium-bank 360-degree turns concentrating on where the horizon line intersects the instrument panel and then taking a mental picture of this attitude. Once these mental pictures have been instilled in the mind of the student, it becomes second nature for her.

Step three involves power changes. I first begin with a pre-determined/desired airspeed and a full power setting. For example, the Piper J-3 Cub at full power uses a published 60 mph airspeed for a best rate of climb. I’ll have the student raise the nose to where he thinks the 60 mph climb attitude should be and establish a climb. While holding this attitude steady in relation to the horizon, we’ll note the stabilized airspeed. If the airspeed is at 70 mph, raise
the nose about 1/2 inch above the horizon and stabilize. If less than 60 mph, lower the nose 1/2 inch and hold steady. When the desired 60 mph airspeed is reached and held steady, note where the horizon line intersects the airplane panel and again take a mental picture.

When the desired 60 mph climb attitude becomes comfortable, then it is time to establish the 60 mph descent attitude. Carb heat is applied, and power is reduced to approximately 1200 rpm. With eyes on the horizon, the student is then required to establish a stabilized descent attitude maintaining a steady 60 mph (suggested descent and approach speed for the J-3 Cub). If the airspeed is too fast, the nose is raised 1/2 inch and stabilized, or lowered the same amount if too slow, until the airspeed is a steady 60 mph. While holding this attitude, note where the nose of the aircraft is positioned in relation to the horizon and again take a mental picture.

After establishing the desired nose attitudes for straight and level, climbs, and descents, the fun begins. As the instructor I’ll cover the airspeed indicator and have the student demonstrate level flight, climbs, and descents using attitude (eyes on the horizon) flying only and expose the airspeed indicator to him when each attitude change is stable. Students who learned to fly in a fully instrumented aircraft are amazed that this can be done without their eyes fixated on the instruments!

If pilots, regardless of experience, would practice and perfect what has been described above in any of the aircraft they might be flying, it may save them from experiencing an incident or accident sometime in their flying career. Altitude and airspeed control are directly related to attitude control. Think about it. If attitude control is established, both altitude and airspeed will remain steady while at a constant power setting. Have you ever gone flying with a friend and watched the altitude fluctuate plus or minus 500 feet or more? You’re constantly riding a roller coaster while the airspeed fluctuates plus or minus 15 mph. You’ve probably added a cumulative 5-10 miles to a 50 mile trip due to constant climbs and descents. The pilot is not practicing proper attitude flying while upsetting your stomach contents consisting of cold pancakes, partially cooked sausage, and bad coffee.
Use of the trim system in the aircraft is another annoyance I constantly encounter. The trim is checked and set prior to takeoff and then never touched again for the duration of the flight. After 15-20 minutes of flight in this configuration, I’ll ask the student if her arm is getting tired, and the answer is YES! If any of you out there have ever flown with me, you’ll remember this story I tell. Pilots are basically lazy and desire to fly with two fingers. That is why aircraft designers introduced the trim system. So use it to your advantage.

Every time a power or nose attitude (pitch) change is made, stabilize with elevator input, then adjust the trim so that the new attitude can be maintained with two fingers. Unless you are a muscle builder when not flying, why do you want to build your forearms up like Popeye the Sailor Man? Adjust the trim and fly with two fingers. Fatigue becomes a factor in longer flights so use every tool available to you to reduce it. I often have students trim the aircraft and then see how long it will fly straight and level without touching the controls. It helps instill the idea of using trim as an asset.

“Listening” to the airplane while flying is another trait that I frequently find lacking. The aircraft is always telling you something, but it seems few are aware. Several years ago I had the privilege of working with three students who had been professional race car drivers. Each was adamant about “listening” to the airplane while in flight. When I asked one of the individuals what he was doing, he stated rather emphatically, “Krog, a race car is always talking to you while racing, and I find the airplane no different.”

As a good proficient pilot, hear what it is saying. What do I mean by this? First, we’ll talk about airflow. The movement of air over and under the wings and around the fuselage makes noise. If the airplane is slightly skidding or slipping through the air, the airflow causes the windows to vibrate or rattle in a J-3 Cub for instance, and airspeed is always something less than expected. Trim the plane for straight and level cruise flight. Remove your hands and feet from the controls and observe what happens. What does the aircraft do? If it pitches slightly upward or downward, the trim is incorrectly set and airspeed is not where it is supposed to be. Retrim and reduce the load on the elevator. If the ball is not centered in the turn coordinator (or simple inclinometer) when at level cruise flight with your feet off the rudder pedals, the aircraft is either slipping or skidding. It isn’t flying efficiently. This can be cured by adjusting the rigging (on some airplanes) or adding trim tabs to an aileron or rudder. The aircraft wants to fly efficiently; you just need to listen to it and help it do so.

Many of us are flying aircraft powered by the lower horsepower Continental powerplants. These engines are talking to you all of the time. Listen to them. Once accustomed to the sound of your engine, it is quite easy to hear it laboring if it is doing so. Most tachometers found in the planes we fly are as old as the plane itself, often inaccurate by 200-300 rpm. The next time you do some flying in smooth air, listen to the engine when the tach is set at the recommended power setting. How does it sound? Now add 100 rpm and listen again. Does it run more smoothly or does it sound like it is really working? Reduce the rpm setting by reducing it 100 rpm below the recommended setting and note the sound. With a little practice you’ll find that “sweet spot” power setting for your airplane. Remember, though, that this setting will change if your prop is changed.

We all know how to fly. Now it is time to perfect that knowledge and treat you and your airplane to an easy and fun efficient flight.

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**Travel Air (Also see page 111)**


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When it comes to picking their favorite postwar trainer, most folks fall into line behind one of two airplanes: the Cub or the Champ. Both have their supporters and detractors, but all will admit that the little Aeronca Champ is the only classic of the period to give the Cub a run for its money in the learning-to-fly game.

The first lines for the new airplane, the Model 7 Champion, were laid on vellum early in 1944 and the airplane flew in May of that year. Chief test pilot Louis Wehrung did the honors. The official designation of the airplane was 7AC (Model 7, first variation, Champion) and it used the A-65 Continental.

In laying out the configuration of the Champ, designer Ray Hermes took square aim at his primary com-
petition, the J-3 Cub, which by that time was nearly a decade old. He made a list of every one of the Cub’s shortcomings and designed them out of his new airplane. The final lines of the Champ are the net result of anti-Cub design goals.

Forward visibility had always been a Cub weak point, and Hermes solved that in two ways. First, he put the pilot in the front seat; and second, he raised the seating position and dropped the nose so the pilot could see straight ahead while on the ground. This is why a Champ appears so high in the cabin when compared to the Cub. The Cub may have finer, sleeker lines, but the Champ pilot not only sees where he’s going but sits up in real comfort (relatively speaking).

Cubs also came in for criticism in the drafty arrangement of the door. While the split door may be perfect for viewing sunsets today, when the Cub was working for a living, instructors and students alike cursed the leaky doors. The Champion used a hinged, single-piece door not unlike an automobile.

A little over 8,100 Champs were produced, most of which were the 65-hp 7ACs which ended production in April of 1948 to be replaced by the 85-hp 7BCM (it was fuel injected and had a larger dorsal fin, as well) which was ordered by the military as the L-16A. The military then went to 90 hp (fuel injected), and the nearest civilian counterpart was the 7CCM. The most common civilian version to come out of all of this was a combination of the A and B models L-16—the 85-hp 7DC which had the larger dorsal and an additional fuel tank in the right wing. Only 166 7DCs were built before the final Champ was introduced, the 90-hp 7EC. The final Champ rolled off the Aeronca line in January of 1951. It was Champ 7EC, SN96, N4749E. Anyone know where it is today?

A good design has a way of surviving, and the 7EC is one of those. In 1954, Champion Aircraft of Osceola, Wisconsin, put the 7EC back into production where it continued to be upgraded, eventually becoming the 7ECA Citabria in the early 1960s.

**Mechanical Description**

Champs use the triangular aft-fuselage that Gene Roche originally designed for his little C-2 in the late 1920s. The nose on a Champ looks stubby, compared to a Cub, and will house from the A-65 to the C-90 Continental.
the elevator. The arrangement is quicker and easier, although since it is located over the front pilot’s left shoulder in the ceiling, it’s a stretch to reach from the back seat.

To absorb landing shocks, the Champ uses an oleo-spring arrangement in the front leg of the landing gear “V” frame rather than bungees. When I had spoken with the late Buzz Wagner of the International Aeronca Association, he had said the landing gear is the area in which they see the most problems, mostly because people don’t maintain them or don’t understand the system. The system is designed to use exactly 8-1/2 ounces of fluid. Let it get a half an ounce down and the gear will be damaged. According to Wagner, the majority of Champs in operation need the landing gear rebuilt to one degree or another, and the difference in ground handling, when all the worn parts are replaced, is significant.

There were two different oleos installed—the original straight oleo and the “no-bounce” oleo which came out of the military’s desire for an airplane that could be dropped from ridiculous heights without damage. The original oleo is less complicated and easier to handle in a crosswind. Wagner, among others, has new and rebuilt replacements for either one.

All Champs prior to the 1954 reintroduction of the 7EC used mechanical brakes. These brakes, if properly adjusted, work just fine. There are two distinct different types: the Van Sickle/Cleveland type, which is a traditional drum and shoe setup where a rotating cam actuates them, and the Good-year, which is a form of mechanical disc brake. In either one is there no adjustment to move the shoes or pads closer to the drums to com-
pensate for wear, as in a car. This is a weakness in the design, and adjusting the cable tighter (most mechanics’ initial urge) won’t help. All that does is rotate the cam closer to its limits. Wagner said if shoe brakes are no longer holding, replace the shoes. In the caliper brakes, replace the pads, and if they still don’t hold, have the cam built back to its original dimension by welding.

