



The Ten Month  
Restoration of...

# NC33NA

By "Team Waldo":  
Rob Lock, Lisa Heidinger and  
Roger Brown





# A Brief History of NC33NA

This aircraft, an Army PT-17, was built by the Boeing Aircraft Company in Wichita, Kansas in September of 1941. It was soon delivered to the famous military/civilian training base, "Thunderbird Field #1" in Glendale, Arizona. It served there, training cadets, throughout WWII.

Following the war, it was sold as surplus and eventually ended up as a crop duster with the Sawyer Flying Service in Joseph, Oregon. It was used in that capacity until the early 1960s.



The tired and run out "Stearman" was then sold, and ended up in California for a rebuild and reclassification to standard category. A new airworthiness certificate was issued in the late

1960s. The restored aircraft was sold to a family in Wendover, Utah. The family operated the FBO there... hence the "Northern Nevada Aviation, Inc." on the lower fuselage and the NC33NA change of the "N" number.

NC33NA mostly languished while in Wendover, with only forty hours logged in twenty years. It was purchased by current owner, Roger Brown, on April Fool's Day, 1990. Over these thirty-plus years, Brown has flown it more than 1,500 hours and has visited all 48 contiguous United States.

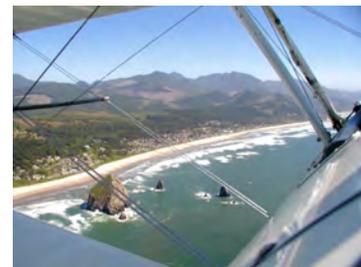
During Brown's ownership, the aircraft has been a regular attendee at the annual Stearman Convention in Galesburg, Illinois. For more than fifteen years, it has been a contender for, and multiple time winner of, the prestigious and coveted, "Aircraft Most In Need of Restoration" award. Typically, well over 100 aircraft are at the convention, and NC33NA would often be deemed the worst aircraft in attendance. One year, it won the aerobatic competition as well as the "In Need..." award.

## The Restoration of NC33NA

As we know, all too well, 2020 was the year of COVID 19. Rob Lock, owner and operator of Waldo Wright's Flying Service, gave Brown a call in June of 2020. They've known each other for about twenty-five years. The pandemic had shut down Lock's antique biplane ride business. He said something like, "Your airplane needs to be restored, and I need work!" Lock is an A&P, IA FAA certified mechanic. He has restored multiple antique aircraft, to include his Stearman, Travelair and New Standard. His father was Robert Lock, who's technical columns appear each month in the back of EAA Vintage Magazine.

After some tossing about of logistics, dollars and time frames... a decision was made to dive into the rabbit hole. Brown's main

requirement was that the project be finished in time to attend the 50th anniversary of the Galesburg Stearman Convention... scheduled to kick off on Labor Day of 2021. Lock responded with a less than convincing... "I think that's doable."



On August 4 and 5 of 2020, Brown flew the tired old NC33NA from Lowell, Michigan to Winter Haven, Florida... home of Waldo Wright's Flying Service. He landed a little before lunchtime, and by quitting time that day, all the sheet metal and all the tail group

had been removed!!! Over the next three days the wings and center section were removed... with all fabric stripped away from all components! What was underneath was mostly expected, but troubling nonetheless.

Brown's home is at Aero Acres (FD88) an airpark community near Fort Pierce, Florida. It is about a two hour drive, or a one hour flight from Winter Haven. Lisa Heidinger, a friend and neighbor of the Browns, picked Roger up on Saturday, August 8th. Using Lisa's pickup truck, they hauled all the sheet metal, wing struts and other items to Brown's hangar for paint stripping and repair.



A couple days later, they returned to Winter Haven to help Lock remove the engine (firewall forward) and all the bird cage. The engine, motor mount and induction system were taken to Brown's for disassembly, painting and detailing. The engine had just 300 hours since a 2016 Yesteryear Aviation overhaul.



Lock worked seven days a week on the project... completing the final disassembly, then beginning the road back. Heidinger began the daunting task of stripping all the sheet metal to bare aluminum. Brown was in Michigan for the remainder of the summer, but did what he could, by sourcing needed parts and offering moral support. He returned

to Florida in early October, and was amazed at the progress made on the restoration.

