



Fall 2023

AT-10 WICHITA



AIRCORPS AVIATION

Cadet Air Corps Museum AT-10 Wichita Restoration

by Chuck Cravens



Pilots in multi engine training needed to develop skill in formation flying to prepare for missions in bombers and transport aircraft. AT-10s were a perfect trainer for these much needed skills.

We are pleased to report that the AirCorps Aviation restoration techs resumed work on the AT-10 project for Cadet Air Corps Museum this fall. The rudder pedals, forward fuselage, elevators, and vertical fin are all assemblies that received attention. Several employees made a trip down to Sam Grave's place in Tarkio, Missouri to pick up some original parts and assemblies for possible use in the restoration.



Fuselage

Work continued on preparing the wooden portion of the fuselage for another coat of protective varnish. A new removable nose section is under fabrication in the restoration shop.



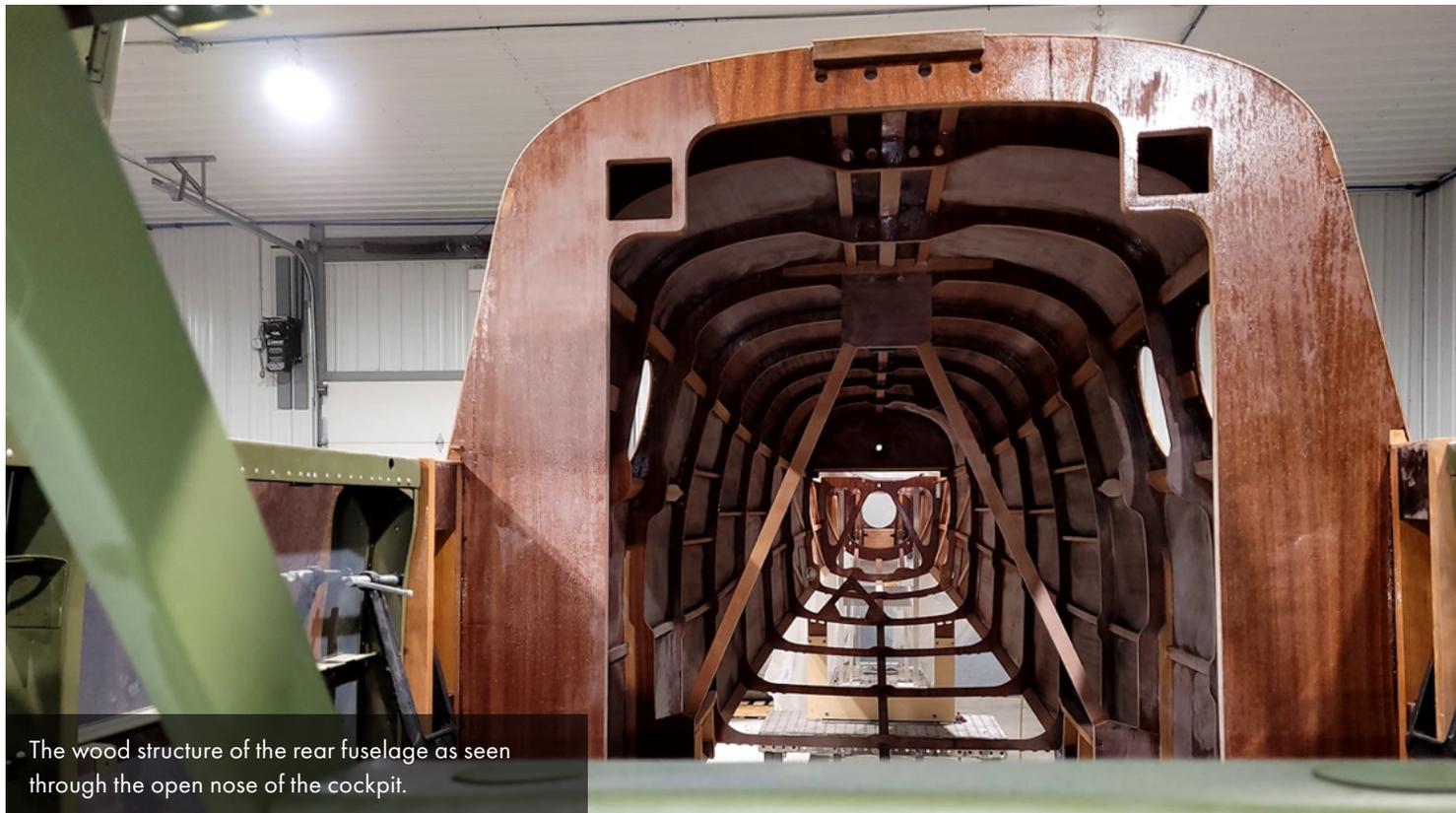
This is a side view of the fuselage with the cockpit area mated to the wood structure.