The post-1954 American Champion 7ECs use hydraulic drum brakes which eliminates most of the problems. Fortunately, none of the brake types are expensive to rebuild.

The wings are a combination of wood spars and formed-aluminum ribs. There is no rib stitching, as with most fabric airplanes, since the fabric is screwed or riveted to the ribs. Generally speaking, Champ wings give little or no trouble, although they are now old enough that the spars should be inspected closely.

The wing struts are welded closed which makes them less susceptible to rust than some others. Rust, however, is still a definite concern, and they should be carefully inspected as per FAA guidelines. The end fittings are welded bushings, not adjustable forks, so there is no concern in that area.

Flight Characteristics

It takes about 10 seconds in a Champ’s cockpit to decide that all of
chief designer Hermes’ anti-Cub design goals were met and then some. Some argue the Champ cockpit is too modern. Too civilized. Those are usually Cub pilots speaking.

Once on board, the immediate impression will be of visibility and a cheerful airiness. The wing and skylight are so high and the pilot sits so far forward that there is none of the “man trapped in an airplane” feeling of so many of the Champ’s contemporaries. This is definitely the airplane for a big person.

One of the cockpit’s niceties is that all of the major engine controls, i.e., carb heat, fuel on/off, and mags, are in a panel by the pilot’s left hip. This makes them available from both seats, although the front seat pilot has to squirm around a bit to get a hand down there.

Incidentally, the later airplanes have most of the fuel in the wings and do away with the fuselage tank, while the original 7AC usually has a fuel gauge peeking out of the top of the boot cowl for the fuselage tank.

If it’s a 7AC, you’ll be doing the “Brakes! Contact!” routine with an Armstrong starter. If it’s a 7EC, there’s a “T” handle on the right half of the instrument panel that eases the starting chores.

In most areas, there’s a big handling difference between the A and E models because of the difference in weight. An original, lightly finished A model with its 65-hp Continental weighs 710 to 725 pounds or about the same as a Cub. The 90-hp E models sometimes weigh as much as 200 pounds more because of electrical, interior, tanks, etc.

There’s some difference of opinion as to how to start a takeoff in a Champ—stick forward or stick back. A lot of the flight schools that used later 7ECs with the no-bounce gears routinely started the takeoff roll with the stick full forward. Presumably, this was done to get the tail up as soon as possible to keep the oleos from extending. If the pilot waits too long to pick the tail up, the weight will come off the oleos while in a three-point position, allowing them to extend. When they’re extended, they have little to no resistance, so they’ll compress easily. When one compresses, even though the airplane is headed straight, the illusion is that the airplane is turning, and pilots often poke in rudder that’s not needed, causing a swerve where
there was none. Bear in mind, however, that all of this is happening in slow motion as the airplane will fly off somewhere in the neighborhood of 45 mph.

Theoretically, the bigger-engine Champs will climb better than the lowly 7AC but not by much. The books say an AC is supposed to give 500 rpm and the EC 800 rpm. In real life, the difference isn’t that great. Because of its lighter weight, the 7AC floats off the ground compared to the 7EC, which feels more like it’s on rails. Only the very lightest 7AC, however, has the featherlike feeling of a Cub when it separates.

Most of the Cub’s resemblance to a feather is probably because the Cub has just enough wing area that its wing loading at gross is a little lower, 6.8 pounds/square foot to 7.1 pounds/square foot. The books say a 7EC weighs 890 pounds empty (1,450 pounds gross, more than a C-140) compared to a 7AC at 710 pounds (1,220 pounds gross, about the same as a Cub).

Note that the 7EC, despite its much bigger engine, has about the same useful load as the 7AC.

Once up to cruising speed, the 7AC (65 hp) generally can be depended on to fly 5 to 8 mph faster than the similarly powered Cub, or a good solid 85 to 90 mph. The 7ECs seem to run about 90 to 95 mph.

Ask any who fly a Champ and they’ll all say it’s a “rudder airplane.” That’s because its adverse yaw is so pronounced that you either coordinate with rudder or slip and slide around on the seat. It’s much more noticeable than in a Cub. This makes it a superb trainer.

When you start trying to compare things like roll rate and aileron pressures between airplanes such as the Cubs and Champs, you’re dealing more with perceptions than actual differences. For one thing, the Cub control stick juts up higher, especially in the front seat, and has an innately “bigger” feel to it. The mechanical advantage means the stick moves farther than a Champ’s in the same situation, but the response is probably close to being the same. Also, the pressures are close, but it is very difficult to say. The perception is that Cub controls are heavier, when they really aren’t.

There is, however, a difference to the overall feel of the controls. Somehow, a Cub feels a little more precise and a touch quicker. We’re splitting some very slow-speed hairs at this point, but that seems to be the general opinion.

Compared to a C-152, the roll performance will seem leisurely at best. The pressures are slightly lighter than a Citabria and the roll rate about the same.

The Champ stalls normally, with just a tiny bit of edge to it. Release the stick and it’s flying again. Kick a rudder hard and it rotates into a surprisingly comfortable spin that stops as soon as you release back pressure and punch a rudder. Just letting go will bring it out almost as quickly as doing something deliberate.

Depending on the model, a Champ is happy to approach at just about any speed, but keeping it under 60 cuts down the float. Three-point landings happen almost automatically once you get used to a nose that’s not in the way. The sight picture isn’t that much different than landing a C-152 on its mains and holding the nose off. Actually, you can probably see more out of the Champ.

In a no-wind situation, the airplane will track perfectly straight. Given a good crosswind, the pilot will have to work a little harder, but the airplane will handle it as long as the pilot keeps the wing down and the nose straight.

Wheel landings are also automatic and probably easier than in any other type of taildragger. Just don’t force it on. Let it find the ground, pin it in place, and the landing is over.

The controversy between those who love the Cub and those who swear by the Champ will never be resolved. The important thing to remember is they are both terrific airplanes, and the Champ wouldn’t have survived as long as it has if it hadn’t had the Cub as a role model.
As Keith Swalheim's SR-5 clearly shows, not all Reliants were Gull Wings. However, like many other Reliants, it too spent much of its life involved in blue collar aviation in Alaska and suffered accordingly.
Once in a while you’ll hear serious debates about which is more difficult: scratchbuilding an airplane from nothing but plans or doing a complete restoration on a big antique/classic aircraft. Truth is that neither is a walk in the park. When you start a scratchbuilt home-built, all you have is a roll of paper, a pile of tubes, and sheets of shiny metal. However, when you have your antique bird stripped down to its underwear and the ravages of time become evident, even though you have something that looks like an airplane right from the beginning, more than one restorer has come to the conclusion that working with rust, rot, and corrosion definitely make home-building look easier.

Not a Gull Wing but still a Reliant

By Budd Davisson
Further, regardless of the antique airplane’s age, that pile of decaying parts represents a certified airplane. That seemingly minor difference means that anything that applies to a brand new, half-million dollar Cirrus, also applies to the mildewed, rotten remains of a 1934 Whizzer Go-Fast. Once an airframe has been assigned a type certificate, it is certificated forever (unless it is put in experimental: air show/exhibition). So, the FARs figure into every decision, right down to the last nut and bolt, something homebuilders don’t have to worry about. If a restorer wants to update to newer, better hardware or components, he does it. If a restorer wants to do that, 337 Forms become a way of life.

So, when Keith Swalheim, of Cottage Grove, Wisconsin, looked at the SR-5 Stinson Reliant he had just bought, he must have wondered if he’d made a bad decision. Included in the long list of airplanes he has owned is a Pitts S-1S he scratchbuilt with a few friends. So, he knew the joys of working with new steel tubing and fairings that weren’t a collection of dents and welds. Still, there is something about the lines of a big old antique like the straight-wing SR-5 Reliant that touches the soul of a restorer/aviator as nothing else can. They literally exude history and character, something a homebuilt can’t be expected to do.

Keith says, “I found this SR-5 in Racine, Wisconsin. I saw it in an ad and bought it in 1987. It had been stored disassembled after being shipped from Alaska about 10 years previous, but basically, it was an entire airplane. You couldn’t really call it a basket case in the traditional sense because the major components were almost all there and more or less in one piece. How-

The instrument panel is unique to the SR-5 and Ken had to buy a trashed fuselage to find one for a pattern. An iPad is used in place of modern avionics.

According to Swalheim, if you have even a junk cowling, you save it: “bumps are expensive.”

1930’s aircraft borrowed heavily from the automotive and luggage industries for small hardware.
ever, what I didn’t appreciate at the onset was that it was actually the rusty remains of a tubing fuselage with an airplane-shaped cocoon wrapped around it, giving it form but no substance. Big airplanes, like Reliants, have acres of wooden stringers and formers, and in this airplane, almost all of them were too rotten to be usable. The door, which is several inches thick and a classic piece of cabinetwork, was a door in appearance only. It was so frail that you could easily have torn it to pieces with your hands.”

It has to be said, however, that Keith didn’t get blindsided by this project because his aviation roots run deep in vintage airplanes. In fact, he started flying in high school, but ran out of money and, for a decade, aviation was an on-again-off-again process for him (sound familiar?). Then he decided to get ‘er done and finished his training in a PA-15 Vagabond. He got his certificate in that airplane and then later restored it. So, the woes of rag and tube restoration were known to him almost from the moment he started flying.