Brown and Heidinger began the process of building both upper wings and rehabbing the lower right. The lower left and center section were replaced a few years ago by Yesteryear Aviation. As you'll see in the photos, there was much wood work to be done. The wings were either all brand new from Yesteryear Aviation kits, or completely rebuilt to like new condition.

All wing hardware was removed, cleaned, inspected, painted and reinstalled. Once each wing was completed, it was hauled to Winter Haven for a test fit, then onto the fabric covering and finishing process.



Lock was pushing hard to keep the major components coming. He didn't want not slow up the fabric covering timeline. Brown and Heidinger were coached by Lock to help with the cover work... from the cutting and fitting, gluing in place, taping, stitching and sanding the silver Polyspray. Lock did all the spraying, to include the Polytone finish.

By early in 2021, the project was really on a roll. Brown and Heidinger were constantly making the trip back and forth to Winter Haven... either driving when hauling wings... or commuting in the Brown's 1946 Ercoupe. Somewhere along the line, the threesome dubbed themselves, "Team Waldo", after Lock's... "Waldo Wright's Flying Service".

Little by little... step by step, NC33NA began taking shape. The team could begin to see the finish line. The tail group was covered, painted and put away. Wings soon began to be finished and stored for eventual assembly. The fuselage was



covered. The landing gear and a new firewall were installed. By late spring, most of the components were nearing completion.

Sheet metal panels, doors and fairings were painted and soon found their way onto the fuselage. The tail group went on. On May 21 the lower wings were installed. Ten days later, Team Waldo was joined by Brown's wife, Terese and a friend, 19 year old Hannah Dougherty. The Upper wings were installed and rigged.

The next few days were a blur of activity. On June 9th, NC33NA was test flown by Brown... with a minimum of squawks to report. On June 10th, the Browns flew NC33NA to their Aero Acres home and a warm reception from dozens of neighbors!



The entire process was completed in just over ten months. Nearly two months ahead of the Stearman Convention deadline!!! Hooray "Team Waldo"!

## The Sidebar to the Story...

NC33NA's restoration began on August 5, 2020. The day before, Lisa Heidinger's husband, Albert, began a Stem Cell Transplant procedure. Albert, a United Airlines pilot, had been battling leukemia since late in 2019. Chemotherapy and other treatments had the disease in remission. Doctors recommended the transplant to increase the odds of staying in remission. A 100 day, isolation, near the cancer center, was part of the process.

In early September, Jill Manka, Rob Lock's companion of more than ten years, was sidelined with an illness. Jill is an integral part of Waldo Wright's Flying Service, and had anticipated being heavily involved in Brown's Stearman restoration. The illness, more or less, took her out of the picture for the bulk of the project. At this writing, both Jill and Albert are doing remarkably well, and are looking forward to attending Oshkosh!

Needless to say, all this had an huge impact on "Team Waldo". The reader might suspect that impact would be of a negative nature. To the contrary, the circumstances involving their loved ones, somehow translated into a

laser focus on the Stearman project. Rob and Lisa both stated, on numerous occasions, that the project had been their biggest salvation. Both said that thinking about the Stearman, working on the Stearman and relying on the support of Team Waldo was their key to sanity during these troubling times.

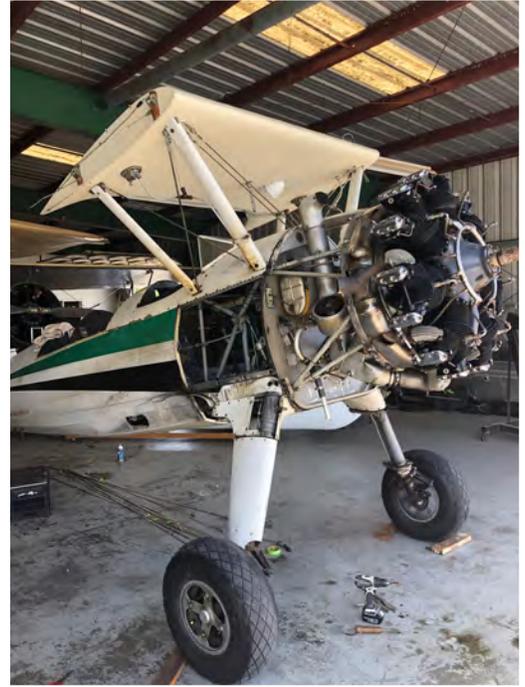
The restoration of NC33NA became secondary to a story



revolving around COVID-19, leukemia, a brain tumor and most of all... the camaraderie and friendship that