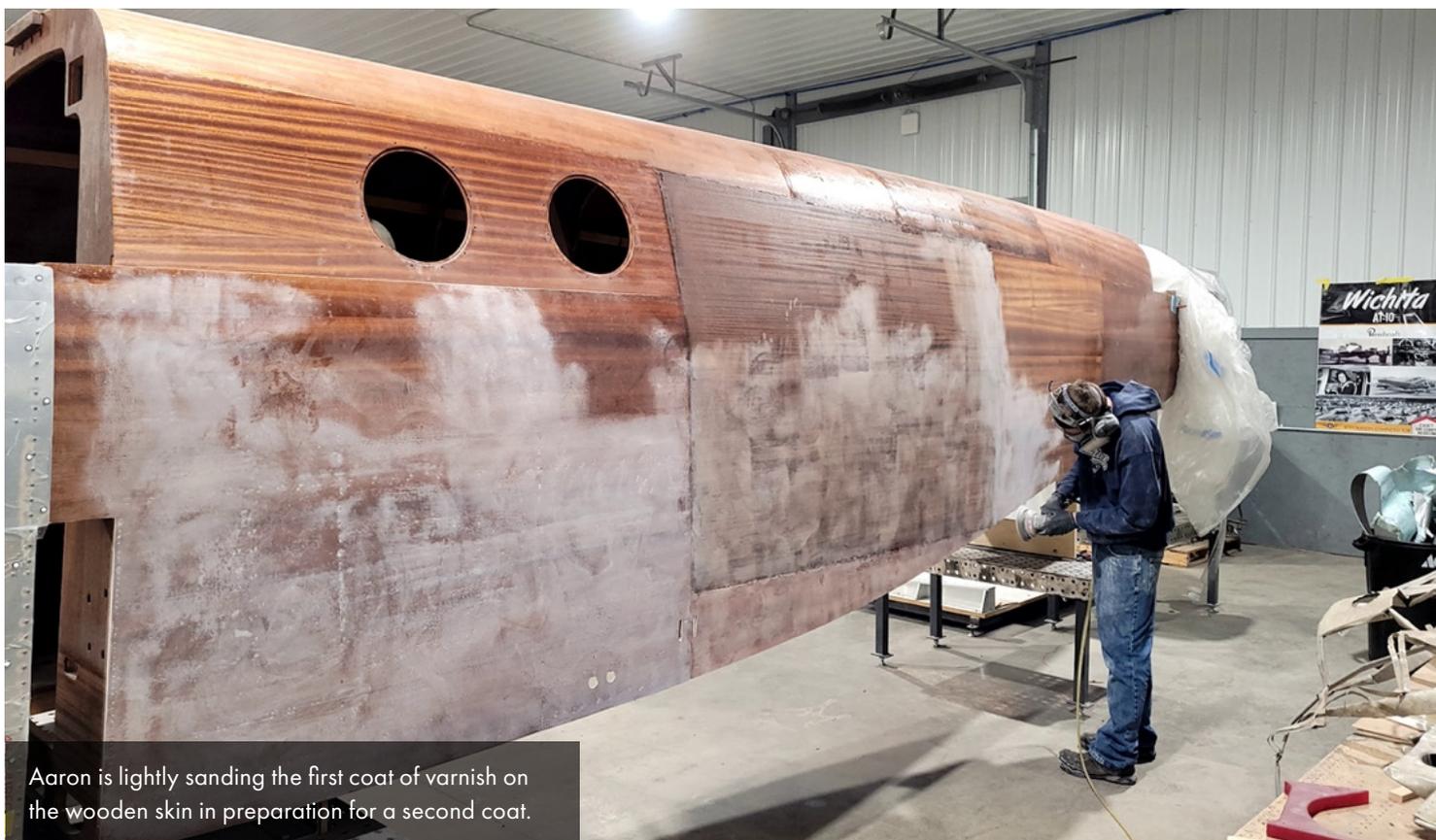
The cockpit section of the forward fuselage is test fitted to an original demountable nose section.



The fuselage from another angle, the crossbar for the rudder pedals is visible inside the nose opening.



The wood structure of the rear fuselage as seen through the open nose of the cockpit.



Aaron is lightly sanding the first coat of varnish on the wooden skin in preparation for a second coat.



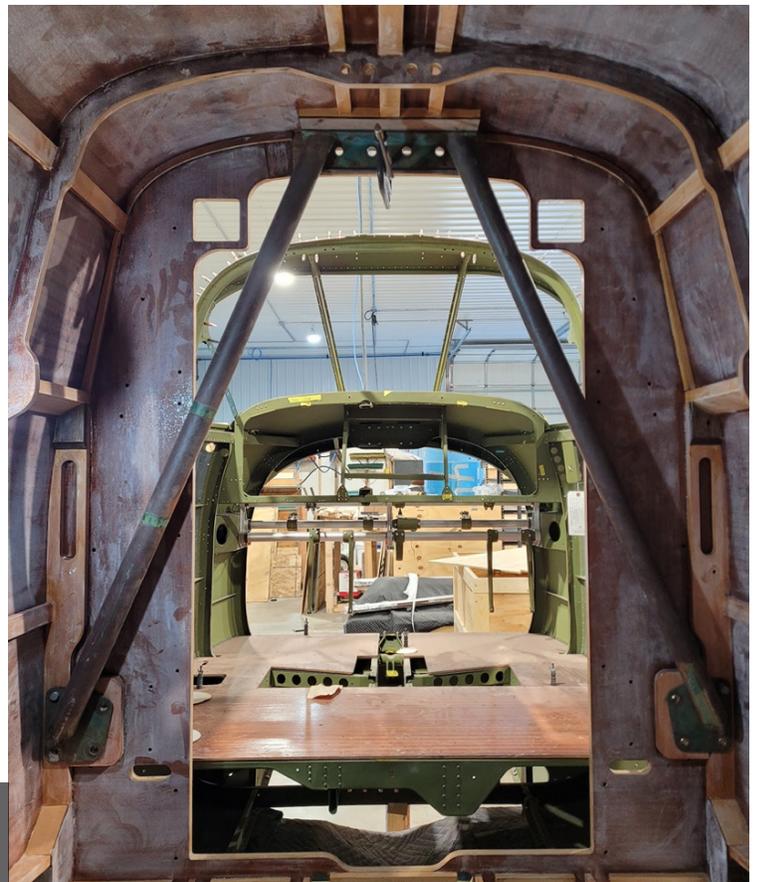
The original nose section has been mounted, but it will be replaced with an entirely new duplicate.



The new removable nose section is taking shape in the restoration shop.



The hole in the center of the removable nose section will hold a passing light.



The metal forward fuselage as seen from inside the wooden rear fuselage



Rudder Pedal Assembly

All the component parts of the rudder pedal assembly have been inspected and restored where necessary. Once that process was completed, Aaron began assembling those parts.