He says, “I did the Vagabond in 1980, which seems a lifetime ago. It was my first full restoration, and it managed to win the ‘Best Piper’ award at Oshkosh that year, which I hadn’t expected. I eventually sold it, and it went to England. That airplane not only taught me how to fly, but how to work with fabric, wood, and steel tubing. I also had an old friend, Bill Amundson, in town who taught me fabric and how to solve problems when shooting Randolph dope.”

Given the difference in size and complexity, it could be said that the Vagabond gave him his rag and tube high school diploma. A follow-on project, a 108 Stinson, got him through “restoration college,” but the monstrous SR-5 project gave him a couple of postgraduate degrees, not to mention a Ph.D. in headaches. All of which, considering the final result, was worth it.

“If the fuselage tubing itself,” he says, “wasn’t too bad. I had to weld in a bunch of tubes at the back where it was pretty rusty, but you expect that in almost any old taildragger. So, all I had to do with most of the steel was have it sand blasted and powder coated a reddish brown that nearly matches the original color. The problem, with the airplane in general, however, was that the airplane has a ton of wood in it. Plus it had spent 36 years in Alaska, mostly outdoors, while it flew men and supplies in and out of remote mines. So, it wasn’t babied. Just the opposite, it was essentially a flying pickup truck that was essential to the mines’ operation. It was a tool.”

A lot about the airplane reflected its “supply truck” background because many nonessential parts were missing, both inside and out. “Basically, it looked as if they’d stripped out the back to make more room for cargo. Plus, the doors, besides being deteriorated, had been seriously abused while loading and unloading the supplies going into the mines and the ore, men, etc. that was coming out. The back seat was missing entirely, and the floorboards, even if they hadn’t been so deteriorated, couldn’t be used because they were really beat up. “The good news about the wood was that most of it was there and was good enough to be used as patterns. So, I made new floorboards out of marine plywood and gently took the door apart and used the parts for patterns to build a new one. However, building a new door wasn’t nearly as hard as finding the right door handles. I knew that both the door handles and the window cranks had come from a car. This was common for airplanes in the ’30s, but no one could tell me which car they came from.”

“Complicating the search for door and crank handles was the fact that no drawings existed for the SR-5, so I didn’t even know what he was looking for. Old photos were too fuzzy for positive identification, and none of the few SR-5s in the museums had the right handles. That much we could tell from the photos. I managed to locate a pair of old Buick handles in LaCrosse that closely matched old photos and was able to save the sill plates, but even the frames of the openings had to be made from scratch by ripping up birch.”

“The front seats were there, but again in form only as they were in terrible condition. You definitely
The Stinson may be old, but it is just as utilitarian today as when new. The entire Swalheim family, have grown used to traveling in Stinson-style.

Restoring the interior on an airplane that, for much of its life, was valued for its utility, not its history, almost always means the panel has been butchered or replaced.

wouldn’t have wanted to sit on them. Fortunately, the frames were good, so they were sand blasted and powder coated. The upholstery is leather and the headliner mo-hair, just like the original.”

Restoring the interior on an airplane that, for much of its life, was valued for its utility, not its history, almost always means the panel has been butchered or replaced. In this respect NC14163 was pretty average: The original panel was gone. Replaced by one of unknown lineage.

“Not only had the original panel disappeared, but the new one wasn’t close to being right, and even that one had been hacked up. This probably happened in 1946, when a bunch of radios and instruments were installed. This was a major problem because the panels on the SR-4 and SR-6 were different. I needed an SR-5 panel, which had a shock-mounted center panel, and that was that. I couldn’t fake it with an alternative.”

Keith says, “Only about 140 SR-5s were built so, in theory, that means in 1934 there were 140 instrument panels made for them. Seventy-five years after the fact, I had to find one of those 140 panels. There are maybe three SR-5s still flying and six or seven projects, and no one was willing to give up their panel. I lucked out when I found half of a chopped-up fuselage in Kansas that had the instrument panel intact. We used it as a pattern to make a new one complete with a wood-grain finish.

One of the more useful statements Keith made about flying the airplane is one that all antiquers could benefit from. He says, “To keep an antique instrument panel as original as possible don’t install any navigational avionics at all and try to hide them. Use a mini iPad instead.” Here we have a very clear “old meets new” solution to a long-standing problem.
The airplane had been ground looped hard at some point in the 1930s, which left the gear tweaked, but Keith could see where it had been straightened years before.

“The firewall,” he says, “wasn’t much better than the instrument panel. It had tons of holes, most of them having no obvious use.

However, there was the cutest little metal thermos jug mounted on the firewall, with nothing attached to it. I don’t know what it was for, but after making a stainless steel firewall, and removing it, I polished the little thermos and kept it, because it’s cute.”

The engine is a Lycoming, from back in the day when that company made “real” motors (meaning round ones). This one is an R-680-E3B that cranks out 300 horses and puts them through a 98-inch (that’s more than 8 feet folks!) 2D20 Hamilton Standard prop that was overhauled by Maxwell in Minneapolis. That sounds

With the exception of forming/repairing the cowl, Swalheim did the majority of the restoration himself, including the painting. It is finished in Randolph dope. The very definition of the word “Classic”, the old Stinson’s Reliant lines are hard to miss.
The Lycoming R-680-E3B cranks out a solid 300 hp.

The expansive cockpit begs for details like the map pocket.

The flares are no longer there: some details are better left out.

The big tail was a Reliant trademark.
simple, but “…the blades were bad, and it was really hard to find another set.” Nothing is simple when restoring flying machines that are nearly eight decades old.

“The cowling was there, but it was just a bumpy sheet of welded patches and rips. However, no matter how bad an SR-5 cowl is, you find a way to save it. Which we did. I hired a pro, Sean Miller, to do that work. Basically, if you don’t have a cowl, you spend lots and lots of money. Bumps are very expensive.”

Keith says the cowl is held on by two turnbuckles that pull the cowl down around a system of rubber shock mounts that are bolted to the rocker arm housing castings.

The big panes of automotive glass that form the distinctive “V” windshield give the airplane a “deer in the headlights” look as they stare out over the shapely cowl. Fortunately, the windshield frame itself was in reasonable condition, so Keith didn’t have to get involved in the tedious work required to restore a badly bent windshield frame.

He was equally as lucky when it came to the wheelpants.

“I replaced the original brakes with Clevelands, so I could service them more easily, but I wanted to put wheelpants on it. The problem was that the SR-5 wheelpants were subtly different than both earlier and later ones. However, I found a pair from 1935 that matched the bolt holes perfectly. I was lucky.”

His luck continued upward into the wings because the spars were good and only needed re-varnishing. The ribs are square aluminum trusses, and termites and fungus don’t like aluminum so the rib work was purely mechanical in nature. Even so, the wings were completely disassembled. He did it one wing at a time, so he always had a wing to use as a guide for the other one.

“The small nose ribs up front were 1/4-inch plywood and replacing them was easy, and I covered them with a new, very stiff 0.032 leading edge.”

The aileron controls got new cables, but the flaps are actuated by a mechanically turned torque tube. 1934 was the last year for Reliant flaps to be mechanical as 1935 introduced a vacuum cylinder.

When the billion details that went into bringing an ancient pelican back from the edge of death were finished and it was time to install the feathers, Keith split his allegiance between old and new: The covering is Ceeconite, but the finish is 30 coats of butyrate dope with lots and lots of sanding and polishing. Incidentally, he did all the painting himself. Not many paint their own airplanes.

“I never did know what the original colors were, but the scheme we used is right. That much I know. The basic color is Sandalwood Tan, with Colorado Red trim and True Blue pin striping.”

For what it’s worth, Keith, it looks absolutely right to us, whether it is or not.

So now that the monster Stinson project is done, what’s next on Keith Swalheim’s agenda?

He says, “I have a Cessna 180 in Arizona, where I spend half the year, ready to finish. And I’m the third owner of a 1935 Chevy two-door that needs my attention. So, I’ll keep busy.”

Of that, we’re absolutely sure. Folks that challenge the impossible, as represented by a big Stinson, don’t make watching TV reruns a habit.
I like “working” airplanes—airplanes that earn their keep—not “hangar queens.” This story is about a “daily flier” airplane—the antithesis of those perfect award-winning showplanes. These vintage airplanes are prized because they are an economical way to get into the air. We own them because we appreciate their flying qualities, and because they take us back to an earlier, simpler time—a time when flight was more about aerodynamics and control than electronics, and when every flight was an adventure. For most vintage aircraft owners, our aircraft will never win an award, and that’s okay with us.

Simply owning the airplane—and being able to fly it whenever we want to—is reward enough. While others complain about the cost of flying (or quit flying altogether), we owners of these “flying flivvers” happily enjoy the economical pleasures these everyday airplanes provide—just as they’ve been doing for decades.

My Cessna 120 and I were both “born” in the same year—though NC2492N officially became an airplane on February 17, 1947, and I wouldn’t become “official” until May 1—only a couple of months later. I guess that it could be said that we were both postwar babies—my folks waited until the end of the war to get married, and Cessna produced the Model 120 to offer to the thousands of pilots who would be
returning from the war. As it turned out, we were both “delivered” to the same area—rural Ellendale, Minnesota. We were within 5 miles of each other in our early years, and we both “lived” on farms.

I received my first airplane ride at the age of 4, but not in this airplane. This airplane was less than 1 mile away from where I did receive my first airplane ride. Since we both turned 67 this year, it’s only fitting to tell the story.

My dad was not a pilot, and was initially against my learning to fly, but he did say that I could do anything I wanted to do—provided I pay for it myself. Most kids like to challenge the limits of parental authority, and I thought I would shock them by announcing that I’d like to learn to fly. My parents talked it over, and held to their word—but they wouldn’t help me out, either. I mowed lawns, worked for a drainage company laying drain tile in swamps, and worked at a lumberyard to make flying money. Since I was not yet 16 (or legally able to drive a car), I had to ride my bicycle 9 miles on a gravel road to Albert Lea for flight lessons. I put in my flying time, and on my 16th birth-
I soloed. I had a pilot’s license before I had a driver’s license.