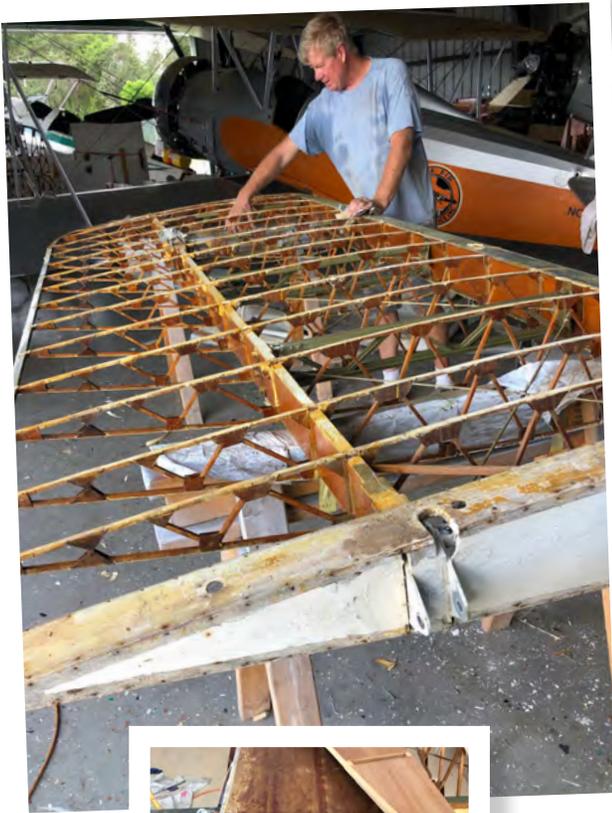
evolved into "Team Waldo"! Brown says, the beautifully restored Stearman is just icing on the cake!

## - DISASSEMBLING NC33NA -



After landing at Waldo Wright's Flying Service on August 5 of last year, the team immediately went to work tearing the plane apart. In less than a week, all major components, such as wings, center section, tail group, birdcage, sheet metal and firewall forward were removed. All fabric was removed from all components. The sheet metal and parts such as the wing struts, went to the owner, Roger Brown's hangar, near Fort Pierce, Florida. There, it would all be stripped of paint, repaired and painted in epoxy primer. The engine was stripped of most accessories, such as exhaust, intake, linkages, hoses, mount, etc. Everything was detailed before going back together. Some damage was found under the fabric covering. Pictured are a rotted wing walk on the lower right and a broken bow on the upper left.