This original rudder and brake pedal assembly has one of the brake linkages in place. The AT-10's brakes are "toe brakes" activated by pressing on the upper part of the rudder pedals.



The rudder pedal assembly components rested on a bench as assembly began.



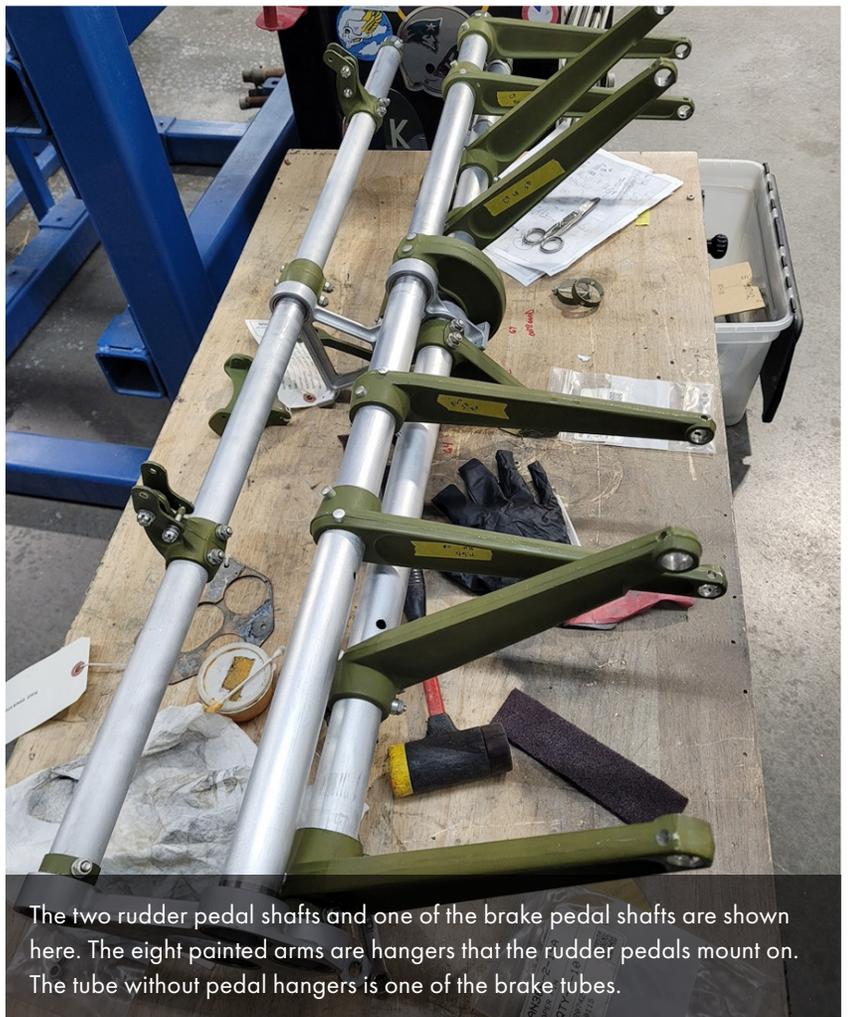
Aaron begins assembly.



Aaron is working on one of the brake shafts.



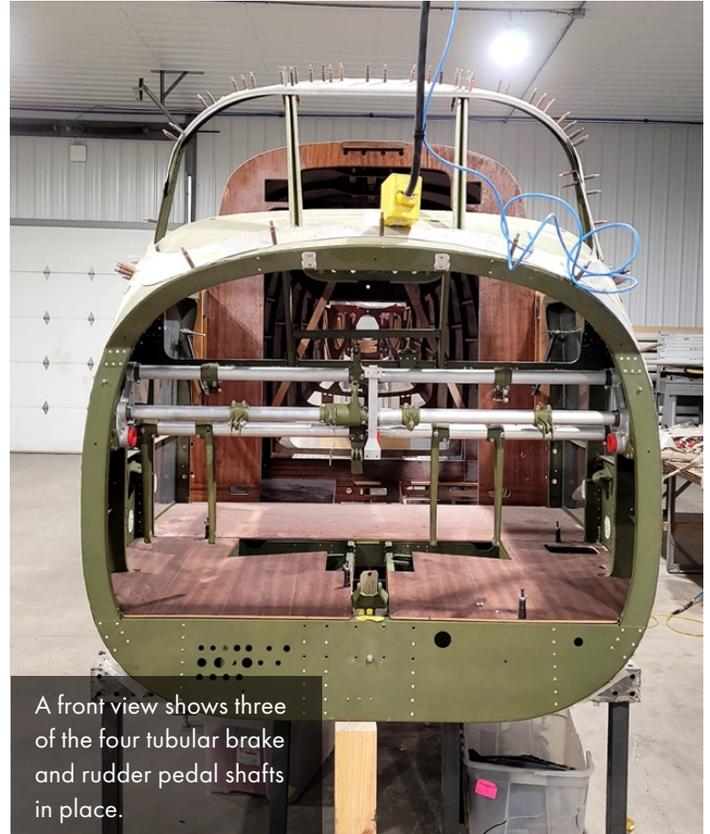
This shaft tube is one of four in the rudder pedal/brake pedal assembly. It is one of two tubes upon which brake linkages are mounted.



The two rudder pedal shafts and one of the brake pedal shafts are shown here. The eight painted arms are hangers that the rudder pedals mount on. The tube without pedal hangers is one of the brake tubes.