First Date

I first met NC2492N when I started taking flying lessons in 1962. It was a former trainer at the Albert Lea Airport, but had been replaced by the newer Cessna 150 in 1961. The FBO operator sold half of the airplane to a young farm boy. I had soloed and flown about 30 hours in the 150, and my uncle (who owned a 172) and I considered buying an old Champ or Cub together. We figured we could buy one for under $1,000 at the time—still big money for someone only 16 years old.

My dad had taken pity on me and driven me to the airport on a cold November Sunday in 1963—and he was getting the urge to go flying (though being a taciturn Dane, he wouldn’t admit it). We overheard the young farmer tell the FBO operator, “I’m going to have to sell my half of the airplane. I’m getting married, and my fiancée wants a couch, not an airplane.” Dad asked me which airplane they were talking about, and I took him into the hangar to look at it. It looked a lot like the 150, except for the “conventional” tail-dragger landing gear and the fabric covering on the wing.

“Is this a good airplane?” he asked. “Do you suppose I could learn to fly in it?”

I allowed that hundreds of pilots had learned in this very airplane, and he asked me to arrange a demonstration ride in it. The next day was sleeting and raining, with low clouds—but when I looked up from my high school classroom, I saw 2492N on base leg.

I heard nothing more from Dad about the airplane, but a few days later he asked, “Do you have $900?” I affirmed that I did, having just been paid for working for the drainage company. “Then you own half of the airplane,” he said.

I couldn’t believe it—I didn’t own a car yet, but I owned half of an airplane! “Don’t tell Ma,” he admonished. “I have to buy her that freezer she wants in order to keep the peace around here!”

The rest of the winter was spent learning to fly the beast. After the easy-to-fly 150, mastering the tail-dragger (especially one as difficult as the 120 with gear extensions) was difficult. We spent hours just taxiing the airplane on the grass at the airport. Due to the lack of instruments in the 120, Dad and I had to take our FAA checkrides in the 150, but in May of 1964, I received my private pilot certificate! I immediately set about giving rides in the 120 to all who would help pay for the gas in order to “build time” toward the 250 hours re-
quired for the commercial rating.

During this time Jay Fenwick, who would become my best friend, was working for the airport. He was paid partly in cash, the rest in flying time. The FBO operator suggested that since I was going to get my instructor rating “right after the commercial,” that I teach Jay to fly (in my airplane, and at my expense, of course). As 17-year-olds, Jay and I had a lot of fun learning to fly that old 120. In May of 1965, I received my commercial rating days after becoming eligible for it at age 18. The following year, I received my flight instructor rating—the night before I was to report for induction into the Army. Jay and I had both volunteered for helicopter flight school—I was turned down because of my vision, but Jay got flight school—and flew the L-19 (O-1E) Cessna Bird Dog—a high-powered high-wing relative of the Cessna 120. I became a combat medic, but because of my civilian ratings, I ended up running an Army flying club and doing instrument training. My civilian ratings, earned in 2492N, probably saved my life.

**Now What?**

In the meantime, Dad got his private pilot certificate. He did the normal round of giving rides, but wondered what was next. In 1965, the FBO was working with a local Cessna dealer as a “sub-dealer” for used airplanes—they had posted photos of a dozen airplanes for sale above the Coke machine at the airport. “Which one should we bring down for you guys?” asked the FBO operator. I was shocked to hear my dad say, “The yellow Skylane.”

“Are you serious?” the FBO asked.

Dad replied, “Yes, the 120 just isn’t big enough for the both of us. We’ve been thinking about a 172, but maybe this would fit us better.”
We arranged for a demo of the 1959 Skylane. After the 120, we couldn’t believe the room and power of the Skylane.

A few days later, Dad asked, “Do you have $4,750?”

I told him I did, as I was now out of high school and working.

“What about the 120?” I asked.

“We’ll sell it ourselves” was his reply.

We didn’t sell the 120 until I was in the Army, a year later. I still flew the airplane until I left—it was cheaper for me to fly it than the more expensive Skylane.

While in the Army, I got a letter—Dad had sold the 120 to a party in a nearby town. My pet was gone—but I still owned part of the Skylane, and on Army pay, I wasn’t going to be doing much private flying anyway. Best of all, we had paid $1,800 for the little Cessna, flown it hundreds of hours, and sold it four years later for $2,500.

I knew that I wanted a career in general aviation. A few months later, I got another letter—the airplane had been sold again, this time to an owner in another town. Incredibly, the airplane somehow had less time on it now than when we originally sold it—probably due to the lack of a recording tach.

For every hour of flying equals multiple hours of polishing!
I lost track of the aircraft for several years, but stopping at Baudette, Minnesota, after a fishing trip to Canada in the late ’70s, I saw 2492N tied down outside.

I lost track of the aircraft for several years, but stopping at Baudette, Minnesota, after a fishing trip to Canada in the late ’70s, I saw 2492N tied down outside. The paint we had done in 1965 was beginning to look more than a little sad. Every year on our annual trip, I would make a point of going over and visiting my old friend. It continued to deteriorate, but obviously, it was being used.

The airport operator indicated that a pilot used it to give rides to his grandchildren, and flew it on skis in winter to fishing spots on the lake. I left a note for the pilot each year—telling him that if he ever wanted to sell it, to please get in touch with me. Fifteen years later, in 1994, I received the call.

“I need to trade up to something faster,” the owner said. “It takes me too long to get out to Steamboat Springs to ski with my grandchildren, and the airplane struggles to clear the 11,000-foot pass! I’m going to ask you too much for it, because I know you’ll pay it—but you can ask too much from me for that Cherokee, so we’ll all get along okay.” We struck a bargain over the phone, and he delivered the Cessna.

The airplane was really tired. The fabric was poor and patched, there was hardly any paint left on the fuselage, the seats were ripped, the engine was on its last legs, and the panel had been chopped up. The good news was that it had the original engine and prop as spare equipment—though neither was airworthy. I flew it twice, and then decided we had to do the restoration.

Restoration

Old 2492N was disassembled—completely. The good news was that there was no corrosion, and very few parts requiring replacement. The airplane became a “back room project” at my FBO—when there was nothing else to do, the mechanics worked on the 120. The predictable result was that the airplane had more time billed against it than it took Cessna to build in the first place. The wings were re-covered—they were in excellent shape inside. Our mechanic had done an excellent job in covering them in 1965, 40 years prior.
The control cables and pulleys were replaced, the wiring replaced, the original engine was majorly overhauled, all accessories and the exhaust overhauled, and new glass was ordered. The original prop was sent out for overhaul. The instrument panel was removed, taken to a metal shop, new metal welded in, and reshaped and repainted to look like new. All of the original instruments were there, including the radium “glow in the dark” gauges. All instruments were sent out for repair—as I understand it, the radium-dialed instruments can be repaired, but not overhauled. I wanted the interior to be as close to original as possible—the original seat covers were still in place under the newer covers. Cessna could not give us the original paint numbers or seat colors, but Airtex was able to find material for the seats that exactly matched. The remaining paint was removed, the fuselage polished.
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The Cessna 120/140

The Cessna 120 and 140 were produced on the same production line. The 120 was the “standard” version, intended for flight schools, and the 140 was the “deluxe” version for personal travel. The basic 120 did not have the flaps, rear window, or fancy upholstery of the 140. Even the electrical system was an option. Both aircraft shared the Continental 85-hp engine, capable of moving the airplane along at about 100 mph on 5 gallons of fuel per hour. The airplanes carry 25 gallons of fuel. My airplane has a useful load of 585 pounds. Takeoffs and landings aren’t “Cub short”—but they are better than most “modern” airplanes. Rate of climb, though, is anemic. There is only so much you can do with 85 hp. Expect to pay in the neighborhood of $15,000-$20,000 for these early Cessnas—slightly more than for an early Cessna 150. The 120/140 morphed into the Cessna 150 with the addition of tricycle gear and a square tail. Look at the lower upturned door lines and the primitive instrument panels of the first 150s—the Cessna 120/140 family history is very evident.

The owner of 2492N offered to fly me the 20 miles to the hospital—away had an inflamed appendix. I questioned whether the newly overhauled engine was making power, as it didn’t produce the static rpm on the ground that it should have—though it did okay in the air. I wondered if my memory of the performance of the airplane was faulty, or if the 120 and I had really each gained that much weight. The problem was solved when we re-installed the original prop—though the prop pitch on the prop we were using was stamped 46 inches—it had been reworked to a much higher pitch—something on the order of 54 inches—well outside of specifications. The airplane performs just great with the “proper prop.”

Today, the airplane is not an award-winner, and that’s okay with me. During the restoration, the mechanics asked if I wanted to replace the wrinkled nose cowl—there was even one located. “No,” I told them. “That’s part of this airplane’s history.” The only damage that the airplane has ever sustained was in the winter of 1951. A blizzard had shut down all roads in southern Minnesota, and my mother was pregnant and due with my sister. The county had broken two snowplows trying to open the road to our farm, so she had to walk nearly a mile to a country road that had been shoveled open, where a neighbor was able to break through to the main highway and to the hospital at Albert Lea, Minnesota. Unknown to the plow operators, a neighbor about 5 miles away had an inflamed appendix. The owner of 2492N offered to fly him the 20 miles to the hospital—the airplane was equipped with skis. The neighbor was strapped in, the airplane fired up, but it didn’t accelerate fast in the soft snow. The skis went through the top wires of a woven-wire fence buried in a snowdrift, and the airplane went up on its nose, bending the prop and denting the cowling. The would-be patient now had a broken arm in addition to his internal problems—and was evacuated by sleigh. The airplane was not seriously damaged—the propeller was straightened, and the dents pounded out—it continued to fly from the farm field when the snow melted. The cowling was that way when I bought it 12 years later—it continued to fly all these years—it was obviously airworthy—so I wanted it left just as it was when I bought it, dents and all.