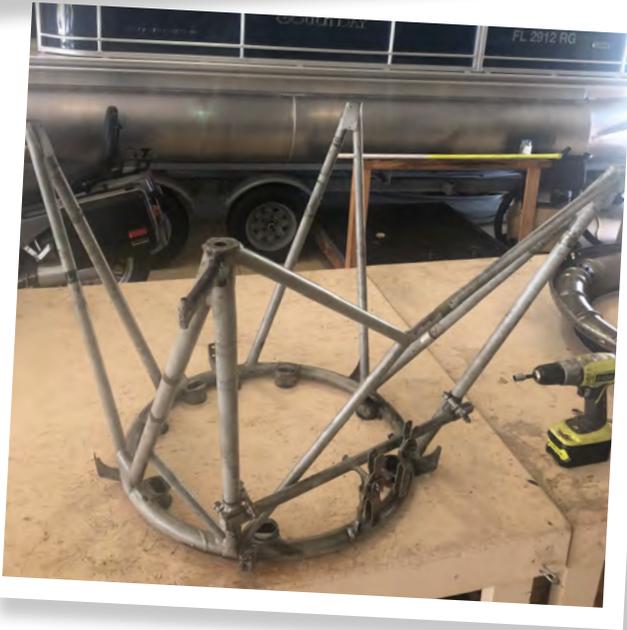




# - STRIPPING, PREPPING, PAINTING -

Team Waldo member, Lisa Heidinger spent weeks last summer stripping paint from sheet metal panels, parts, wing struts, seats and more. She became very good at it, using an environmentally friendly stripper and a power washer. Hundreds of small parts were salvaged, bead blasted and plated with cadmium. Other small wing parts were stripped and painted with epoxy primer before being reused in the new wings. The seats were carefully stripped. One wood seat still had the manufacturer's label under several coats of paint. The label was preserved.





## - NEW STUFF -



Not everything was salvaged. All new control cables were purchased from Yesteryear Aviation. New floorboards were made from mahogany plywood. Correct throttle quadrants we're sourced. New seat belts and harness came from Hooker. All new tires were purchased. Many new wing pieces were obtained, to include all new leading edges. A brand new baggage compartment was ordered. The upper left wing was completely NEW... with spars, ribs and leading edges coming from Yesteryear Aviation. A new stainless steel firewall was installed. Several "correct" instruments were sourced. Every nut, bolt, cotter pin, spring, bushing, bearing and screw is NEW! The list goes on, but you get the idea.



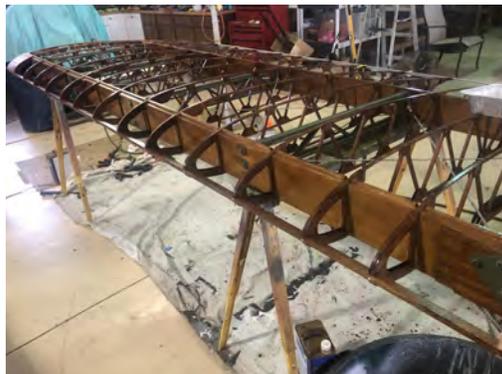
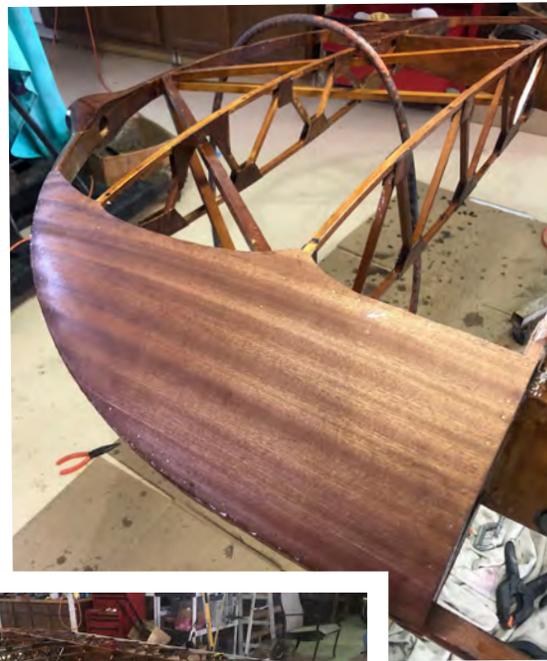
## - WOODWORKING -

There is a lot of wood in a Stearman. All the wood work was performed at Brown's hangar. The lower left and center section were purchased new, from Yesteryear Aviation just a few years ago. They were covered in poly fiber and painted through white Polytone. These two components were prepped and painted to match the rest of the aircraft in Polytone's "Glacier White".

Both upper wings were deemed to be beyond use, to include the spars. A Stearman friend, Jim Lyons, donated an upper right wing to the project. It had been built some time ago, with new ribs, using original spars. A thorough inspection revealed that it was in very good condition and definitely airworthy. Three nose ribs were broken from years of storage. Lisa went to school on those repairs. New ribs were constructed and installed using approved scarf joint methods and glues. All hardware was removed and painted. The hardware was then reinstalled and the wing was squared and trammed. Two coats of epoxy varnish were applied and new leading edges installed. The wing went off to Winter Haven for fabric covering.