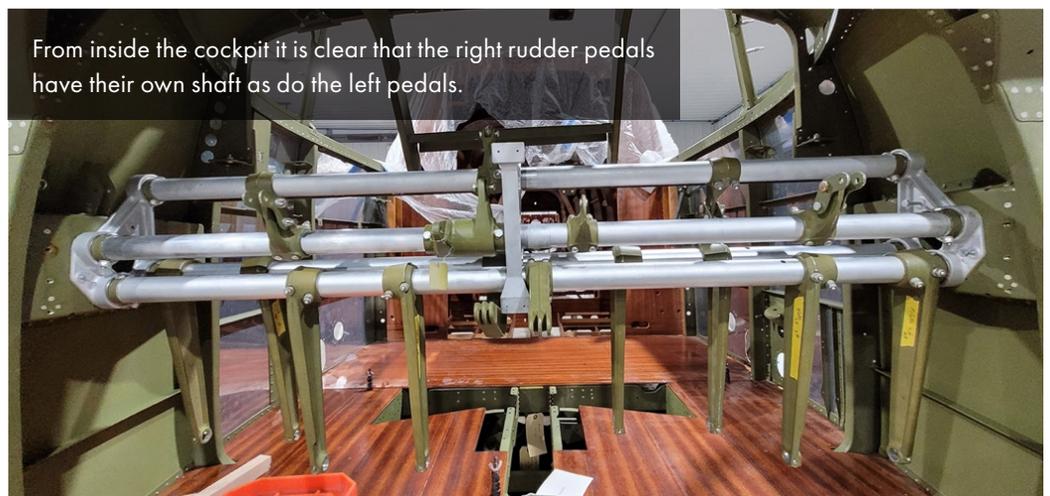
This image shows two of the shafts in place to test their fit.



A front view shows three of the four tubular brake and rudder pedal shafts in place.



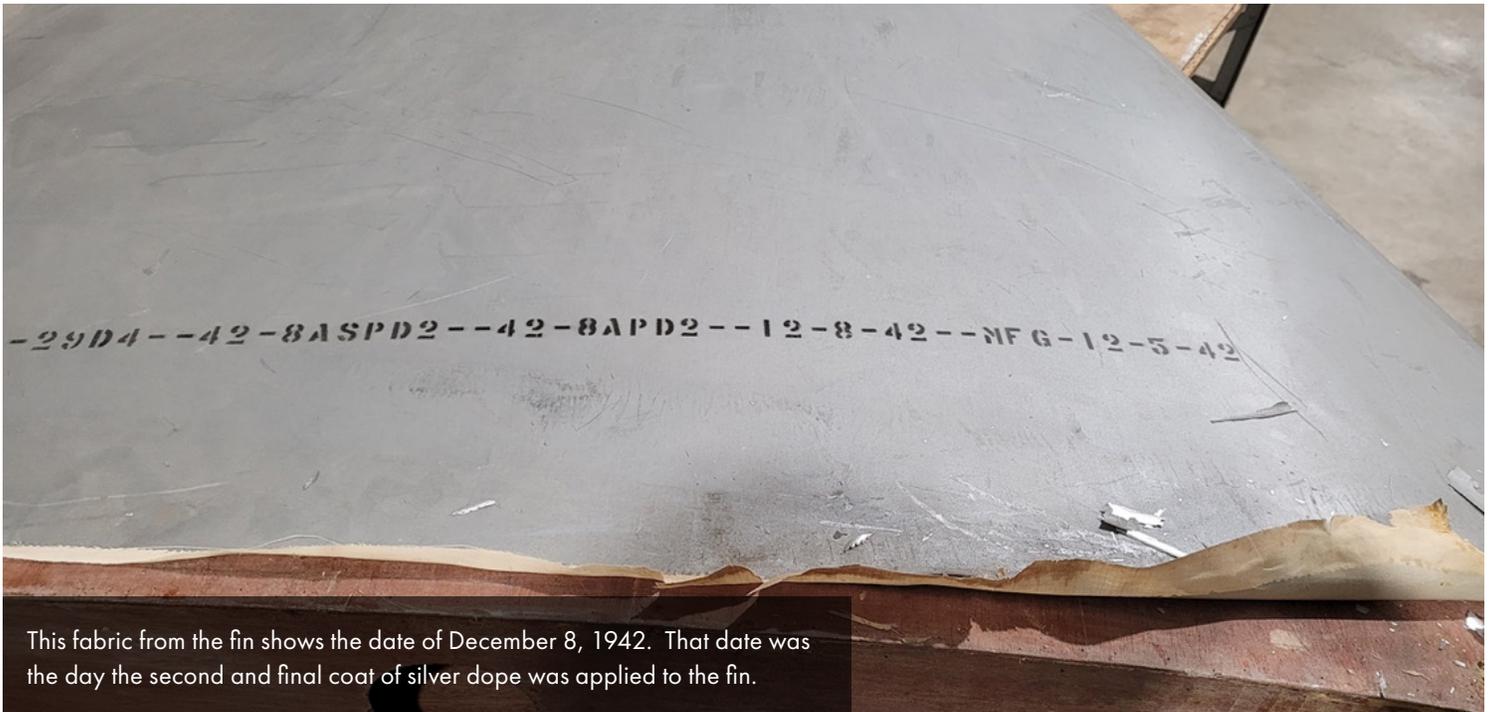
From inside the cockpit it is clear that the right rudder pedals have their own shaft as do the left pedals.