2492N and I are a lot alike in that manner, too. Both of us have enjoyed good health—(though we’ve both gained weight). As Indiana Jones quipped, “It’s not the age, it’s the miles!” We both have a lot of miles on us, but we haven’t slowed down one bit. Neither one of us has spent any time at the doctor’s office, except for FAA-mandated inspections for the airplane and flight physicals for me (though 2492N DID get a “like-new overhaul” at age 50—something not available to humans). We taught each other to fly.

Old “92 November” still knows how to fly—and it doesn’t make some of the mistakes that it did 50 years ago—it’s gotten smarter!

That old Cessna 120 launched me on an aviation career—a flying career that has let me fly 312 unique types of aircraft, visit 78 countries by private aircraft, and have a thousand adventures. That airplane also taught me something about life as well. Some things are keepers—you don’t throw them away just because you found something better-looking. Sometimes, you encounter adverse weather, mechanical problems, or troubles that are not always of your own making. It’s part of life and part of flying—you have to just deal with it. Whether airplane or human—just pound out the dents, make yourself airworthy, step back and evaluate, and continue to fly. Those wrinkles? Why, they just add character—they’re part of the story!
Viewing the aeroplane for the first time, fans attended the first major International Air Meet at Reims, France, in August 1909, with close to 500,000 spectators. It set the standard for all future air shows of the time. To meet the challenge, they built special grandstands, numerous restaurants, a barbershop, and even press facilities. The main drawing card was the Gordon Bennett Cup Race (speed contest). Reims had over 500,000 people in attendance. In the end, a handful of Americans cheered their countryman Glenn Curtiss to a six-second victory in the Gordon Bennett Cup (46.77 mph). The race and the entire Reims meet were a huge success and helped to establish air meets as an international spectator sport for fans and dignitaries of Europe and the United States.

Challenged by the Reims meet, Albert Bond Lambert (namesake of St. Louis Lambert International Airport), who attended the event in France and was a leading St. Louis industrialist and aviation enthusiast, offered Glenn Curtiss (from Hammondsport, New York) a guarantee of $5,000 (2013 - $122,000) to fly his Gordon Bennett Trophy
winner, the Golden Flyer, at the Airship Show in St. Louis, October 1909. Curtiss, who was the fastest man in the air (47 mph at Reims) and the fastest man on the ground (motorcycle at 136.27 mph at Ormond Beach, Florida, in his own V-8 engine design), accepted the challenge and proceeded to St. Louis in late fall for the St. Louis Centennial Week exhibition. Thousands of St. Louis citizens turned out to watch Glenn Curtiss in his Reims racer—the “Celebrity of the New Air Circuits.” At the time, the newspapers were full of headlines of the Wright brothers suing all the pilots (worldwide) and air meets for infringement of their patents, as they felt they owned the rights to all the flying experiences.

The public’s aviation interest at St. Louis and at Reims inspired a group of aviators at St. Louis, including Curtiss, to get together to discuss how they could capitalize on the growing interest in aviation. They decided to hold a world-class air meet of their own in the style of Reims and in the United States as soon as possible. It would be an “international event,” featuring the best aviators from around the world. With winter on the horizon, Los Angeles was their choice of location. At that time, Curtiss was considering the West Coast as a potential area for his winter flying, as Hempstead Plains in Long Island, New York, proved to be impossible with the northern winters and the winds. In October 1909, airship (not aeroplane) pilot Roy Knabenshue from Toledo, Ohio, and Charles Willard, the first man Curtiss taught to fly, met and decided to use Southern California as a winter base for their aerial demonstrations. To reinforce the event’s “international” billing, French aviator Louis Paulhan, a notable from the 1909 Reims meet, was invited. He took part in many air meets, including Douai, France, in July 1909, where he set new records for altitude (150 meters) and duration (1 hour 7 minutes), covering 47 kilometers, and the Grande Semaine d’Aviation in Reims. Flying a Farman in Lyon, he broke three records: height of 3,036 feet, speed of 12 miles in 19 minutes, and in weight, carrying a 160-pound passenger. Paulhan was guaranteed a small sum of money as encouragement to attend the L.A. meet. They then persuaded railroad magnate Henry Huntington to pledge $50,000 (2013 - $1,170,000). The Wrights refused to partake in the flying event due to noncompetitive spirit and Sunday flying.

Hence, with the help of Dick Ferris (L.A. promoter), Henry Huntington (L.A. railroad owner), the Los Angeles Merchants and Manufacturing Association, all the major cities of the West Coast, plus William Randolph Hearst (Los Angeles Examiner owner and aviation fan), they decided to move ahead, and a few months later, Los Angeles hosted the “First American Air Meet” from January 10 to 20 in 1910.

This first major U.S. aviation meet took place at Dominguez Field, just 15 miles south of Los Angeles. The first location considered was a field in Santa Anita, but physical obstructions such as tall trees led the aviators to search for another site. About a month before the January start date, Dominguez Field was agreed upon. The Dominguez family donated the property for the event; it was a former battle area in the Mexican War. This field was located on the top of a small hill in land that was once a part of the Ranch San Pedro, an early Spanish land grant, and could not be viewed by nonpaying attendees as in the case of Reims.

Arriving from the Rose Bowl Parade in Pasadena, Curtiss agreed to the plan, though he had no intention of using the meet to defend the Bennett Trophy he captured at Reims; that race would be months away (October) and held in New York at the Belmont Race Track. However, he believed more money
was to be made in California. Curtiss was looking for winter quarters somewhere in the warmer climate of Southern California. He made several inquiries during the Dominguez meet, and residents from both Los Angeles and San Diego made inviting offers. The greatest inducement came from the Spreckles Sugar Company, which offered some vacant land it owned in the San Diego area known as the North Island for a token rental fee of $1 per year. Another feat, Lt. Paul Beck (U.S. Army representative) flew as a passenger with Paulhan to test the feasibility of aeroplanes in war by dropping bags of sand on designated ground targets.

All of the U.S. states west of the Mississippi had been plastered with posters/brochures; special trains from San Francisco, Arizona, San Diego, and St. Louis had all been booked. Trainloads of lumber would be required for the building of 26,000 seats for the fans, along with electric lights for the tent city of aeroplane hangars. Auto roads for parking would have been constructed. At the Hotel Alexandria (Pilots Hotel), all the rooms were booked. Fifty-thousand people were estimated from San Francisco. All politicians had their schedules fixed. Huntington’s trains were designed to haul 600 to 800 people every two minutes. A full hospital staff was on duty along with a small army of special police (300 men under Sheriff Hammel) to keep the fans away from the aeroplanes and off the infield and to subdue pickpockets (a popular venue at the time).

Telegraph companies placed special wires in the reserved box seats to keep the world aware of the current events. The “Aviation Camp” was ready. The weather had cooperated with average winds of 3 mph and temperatures of 65°F during the day—significantly warmer than New York City which was hit on January 15 with 14 inches of snow in a blizzard and several deaths.

Paulhan and Didier Masson were served Wright lawsuit papers as soon as they arrived at the Port of New York City on January 3, 1910, as was Curtiss prior to his departure from New York. Judge Basel granted a temporary wavier for the fliers against the Wrights, allowing for no restrictions on the fliers at the air meet just days prior to the meet. The plan unfolded to create the “1910 Los Angeles Air Show” which had a circuslike atmosphere—literally. Spectators who got off one of Henry Huntington’s trolley cars and walked half a mile on newly built sawdust roads to the aviation field were met by sideshow barker, a Ferris wheel, and deep sea divers. Attractions also included the Siamese twins Cora and Etta, who were dubbed the Human Biplane in honor of the occasion (most from the Seattle World’s Fair the previous summer). Cash prizes were allotted for competitive events in altitude, speed, and endurance.

For the spectators, they paid
$0.35 per train ticket (round trip—35 miles) and $0.50 for grandstand admission, so the total for admission and round-trip train fare (all admission tickets had to be bought prior to boarding the train) was $0.85 for 14-year-old Jimmy Doolittle (of World War II fame later and Medal of Honor recipient) who attended. Also in attendance were Wm. Boeing, Thaddus Lowe, Pancho Barnes (of *Right Stuff* fame later), Glenn Martin, and William Randolph Hearst. Contributing talks and aeroplane lectures were given at the YMCA and university. Cortland Bishop, president of Aero Club of America, gave his approval for the advancement of aviation for this event. Each day was dedicated to Special City Program—from San Francisco to Arizona Day.