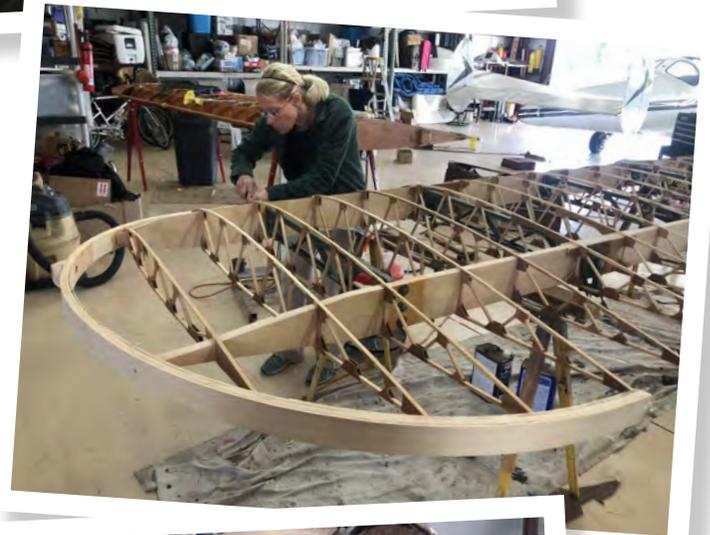
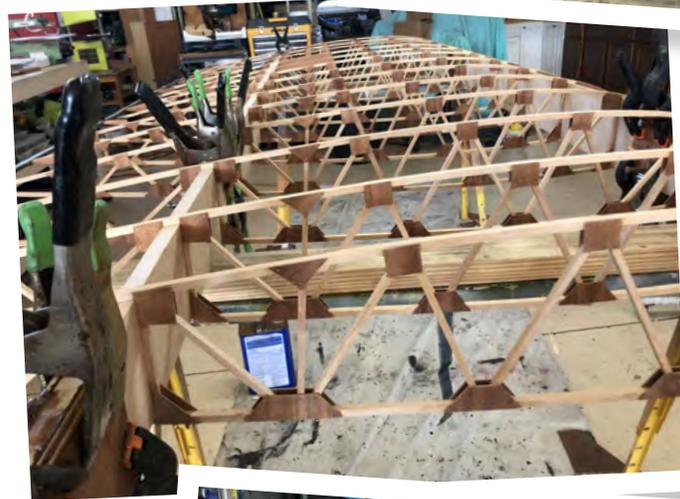
Next up was the upper right. This one was all new construction with spars, ribs and leading edges coming from Yesteryear. Construction of this was almost easy, compared to rebuilding the other upper. This one was soon off to Winter Haven for fabric.