Vertical Stabilizer

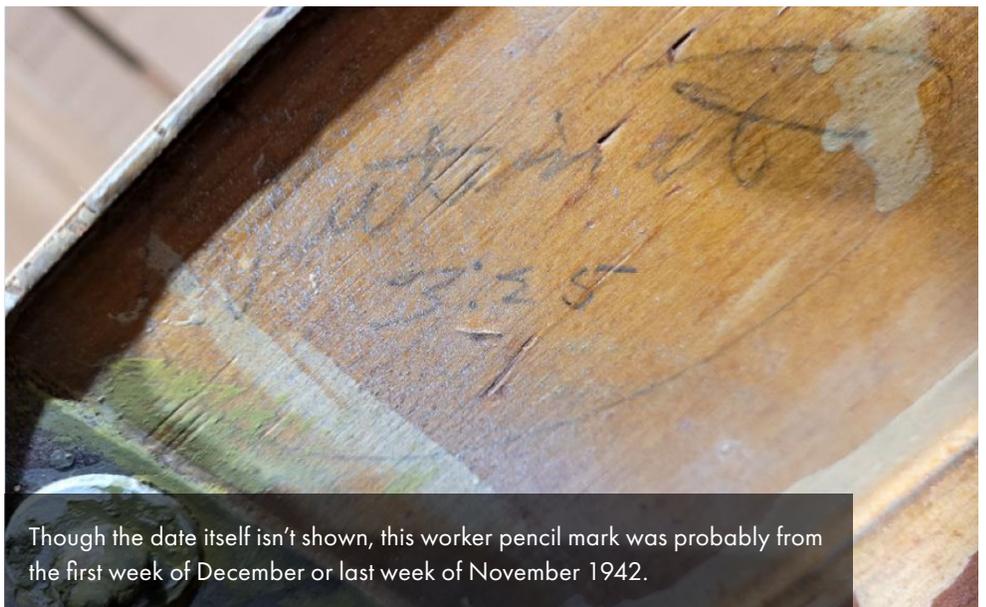
Remarkably, an unused new old stock vertical fin was obtained for the AT-10 restoration. Though new, the skin had to be removed to thoroughly inspect the fin for ravages of time that could have occurred over the 81 years since it was built. Assemblies like this sometimes tell us their story from the marks, dates, and messages the factory workers leave behind inside the structure. That was true in this case, as Aaron found marks that indicate this fin was built by the Globe Aircraft Corporation rather than Beech. Globe built 600 AT-10s under contract.



This fabric from the fin shows the date of December 8, 1942. That date was the day the second and final coat of silver dope was applied to the fin.

Another date from inside the vertical indicated the final inspection of the fin before covering was on December 5, 1942.

3:25 pm is the latest time marked inside the vertical. Other time inscriptions for 1:45 and 3:27 pm are also visible but don't show up well in photographs.



Though the date itself isn't shown, this worker pencil mark was probably from the first week of December or last week of November 1942.



This is a Globe Aircraft Corporation inspection stamp from inside the vertical.



The skin on one side of the vertical has been carefully removed to allow a thorough inspection.



The craftsmanship of the woodworkers hired for the AT-10 program is evident in the opened horizontal.



Here is a closer view of the woodwork.



Interior fuselage framing around the porthole style windows is another display of 1940's woodworking craftsmanship.

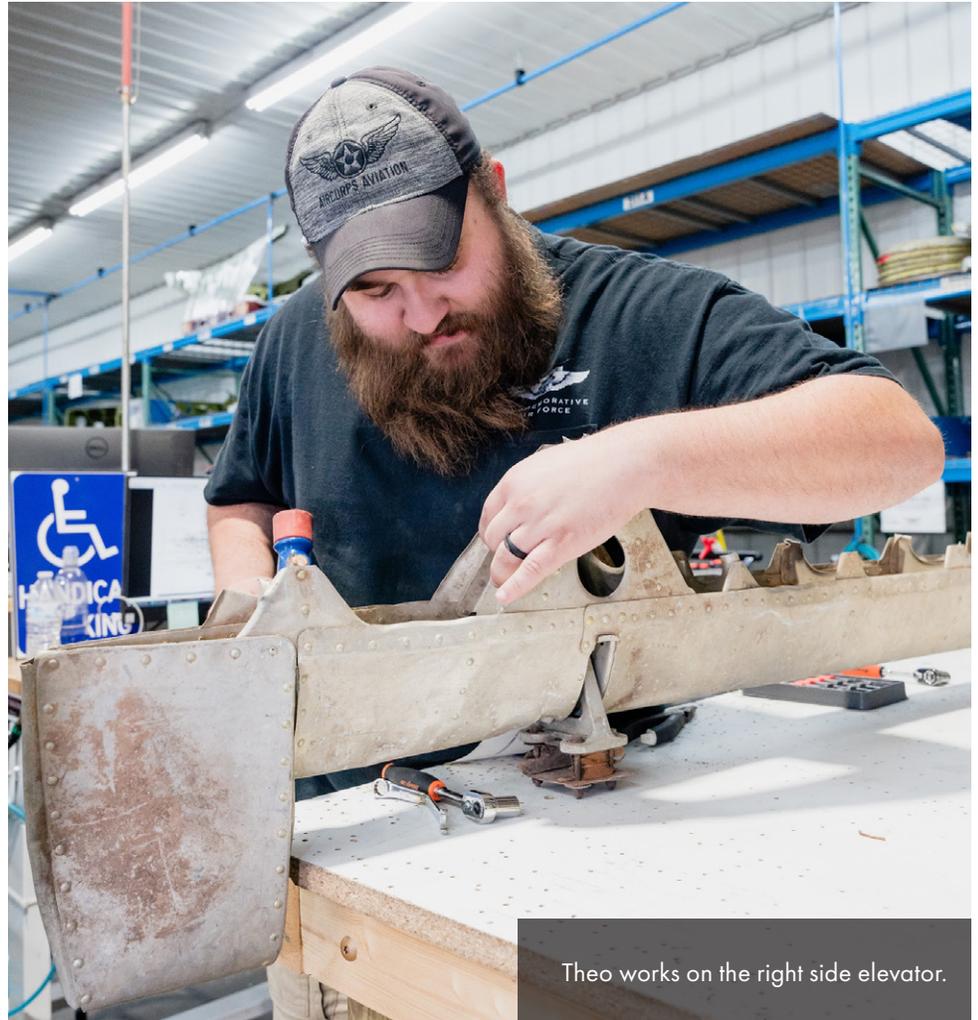


Here is an example of what Beech called "Durawood". This image shows that Durawood was made up of many sheets of 1/64 inch thick walnut layered and glued together.