Curtiss made the first flight over California and the Pacific coastline in a new four-cylinder which sounded like 100 motorcycles all set in motion at the same time. Spectator turnout numbered somewhere around 254,000 by most accounts for the full event. (L.A. population was 319,198.) Although 43 flying machines were officially entered, only 16 showed up, and not all of them flew over the mile-and-three-quarters course, rolled perfectly flat for the aeroplanes/pilots’ takeoffs and landings. The *Los Angeles Examiner* called it “one of the greatest public events in the history of the West.” Gate receipts for the event equaled over $137,500 at $0.50

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**PRIZES and WINNERS**

<table>
<thead>
<tr>
<th>Prize</th>
<th>Award*</th>
<th>Winner</th>
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<tbody>
<tr>
<td><strong>Best Speed during Meet (10 laps)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>$3,000 ($66,000)</td>
<td>Glenn Curtiss – 23:43.4</td>
</tr>
<tr>
<td>Second</td>
<td>$2,000 ($44,000)</td>
<td>Louis Paulhan – 24:59.4</td>
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<tr>
<td>Third</td>
<td>$500 ($11,000)</td>
<td>Charles K. Hamilton – 30:34.6</td>
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<tr>
<td><strong>Endurance, best during Meet</strong></td>
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<td></td>
</tr>
<tr>
<td>First</td>
<td>$3,000 ($66,000)</td>
<td>Louis Paulhan – 1:58:32 / 75.77 miles</td>
</tr>
<tr>
<td>Second</td>
<td>$2,000 ($44,000)</td>
<td>Glenn Curtiss – 1:35:05 / 37.05 miles</td>
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<tr>
<td>Third</td>
<td>$500 ($11,000)</td>
<td>Charles K. Hamilton 39:40 / 19.44 miles</td>
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<tr>
<td><strong>Height at any time during Meet</strong></td>
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<td></td>
</tr>
<tr>
<td>First</td>
<td>$3,000 ($66,000)</td>
<td>Louis Paulhan – 4,165 ft.</td>
</tr>
<tr>
<td>Second</td>
<td>$2,000 ($44,000)</td>
<td>Charles K. Hamilton – 626 ft.</td>
</tr>
<tr>
<td>Third</td>
<td>$500 ($11,000)</td>
<td>Glenn Curtiss – (not recorded)</td>
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<tr>
<td><strong>Slowest lap during Meet</strong></td>
<td>$500 ($11,000)</td>
<td>Charles K. Hamilton – 3:36.4</td>
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<tr>
<td><strong>Quickest takeoff</strong></td>
<td>$250 ($5,500)</td>
<td>Glenn Curtiss – 6.4 sec.</td>
</tr>
<tr>
<td><strong>Shortest takeoff distance</strong></td>
<td>$250 ($5,500)</td>
<td>Glenn Curtiss – 98 ft.</td>
</tr>
<tr>
<td><strong>Starting &amp; Landing in Square</strong></td>
<td>$250 ($5,500)</td>
<td>Charles F. Willard</td>
</tr>
<tr>
<td><strong>Cross-Country (distance)</strong></td>
<td>$10,000 ($220,000)</td>
<td>Louis Paulhan – 45 miles / 1:02:42.8</td>
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* Numbers in parentheses are the current-day, dollar-value equivalents.
per ticket (2013 - $3,217,500). In 1910, that number represented more than half of the population of Los Angeles, and that does not include the attendees who didn’t pay for grandstand seats and the 125 percent return on investment for stakeholders.

The key participant included Glenn Curtiss, the American hero who had won the prestigious Gordon Bennett Cup (owner of the *New York Herald*) race at the Reims race with a speed of 46.77 mph in 1909. Curtiss, American aviation pioneer and founder of the Curtiss Aeroplane and Motor Company, was the most famous with his motorcycle speed records. On January 12, Curtiss broke three world records in excess of 20,000 spectators. C.F. Willard finished off Tuesday’s record with a perfect flight and landing score. Paulhan went on to capture the world altitude record at 4,165 feet off the ground. This earned him the San Diego Medal. Paulhan won with the longest cross-country flight the world had known to date—1 hour 2 minutes, winning $10,000 (2013- $244,000). Curtiss still retained the speed record for the event at 55 mph.

Charles Hamilton and Lincoln Beachey, flying dirigibles at that time, later would become America’s greatest early exhibition pilots. And Louis Paulhan from France, who was the international star of the show. The Los Angeles air meet drew many famous aviators, most of whom were American. Other participants included Roy Knabenshue, Charles Willard, Lincoln Beachey, Charles K. Hamilton, Howard Warfield Gill, and Clifford B. Harmon, many of whom are listed among the Early Birds of Aviation. French aviators at the event included Paulhan and Didier Masson. Strict rules were enforced that all the pilots had to
fly either Monday or Tuesday to be considered for the prize monies for the remainder of the meet.

Paulhan dominated the Dominguez meet financially and won the opening day prize of $500 ($12,200 in 2013) for “Best Opening Day Show.” Paulhan brought with him to the event two Bleriot monoplanes, with Gnome engines, flown for the first time in the United States (the Bleriot was famed for its English Channel crossing in 1909), plus two Farman biplanes, two student pilots, his wife, and pet poodle from France. (He employed eight mechanics.) Consider the logistic issues of shipping these four aeroplanes and crew from Europe via ship and train and wagons to Los Angeles in an age with limited delivery service, no shipment tracking, and lack of telephones—main line of communication was the telegraph. In addition, the poor quality of gasoline on the opening days caused excess engine maintenance and unexpected flight delays.

In 1908 the record altitude was 25 feet above the ground; aircraft just started to make turns in 1908. In 1909 at Reims, France—under 100 feet above the ground (one-third a football field) at 47 mph; in 1909—1,640 feet above the ground (5.5 football fields); and in 1910—10,746 feet above the ground (2 miles) at 55 mph with a companion by Curtiss at the L.A. meet—a new record was set. Every day at the meet was a new record made—on almost every flight.

First, Paulhan set a new flight endurance record by carrying a passenger almost 110 miles (177 kilometers) in his Farman biplane in 1 hour 49 minutes. (Remember at this time almost every flight each day there was a new record holder.) Then he went on to achieve a new altitude mark of approximately 4,164 feet. (Later that year, Paulhan flew the “Le
Canard,” the world’s first seaplane, designed by Henri Fabre in France.) He also performed several aerial feats during the week and near the end of the show, and he carried U.S. Army Lt. Paul Beck aloft to perform one of the first aerial bomb dropping tests, using weights to simulate the bombs.

Overall, Paulhan ruled the skies over Los Angeles, winning as much as $19,000 (2013-$463,410) in prize money, but it seemed that Curtiss, a $6,000 winner (2013-$146,000), grabbed all the headlines with the Wright lawsuit (September 1909) and their legal battle to fly and build aeroplanes on a worldwide basis.

At that same time, promoters were staging the first international air shows; exhibition aviators were putting on their own demonstrations. Lincoln Beachey, the most inexhaustible daredevil of the early exhibition pilots, entertained more than 17 million people during a 31-week period in the 1910s. This is especially impressive when one considers that the entire U.S. population at the time was only around 76 million.

Yes, air meets and aeroplanes were here to stay for the world to see . . .

About the author – Walt has considerable military aviation experience as a retired lieutenant colonel for the Air Force. He has experienced numerous overseas deployments as a fighter pilot and former squadron commander. Walt is currently authoring a book, Aviation – The First Ten Years, due for publication in early 2014 (the first of an early aviation book series). As a member of EAA, American Aviation Historical Society, and the Tailhook Association, he promotes aviation at every opportunity.

References
Wikipedia.org; Air & Space/Smithsonian magazine; California State University; California Water and Power Associates; University Archives Showcases Role of Dominguez Hills in History of Flight; The Ford Library, Dearborn, Michigan; University of Michigan Library, Ann Arbor, Michigan; Northville Library, Michigan; City of Carson, California; Morris County Library, New Jersey; USHistoryScene.com; WingsOver-Kansas.com; AntiqueAirfield.com; MoHistory.org; American Aviation Historical Society

Author’s Notes: Remember—there were no parachutes, no heaters, no enclosed cockpits, no seat belts, no shoulder straps, no brakes, no life preservers, no deicing, no flying instruments, and no radios, but there were poor performing engines, wood spars, and cloth wings. By the end of 1910, there were approximately 1,000 men and women all over the world with pilot licenses. The 2013 exchange rate was $24.39 per 1910 dollar.
Winter Project

That winter I finished assembling the wings and hauled the fuselage home to make all new wood bulkheads, stringers, rear window frames, and the wood pieces that go on top of the fuselage between the wings. I made new Plexiglas windows; installed new rudder, trim tab, and elevator cables; bought a new instrument panel blank; cut the instrument holes into it in the original locations; and painted the panel in the original wrinkle-finish brown paint. The fuel tank, gascolator, and fuel shut-off valve were disassembled, cleaned, and repaired as necessary. I installed a new Airtex cloth headliner and the baggage compartment sack before installing the Poly-Fiber fuselage envelope. The firewall pad, headliner, and baggage compartment sack were color-matched as close as possible to the original pieces that were still in the Champ when I disassembled it. I reused the original floorboards and baggage compartment wood floor after sanding them and repainting them in gloss black. After installing the rudder pedals, brake pedals, and the stick mechanism, I installed the floorboards and built a rotisserie frame so I could roll the fuselage onto its sides or upside down by myself to make the fabric work and all the painting much easier to deal with. I knew I would be doing some of this work late at night and that there would not be anybody around at the airport to help me when I needed help turning the fuselage over.
After gluing the fuselage envelope in place and heat shrinking the fabric, I applied the first coat of Poly-Brush in my basement workshop. It was a good thing my wife was gone for the weekend when I brushed the Poly-Brush on, as even with all the windows open it really stunk up the house until the Poly-Brush dried. After applying a few reinforcing tapes, I decided that this was as far as I was going to go with the covering process in the basement workshop. I moved on to the tail feathers in my heated workshop at the airport where I could make as much stink as I wanted and not have anyone complain about it.