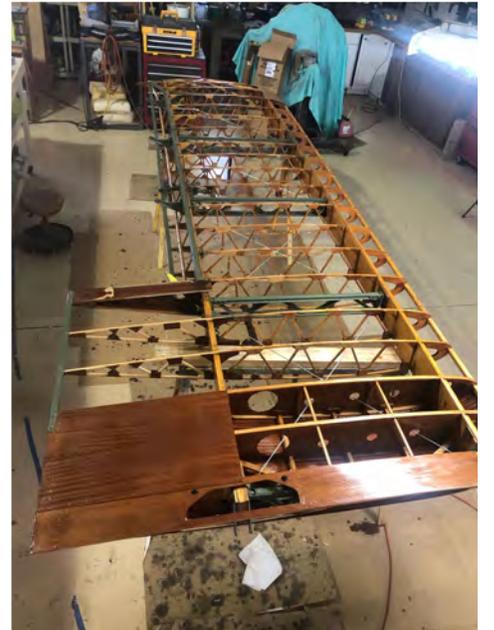
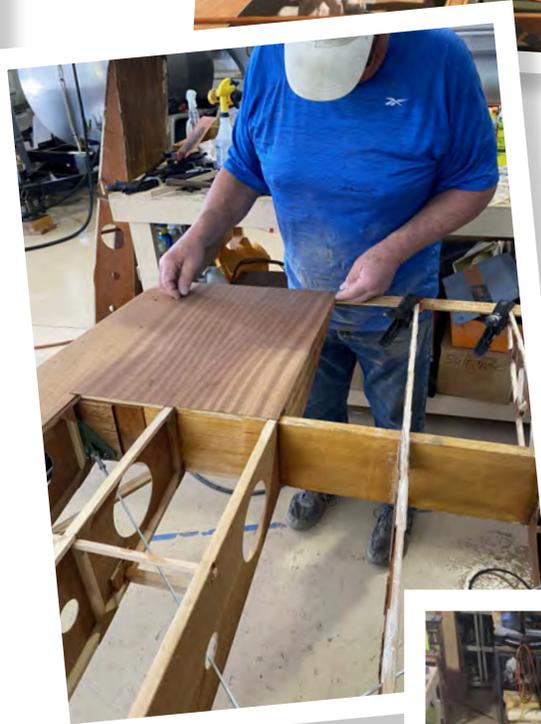
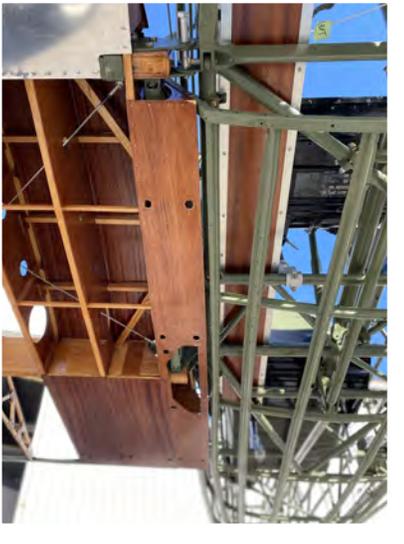
The most difficult was the lower right. This was a Dusters and Sprayers built wing. It was almost new when Brown purchased the aircraft in 1990. Again, a thorough inspection revealed a perfectly good



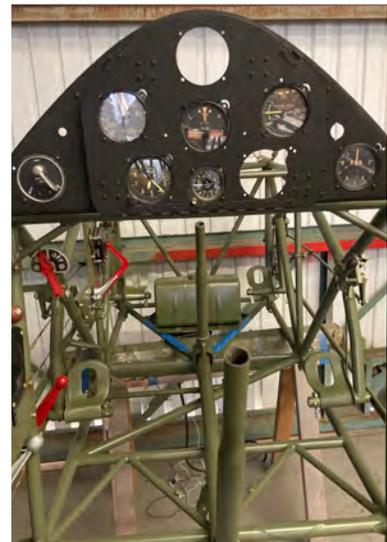
wing, with the exception of the inner three ribs and the wing walk area. Moisture had created a rot situation that had to be rectified. New ribs and wing walk materials were sourced from Yesteryear. All hardware was removed, stripped and painted. Every rib gusset was inspected and repairs made where needed. The wing was assembled, hardware reinstalled and it was trammed and varnished. New leading edges were installed and it too went off to Winter Haven.

As each wing arrived at Winter Haven, Lock conducted a complete inspection and a test fit to either the center section or fuselage. They passed with flying colors. Both novices, Brown and Heidinger were very proud of their accomplishments.





## - FABRIC -



There is a LOT of fabric covering on a Stearman. Poly Fiber was the process used on this project. All the fabric was taken through a Polytone finish in Glacier White. All the fabric work and finishing was performed at Waldo Wright's Flying Service in Winter Haven, Florida. Roger Brown and Lisa Heidinger assisted Rob Lock when covering and stitching larger components such as wings and the fuselage. Rob did all the spray work. Lisa and Roger often helped with sanding the Poly Spray coatings.

In the accompanying photos, you'll see much of the process. Some are quite humorous, if aware of the back story. For instance, Brown's early attempts at mastering the "Rib Stitch" were hilarious. He FINALLY figured it out. When looking at the photos, you notice Rob's meticulous attention to detail... the straight tapes... even spacing... intricate patches... and NO curled pinks!!!

Overall, the fabric work on this project is near perfect!