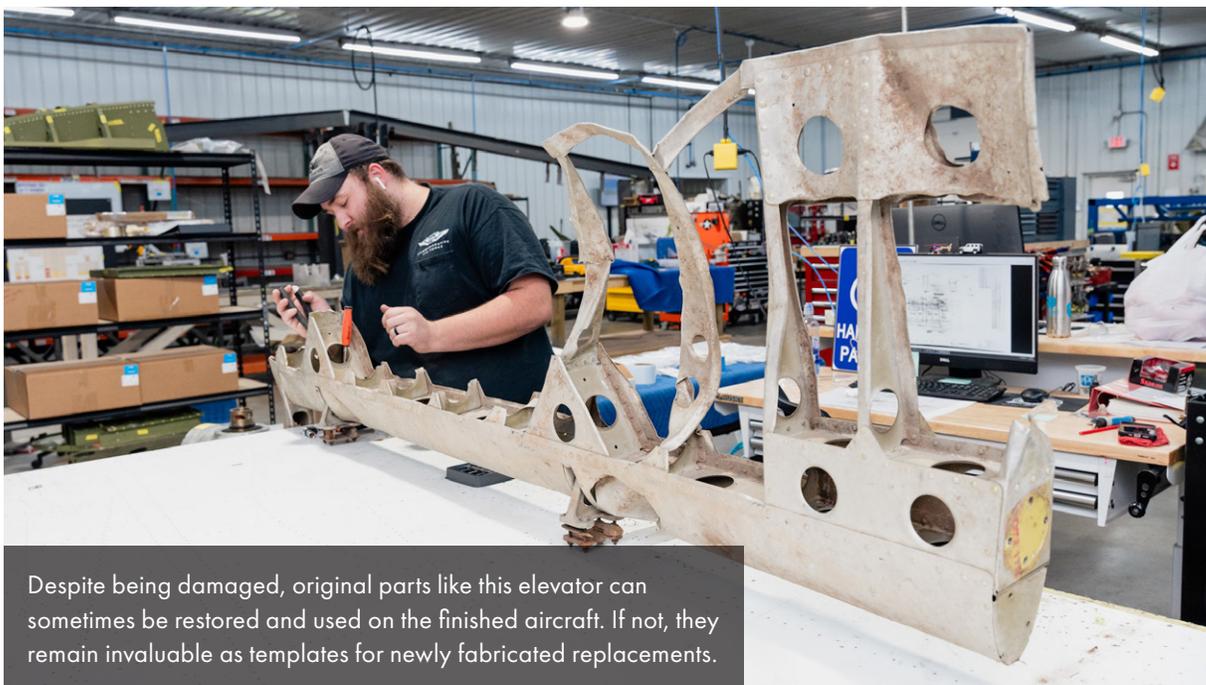


Elevators

Work on restoring the AT-10 elevators commenced this fall.



Theo works on the right side elevator.



Despite being damaged, original parts like this elevator can sometimes be restored and used on the finished aircraft. If not, they remain invaluable as templates for newly fabricated replacements.



Aircorps Aviation carefully inspects original parts, and tags each one individually. This practice identifies parts by name, part number, customer, and inspector, and keeps the project organized.



Upper tail wheel truss assembly



Lower tail wheel support assembly.



This is a male hinge assembly used on both the elevators and rudder.



The rudder horn awaits inspection.