The tail feathers and ailerons took much longer to do than I had anticipated due to the number of pieces and my complete lack of knowledge and experience at what I was doing. This was all compounded by the fact that I have been called a perfectionist, and I wanted to end up with a show-quality finish on this Champ. I had won awards at Oshkosh and other fly-ins with several of my other planes, and Oshkosh was a driving factor in this restoration also. When my father was still alive, he wanted to see me restore 85E after he saw the quality of the work I was doing on the planes that I had built or restored. Fortunately for me the Poly-Fiber manual provides excellent guidance, in a humorous fashion, for someone like me who had no previous experience doing dope and rope work. Without that manual I would have been lost and would have had to wait for Oshkosh to attend the fabric workshop for a few days during the big week.

After I finally finished all the control surfaces and landing gear legs, I was feeling quite confident with the knowledge I had gained and was ready to tackle the fuselage again. I hauled the fuselage and wings back down to the airport and put the fuselage in my heated workshop in December 2002. I slowly worked on the fuselage over the next two months, finishing the taping process and applying the Poly-Spray and Poly-Tone coats of Champion Yellow with the Champ orange splash design on the sides of the fuselage. I bought paint masks for the stenciled N numbers and the original Aeronca winged logo from Moody Aerographics in Florida and located the masks on the rudder and vertical fin in the original locations and applied the orange Poly-Tone. Peeling the paint masks off after painting the orange was an exciting moment for me, as when I stood back and looked at the results it reminded me of that day back in 1959 when 85E arrived at RCX. I remembered looking at the Aeronca logo and the stenciled N numbers on the tail and thought that was a nice touch for such a low-budget plane as the Champ was back then. If someone would have told me back in 1959 that 44 years later I would be painting this same N number and Aeronca logo onto this same Champ at this same airport I never would have believed them.

The wings were actually the most fun of all the pieces to cover as they were big and didn’t have all the curves to tape around. I found them to be easier to cover and tape than the control surfaces were, although...
by now I had some experience working with the fabric process and had conquered the learning curve. Keeping the ribs straight while shrinking the fabric, applying the reinforcing tapes straight, and installing all the fabric hold-down screws took a good share of the time involved in covering the wings, but once I got to the silver and yellow spray coats the pace really picked up. I didn’t use spray masks for the large N numbers on the wings; instead, I measured it all out and hand masked the numbers, as paint design and N number layout is something that I have experience with from painting all the planes we had rebuilt or restored over the previous 40 years.

In February 2004 I went back onto the fuselage and fitted and installed a new windshield; installed the instrument panel and the reconditioned instruments, fuel tank, and plumbing; flocked the interior side panels in tan flocking; and made a new boot cowl due to minor dents in the old boot cowl by the fuel tank filler neck. I also made a new top cowl and installed new Dzus fasteners into it. The original nose bowl and bottom cowl were reused as they were in good condition yet. I rebuilt the main landing gear struts as well as the Scott tail wheel assembly. Then it was time to tear the engine all apart and send the pieces out to various specialty shops to get everything inspected and repaired. The cylinders were not cracked, and the bores cleaned up to where 0.005 O.S. rings would be just fine. The crankshaft required grinding to 0.010 U.S., and the crankcase had a crack by one of the internal webs that required welding. The connecting rods, pistons, and the crankshaft were balanced in an effort to reduce some of the engine vibrations and future cowl cracking and cowl cracking as I had balanced the 90-hp Continental in my T-8F Luscombe when I overhauled it, and it turned out to be a very smooth-running engine. The heavy old original mags needed some work, so I swapped them for a set of new lightweight Slick mags and a shielded ignition harness so I would be able to use a handheld radio in the future. The carb and carb air box were rebuilt, and then the engine was installed on the fuselage. I then made all new aluminum engine baffles with new leather flex strips stapled onto the aluminum baffles, the same as the original baffles were made. Now it was time to final fit, paint, and install the cowling, propeller, and spinner. 85E was now starting to look like an airplane again, and I could see the light at the end of a very long tunnel. Next I stripped the paint off the cabin door, painted and flocked it, and installed a new window and latch assembly. The wing struts were stripped and inspected internally with a bend-a-light and a borescope for rust pits. The struts looked like new internally; however, I replaced the left rear strut as my dad had backed into it accidently one day with his tractor and had creased the bottom of the streamlined tubing. It wasn’t creased so bad that it was unairworthy, but it just wouldn’t look right after this extensive of a restoration. I ordered a new strut from Univair and internally oiled all the struts to prevent any future rust from starting.

With all the parts and pieces finished, it was now time to think about putting it all together. With all the parts and pieces finished, it was now time to think about putting it all together. It was February 2007 so I had some time yet before the Bonanza rush would start. I mounted all of the tail feathers, hooked up the new control cables, and rigged the rudder, elevators, and elevator trim tab. In March I received a phone call from Craig Bailey from northern Illinois...
saying that he and Tom Mainland (both being Bonanza customers of mine) were flying up to see me that Saturday and, “We were going to install the wings on the Champ, no excuses; you better be ready cause it’s going to happen.” I called Carl Formanek and Wayne Tappon, a couple of my pilot friends from the local area, to see if they would be able to help that Saturday. All four of these guys were as anxious as I was to see 85E finally sprout its wings again as it had been a pile of parts scattered all over my hangar and basement for over eight years.

This may seem like a long period of time to restore a Champ, but I could only work on it during the winters, and one winter I did not even touch the Champ as I was rebuilding a damaged T-8F Luscombe. That Saturday morning I had everything all laid out and ready to assemble with all the new AN hardware ready to go. When the crew arrived mid-morning, I briefed everyone on how we were going to do this, and shortly after 85E was wearing its restored wings and struts.

After hooking up the new aileron cables, rigging the ailerons, installing the seat frames, cushions, and new seat belts, it was time to make new wing-to-fuselage fairings out of aluminum. The old ones were not in very good shape anymore and didn’t fit very well, so I made all new ones. Once these were fitted, painted, and installed it was time to weigh the Champ, finish the paperwork, and see if the overhauled 65 would run. After pre-oiling the engine and a couple shots of primer, the 65 started on the first pull of the prop. Once I was satisfied with the short ground runs and had checked the oil and fuel screens for any contamination, I started planning for some safe test flights. Since it had been more
than eight years that I had flown a Champ, or anything else as this was my only plane now, I needed to have a well-qualified safety pilot ride with me as I wanted to be the one who test flew 85E for the first time after the restoration.

There was no question who the safety pilot would be. How unique would it be to have the same instructor who taught me to fly 85E 41 years earlier be the one selected to be sure I didn’t screw up on the test flight. Elmer Wisherd at 87 years young still lived close to the airport and still occasionally flew N2811E, the Champ that he used to own to stay current. When I called Elmer to ask if he would be interested in being my safety pilot, he jumped at the chance. Now all I had to do was pick the day we would make the test flight. As I was lying in bed one early May morning, thinking about the test flight and trying to think if there was a day of any significance coming up that would help me remember that day in the future, I remembered that May 20 was my father’s birthday, so I decided that I would wait another week or so for the 20th to do the test flight. As I thought more about this date it dawned on me that May 20, 2007, would have been my father’s 100th birthday if he were still alive. Now I knew for sure what day the test flight had to happen on, if only the weather would cooperate. I called Elmer to let him know that he needed to keep the 20th open on his schedule, and when I explained why I wanted to do this on the 20th, he said we would do whatever it took to make it happen.

**Back to the Skies!**

Sunday morning, May 20, 2007, was not very nice, with low ceilings, light rain, and a wind that would be a crosswind on either of the two runways at RCX. I knew we would have to wait out the weather and see what would happen later in the day as attempting it now would be foolish. By early afternoon, things were improving somewhat so I called Elmer and told him that even if we just got the Champ off the ground and flew the length of the runway I would be okay with that. I had already preflighted the Champ about five times, making sure every nut and cotter pin was installed by the time Elmer arrived. Together we preflighted it one more time. By now the weather had improved some more and the rain had stopped, the ceilings were plenty high, and the wind had let up somewhat.

My initial plan was to circle RCX for an hour at an altitude that would allow a safe glide back onto
main tire finally chirped its contact with the blacktop, we were down to what seemed like a snail’s pace. Elmer complimented me on my landing, but to be honest, I had completely forgotten that he was even sitting back there as I was so focused on the landing.

Even today 85E is still a hangar queen, and it doesn’t get out much as we are both gracefully aging, but at least now it looks like a queen. The restoration took 1,830 hours to complete, over an eight-year period. With only a little more than 700 hours’ total time 85E has to be one of the least flown 1946 Champs out there. I’m often asked when I’m going to show it at Oshkosh, but 85E isn’t quite up to those judging standards yet. I would like to have a Sensenich wood prop up front instead of the McCauley metal prop that is on it now, and I need to have the original seat cushions reupholstered as per original.

Even today I still get phone calls and visits from folks who have heard the rumors that there is a low-time Champ that doesn’t get flown much tucked away in the back of a hangar at RCX and whether I know anything about it. It would be like stumbling onto an undiscovered treasure if the rumors were true. I’m now realizing my father’s concerns about selling 85E when he owned it. How do you know it is going to go to a good home and not get beaten and abused by someone who doesn’t appreciate having such an excellent piece of aviation history? Through the years, many of our friends and relatives, as well as a girlfriend named Karen, received their first airplane ride in 85E. Not having any children to pass it onto like my dad did, watching 85E fly away to a new home after living with it since I was 9 years old will be a really tough day for me to face someday.
In the last episode we discussed continued airworthiness on aluminum structures. This part will focus our attention on steel structures. To review a very important factor in continued airworthiness, the task falls on the A&P mechanic, for it is the eyes and feel of the technician coupled with years of experience that keep the old airplanes airworthy and flying. Let us never forget those handy individuals who have made aircraft maintenance a career. As a 50-year-plus aircraft mechanic, I can look back over my career and one important factor stands out. It is decision making with an eye on airworthiness and safety. Just think of how many critical decisions I have made in these past years that HAD to be right! Egads, maybe I should have stayed as a box boy in a supermarket, my second major job (I had a newspaper delivery route for the Los Angeles Herald Examiner, where I rode my bicycle over 6 miles every day but Sunday).