## - FIREWALL -

Early in the process, the engine, along with the mount, accessories induction system and oil tank were taken to Brown's. The engine was placed in a custom stand where much was removed for cleaning, painting, detailing, etc. Besides the listed components, the exhaust systems, shrouds, baffles and dishpan were removed. Everything went back together before transport to Winter Haven in the spring. Once back on the airframe, the engine was timed, a compression test was conducted and the valves adjusted with new gaskets on all valve covers.

Also, a new stainless steel firewall was purchased from Yesteryear Aviation. The original outer ring was removed from the old firewall by drilling all the rivets. It was then epoxy painted and riveted to the new firewall.



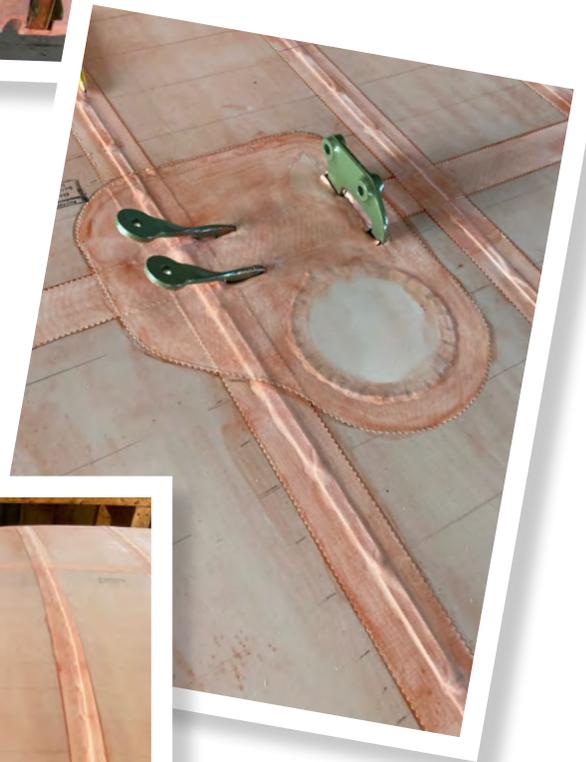
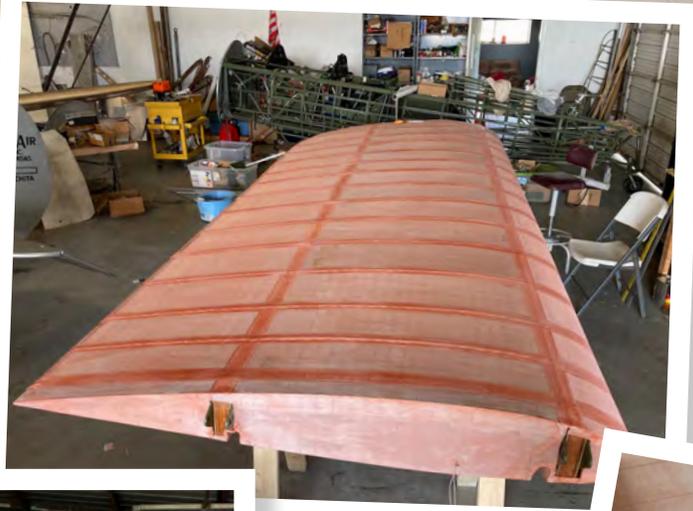


## - FABRIC -

The final assembly of major components had NC33NA looking like an airplane again. Once the fabric work was done on the fuselage and the green and black stripes painted in Aerothane, it was time to start bolting on parts. Rob was able to install the horizontal stabilizer, elevators and vertical fin. Lisa and Roger showed up to help install the lower wings. When the time came to install the uppers, Brown's wife, Terese and a family friend, Hannah Dougherty were enlisted to help. The left upper went up and on with little trouble. Hannah set up her phone to video the upper right installation. It was on, and in place with the bolts in all the struts and attach points, in just 19 minutes!

Then came the installation of all the flying and landing wires. Using a custom set of incident and dihedral boards, a new digital level and Rob's WWII era tensiometer... all wings and wires were brought into near perfect tolerances. It is amazing that this collection of eighty year old parts could still be fitted together that closely!