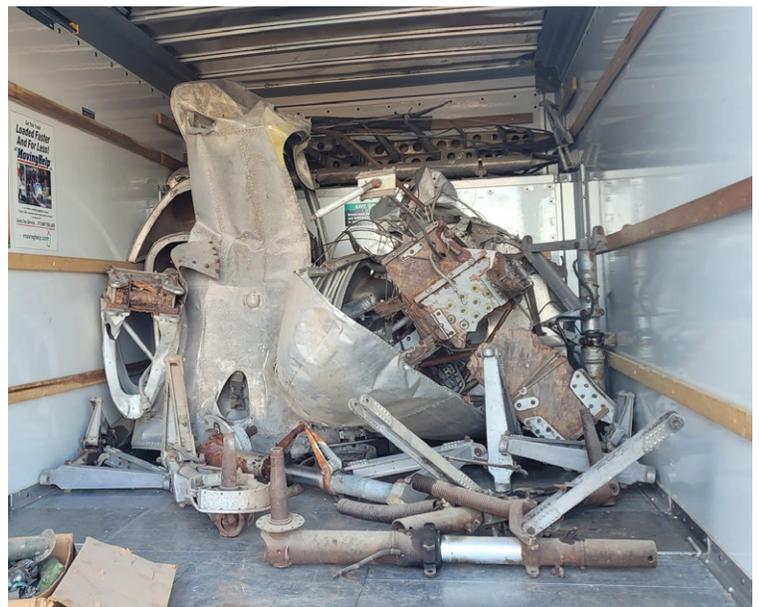
Tarkio Trip

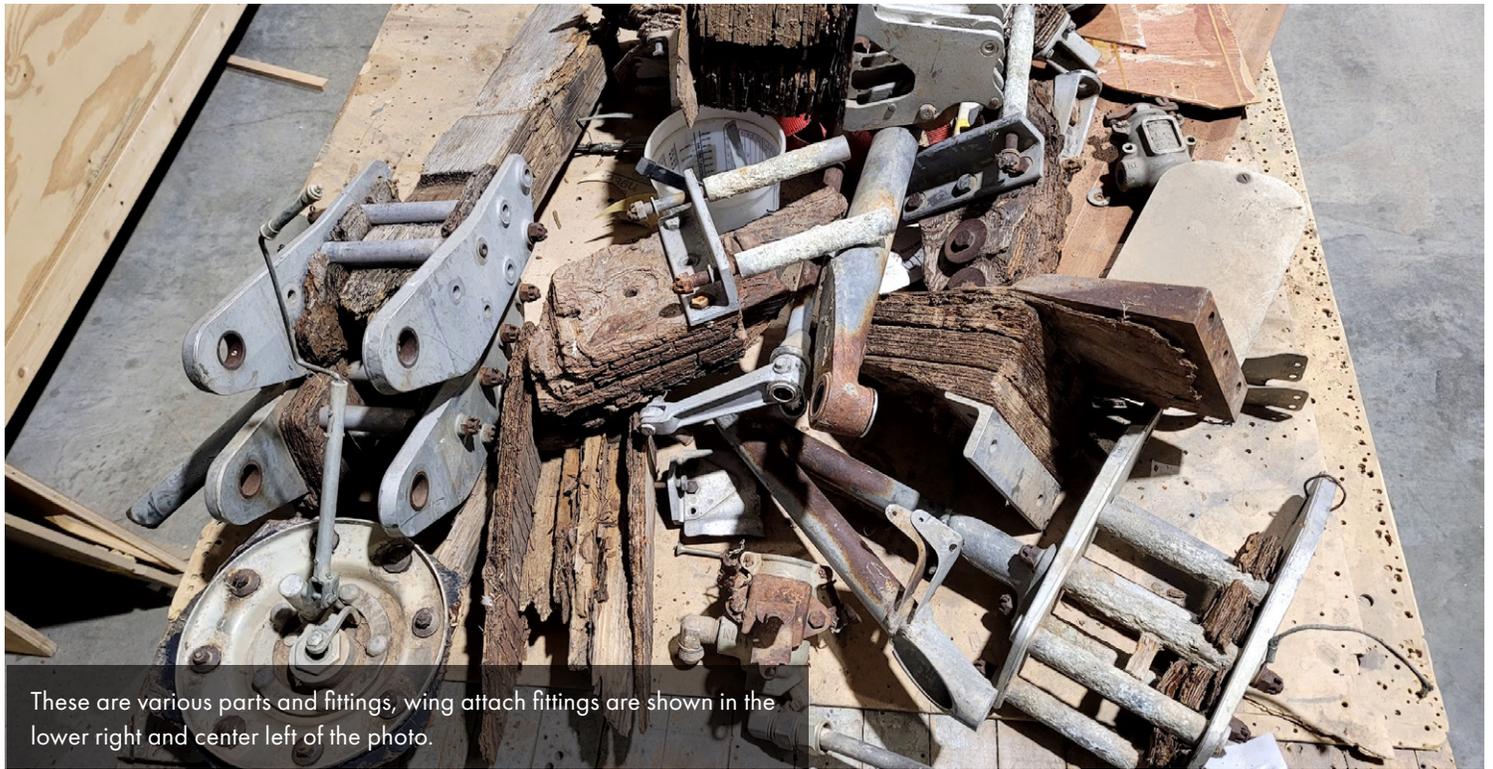
Mark Adams and Aaron Prince from the AirCorps Aviation restoration shop made the trip down to Representative Sam Grave's place in Tarkio, Missouri to bring back original parts and assemblies that will be useful in the AT-10 restoration for the Cadet Air Corps Museum.



Aaron Prince and Sam Graves have the truck loaded and ready to head back to Minnesota. *Photo courtesy of Mark Adams*

Although things look disorganized in the early stages of loading, every single part will be inventoried when it reaches the AirCorps Aviation facility.





These are various parts and fittings, wing attach fittings are shown in the lower right and center left of the photo.



These engine nacelle assemblies were among the components picked up during the Tarkio trip.



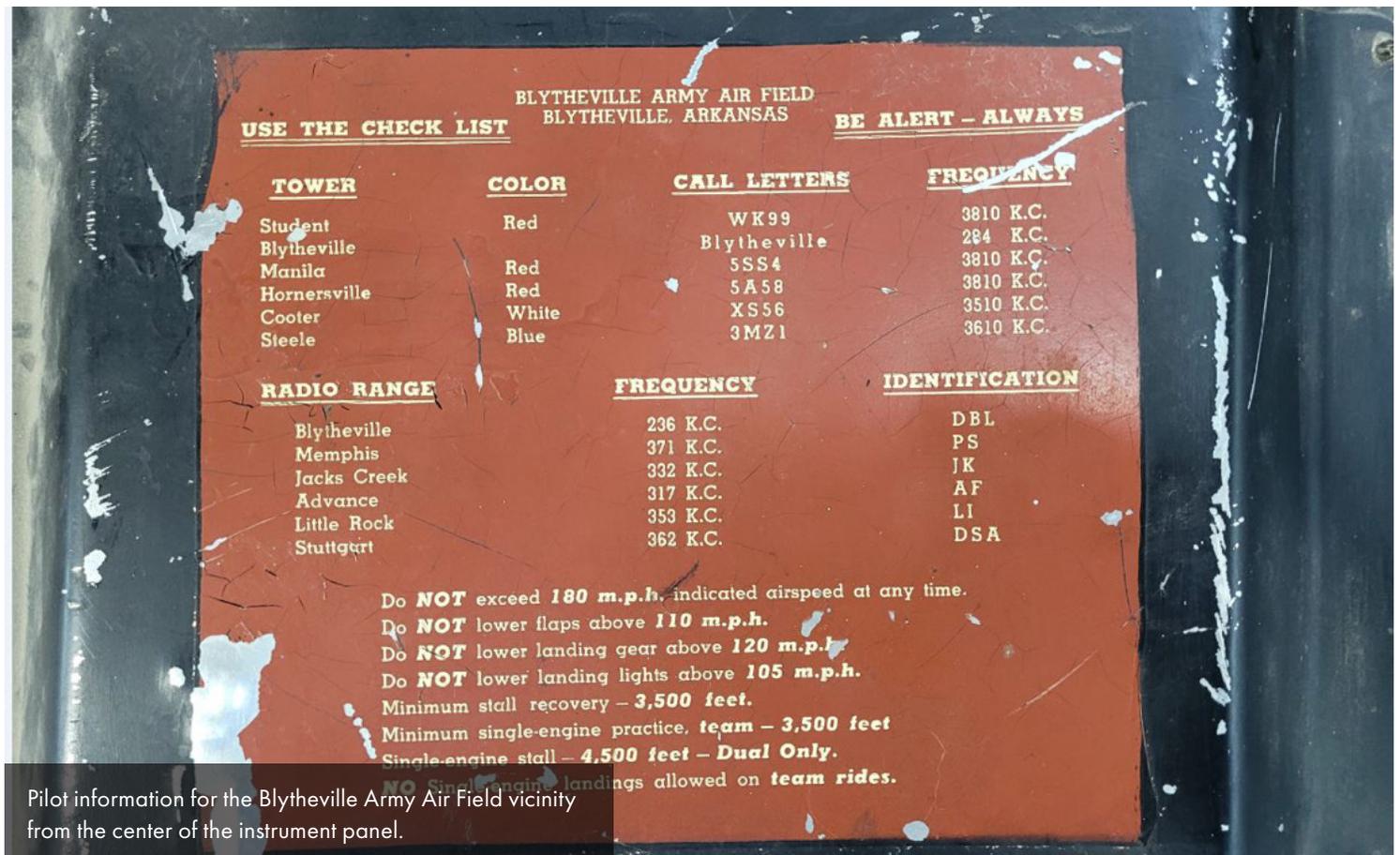
Seats were another valuable find from Tarkio.