The subject is steel structures, so let’s look how steel is made and applied to the aircraft structure. Steel is refined from iron ore by alloying with other trace elements to give a desired product. The oldest steel application is coded 1025. The last two digits give the carbon content of the material, in this case .25% (that is point 25% and not 25%). Generally speaking, steels with carbon content less than .25% do not take a heat treat. Much of the older aircraft structure was fabricated from this 1025 steel. My experience with Travel Air and New Standard aircraft let me examine some of the drawings that show wide use of 1025 mild steel for wing fittings and some fuselage structure. In the late 1920s alloy 4130 appeared and was termed as “chromoly” steel because it was steel alloyed with a small amount of chromium and molybdenum. This material had good heat-treat ability and was easily gas welded, therefore, it found wide use in the aircraft industry.

Common 4130 chromoly tubing is purchased in the “N” condition. It is seamless tube and is normalized after manufacture, which means it has been heated to 1600-1700 degrees F and allowed to air cool. The material will be identified as 4130, Cond. N. The material strength in this condition is 90,000 psi. 4130 chromoly may be heat treated to strengths to 200,000 psi; however, at this strength the material may be brittle. Therefore it is tempered to a more workable strength, from 100,000 psi to 150,000 psi.

The heat-treating process is similar to aluminum, except the oven temperature is much higher. Chromoly is heated to its “critical temperature,” which is 1,575-1,625 degrees F. When the heat has stabilized, it is quenched immediately in oil. The tempering operation requires reheating to 900 degrees F to produce material to 150,000 psi, heated to 1,050 degrees F to produce material to 125,000 psi. Air-cooling from the normalizing temperature will produce a tensile strength of approximately 90,000 psi. Requirements for heat-treating will be found on the appropriate manufacturer drawing.
Illustration 1 details critical data when working with steel alloys as taken from the *Standard Aircraft Handbook*, by Leavell and Bungay. Note that typical heat-treat temperatures (hardening) show the 4130 steel heated to its critical temperature (when all alloying elements are in solid solution), quickly removed from the furnace and quenched in oil. The oil allows the steel to cool more slowly than a cold-water quench. The quenching procedure locks the alloying elements in their solid solution positions and hardens the steel. Notice that to soften the material (anneal), the material is heated to slightly above its critical temperature and cooled very slowly, which is usually cooling in the furnace. The normalize temperature for 4130 is very close to the heat-treat temperature but note “d” indicates the material is air cooled, which is slightly faster than oven cooling.

Steel alloy 4130 welds nicely with both mild steel or 4140 welding rod. Mild steel welding rod will not take a heat-treat so it cannot be used on a component that will eventually be heat-treated. The weld bead does not have a grain structure like the base component, therefore, it is crystalline in structure. Weld beads generally crack along the edge of the bead where it flows into the base metal. Occasionally you may find a weld bead cracked in the middle of the bead, but it is not common.

Illustration 2 details the “after heat treatment” process—how parts may be tempered to reduce hardness and brittleness. Tempering requires the part to be brought to a specific temperature, allowed to soak, then cooled slowly to produce the required heat-treated strength.

Some structural components were internally protected with boiled linseed oil. The oil was forced into the tube under pressure, the component rolled around to assure coverage of the oil around all surfaces, then drained. When I worked on ag Stearman aircraft, we would pressure oil the fuselage frame with linseed oil. It would amazingly hold 8 gallons of oil because all clusters were drilled with a 1/8” drill bit so the oil would flow throughout the entire frame. When the frame was full we would allow it to drain for up to four days, turning the frame, standing it on its nose and finally putting the frame into the three-point position to allow residual oil to drain to the
lower aft longerons. You can tell if some structures, such as engine mounts, have been oiled because there will be small rivets driven into the tubing.

Corrosion protection for steel structures is a must. Cleaning prior to painting or plating is commonly done using a sand blasting apparatus. For spot repairs, emery paper and steel wire brushes may be used. Normally three coats of a good epoxy paint is sprayed on the structure. On the ag airplanes we sprayed a red oxide primer first, followed by a second coat of yellow epoxy and followed by a third coating of white epoxy paint. By changing colors in each succeeding coat, you can see if there are any areas you missed. I have recently had some structural components powder coated, but I question whether one could see cracks through the heavy coatings.

Another protective measure is to cadmium plate, but this requires experience and is not normally done by most mechanics. With the cad plating process comes "hydrogen embrittlement," a buildup of hydrogen in the surface that degrades strength and can lead to cracking in high tensile strength parts. Baking is the only answer to this problem. Highly stressed steel parts should be baked at 375 degrees F for at least 3-hours. Recent studies indicate longer baking can be more productive, depending on course on the stress the part is required to withstand. Type 1 plating is "as plated," which is silver; Type II has a supplementary chromic treatment and is gold in color. Steel parts with tensile strengths greater than 240,000 psi after heat-treatment should not be plated. The Type II process is best for corrosion resistance. The Mil-spec for cadmium plating is QQ-P-416E.

Illustration 3 shows a typical cadmium plating tank, courtesy United Air Lines. Cadmium plating is a "sacrificial" protective electroplating of steel parts. In the corrosion process, the cadmium erodes until it is gone, then the part will begin to rust (corrode). That is the sacrifice the cadmium makes to protect a steel part. Here in Florida it takes less than three years for cadmium to dissolve on AN bolts and clevis wire ends. A continual problem! Stainless steel clevis ends and clevis pins are the answer, but are very expensive.

Typical repairs to chromoly steel structures are described in the Advisory Circular 43.13-1B. It should be noted here that the AC also gives approval to substitute 4130 steel for the older 1025 steel used to manufacture many old airplanes.

Illustration 4 depicts a fuselage fixture invented by Albert Vollmecke, Chief Engineer for Command-Aire. Al told me that a team from Curtiss Wright visited to copy his design for construction of the Travel Air series of airplanes built in Wichita. The steel production fixtures invented by Albert Vollmecke produced structures that were interchangeable and almost identical in size and dimensions.

Illustration 5 is a rare photo of a Command-Aire 3C3 being assembled at the Little Rock factory. Illustration 6 is another rare photo of a special steel table that holds the fixture to fabricate horizontal stabilizers at the factory.

Following its introduction, alloy 4130 became the norm for manufacturing steel structures in the
production of aircraft. The material’s hardness, strength and heat-treat ability made it an ideal choice for steel components. Alloy 4130 is a medium carbon steel containing .30% carbon. Carbon gives steel its strength; the more carbon the harder and more brittle it is. Tool steel contains .95% carbon and is impossible to file or cut with a hacksaw.

After welding, the area should be normalized by heating to critical temperature and allowing to air cool. I use a gas torch with a “rosebud” attachment and heat the weld bead area to a cherry red, then allow the part to cool in still air. This process should not be undertaken where there are drafts or wind blowing over the part as it will cool too fast. Normalizing after welding relieves the strains associated with melting of the base metal. A weld bead has no grain structure, rather it is crystalline in the melted area. Inert gas welding known as TIG causes less distortion than gas (oxygen/acetylene) welding, but all early structures were gas welded.

Inspection of steel structures for continuous airworthiness is critical. Areas on the outside of tubing where corrosion we commonly call “rust” will cause deep pits called “pitting corrosion.” These pockets of pits can reduce the strength of the material significantly. Consider if 50% of the tube circumference is pitted to a depth of 50% of the wall thickness, then the tube has lost approximately 50% of its strength in that area. In trying to invent a guide to determine airworthiness of a structure with corrosion, this is what I use. The question becomes when does the corrosion seriously affect tube strength to say it is unairworthy? That is the call of each individual mechanic who inspects the structure. And no two mechanics have identical opinions regarding corrosion and airworthiness. FAA AC43.4A is a good guide to study.

Internal corrosion in structural tubing is the most difficult to detect because it cannot be seen. Here I use a small center punch with a small ½ pound ball peen hammer or plastic mallet. I tap in the suspected area watching to see if the punch indents the tube. If it does I do a further investigation by cutting out a small portion of the tube to visually inspect. I make the opening no larger than needed; a small triangular cut into about 25% of the tube circumference is all that is needed. The small piece that is removed will show rust corrosion and one can usually bet the rest of the structure in that area is affected. Most likely it would be the aft lower longerons near the tail post. Replacement of the entire longeron or splicing of the affected area would be the only options.

As the FAA places more emphasis on the “aging aircraft” and issues concerning airworthiness, it is important to locate and retain a mechanic who has experience with these older structures. Steel tube, aluminum, wood and fabric structures that must remain airworthy for many years into the future can be kept in good condition by constant inspection and stopping corrosion before it can spread.
a bag of popcorn, or maybe join us at the ice cream social. The invaluable Friends of the Red Barn fund, with contributions each year by our fellow Vintage Aircraft Association members, goes a long way toward creating these many special moments in the Red Barn area.

As a reminder to the many hundreds of Vintage volunteers who assist us each year at Oshkosh, please consider traveling to Oshkosh to assist your fellow volunteers in preparation of the Vintage grounds prior to Oshkosh 2014. Work party dates this year are April 25, 26, and 27; May 16, 17, and 18; and June 27, 28, and 29. Call our Maintenance Chairman Michael Blombach at 260-433-5101 to register.

As always, please do us all the favor of inviting a friend to join the VAA, and help keep us the strong association we’ve all enjoyed for so many years. Join us and have it all.

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