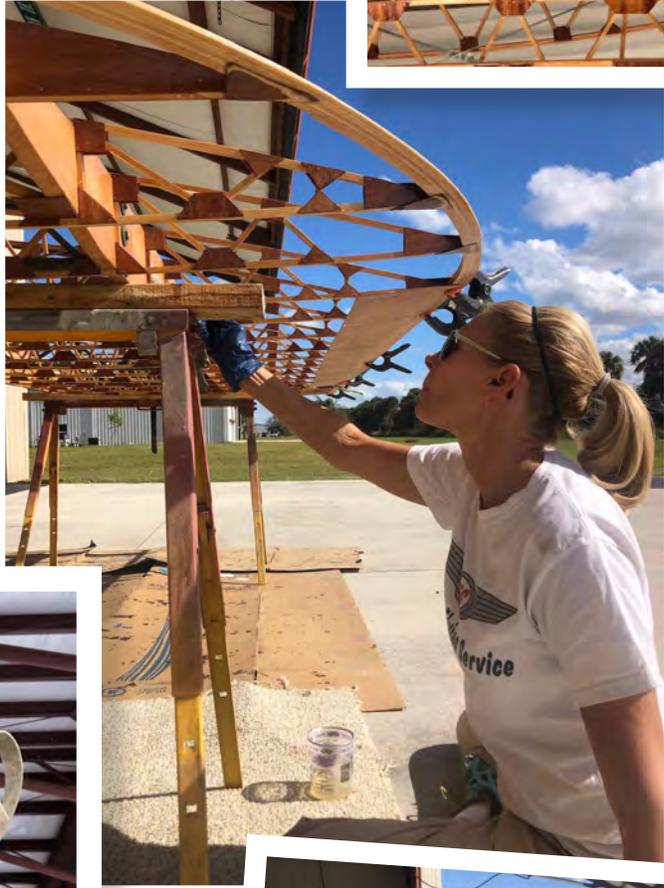


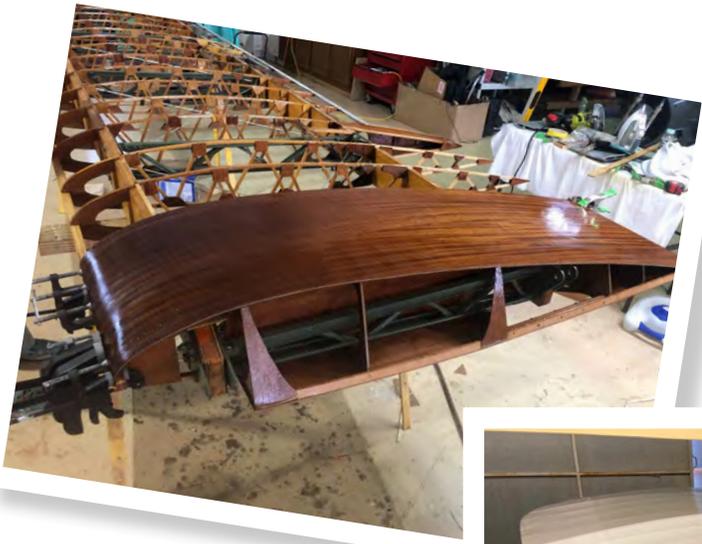
## - PAINT & VARNISH -



Again... a LOT of paint, varnish and a variety of finishes go into a Stearman restoration! Many metal parts were cad plated. Most parts were at least stripped, sanded cleaned and sprayed with epoxy primer. Other pieces, anything that shows, received finish coats of white. All fabric surfaces are coated in various layers of Poly Brush, Poly Spray and Polytone paint. Some areas even have additional coats of green or black Aerothane. All wood work in the wings received two liberal coats of epoxy varnish. Other parts, such as instrument panels and seats got special paints. Lastly, a custom sign painter added finishing touches of hand painted artwork and lettering. Smaller pieces, like fuel sumps and oil fill caps were painted in appropriate colors.

Yes... a LOT of paint work!









## - FINAL ASSEMBLY & RIGGING -



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- MISC -

We're closing out this booklet with a Hodgepodge of photos that hopefully typify some of the fun we had, the attention to detail and love that was put into, and taken from, this project.

It truly was a "Team" effort.