Several instrument panels were brought back to the AirCorps restoration shop. Fortunately, the original instrument panel from the AT-10 (41-27322) project was in place, and it will be restored and used in the finished aircraft.



This is 41-27322's original instrument panel.



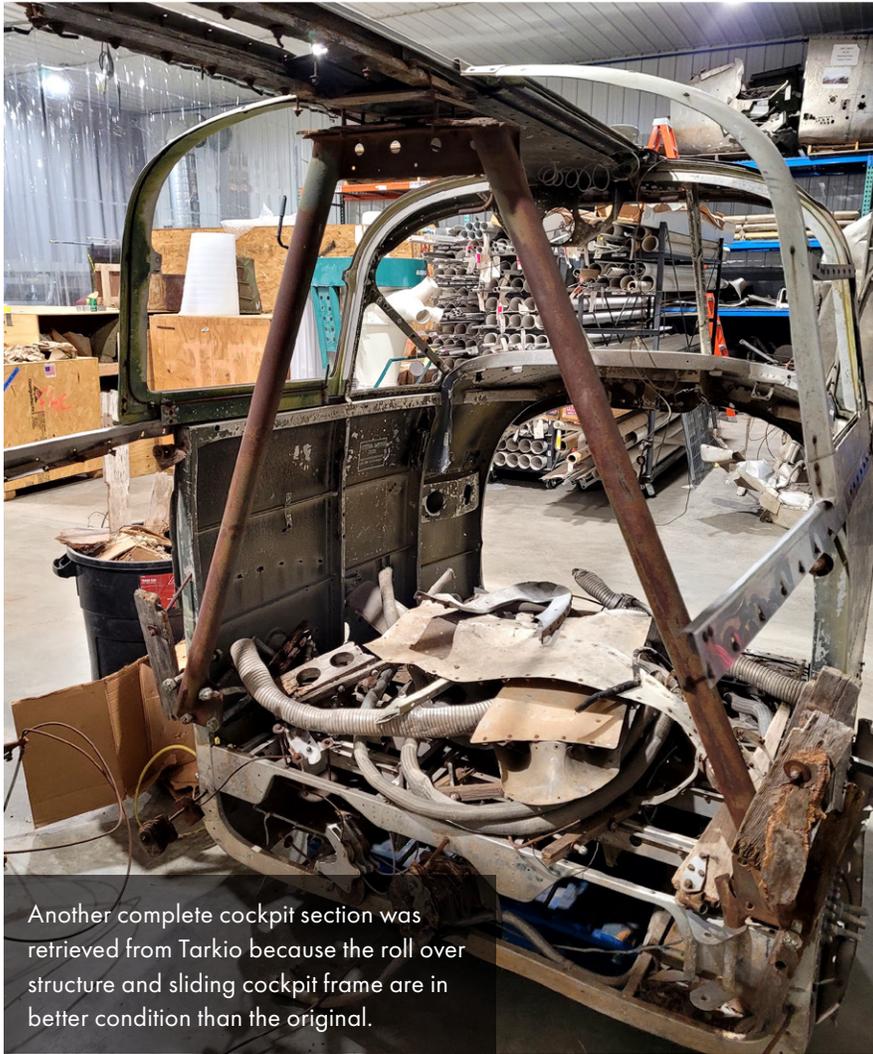
Pilot information for the Blytheville Army Air Field vicinity from the center of the instrument panel.



Landing gear and brake parts were part of the haul of parts.



Additional landing gear components.



Another complete cockpit section was retrieved from Tarkio because the roll over structure and sliding cockpit frame are in better condition than the original.



Here is another view of the cockpit assembly from the trip.



This placard from inside the cockpit lists various flap settings and acceptable speeds for lowering the gear and landing lights.



This placard shows the direction of movement for propeller, throttle, mixture, and manifold heat controls.



Another placard indicates that the airplane has complied with Tech Order 02-1-29 which calls for installation of an idle cut off.



The maximum speed for operation with the cockpit enclosure open is the information provided by this placard. All the original cockpit placards will either be reinstalled as-is, or remanufactured, in the restored cockpit.



These are a set of NOS wings with the original fabric and dope finish in excellent condition. Not only is the finish original, but all the control pulleys and wiring inside the wing are in new, unused condition. Unfortunately, despite never having been used, the wings will still need to be rebuilt.



A look inside one of the NOS wings shows why it will have to be rebuilt. Even though these wings have never been used, some of the glue joints have delaminated over the 80 years since they were built.

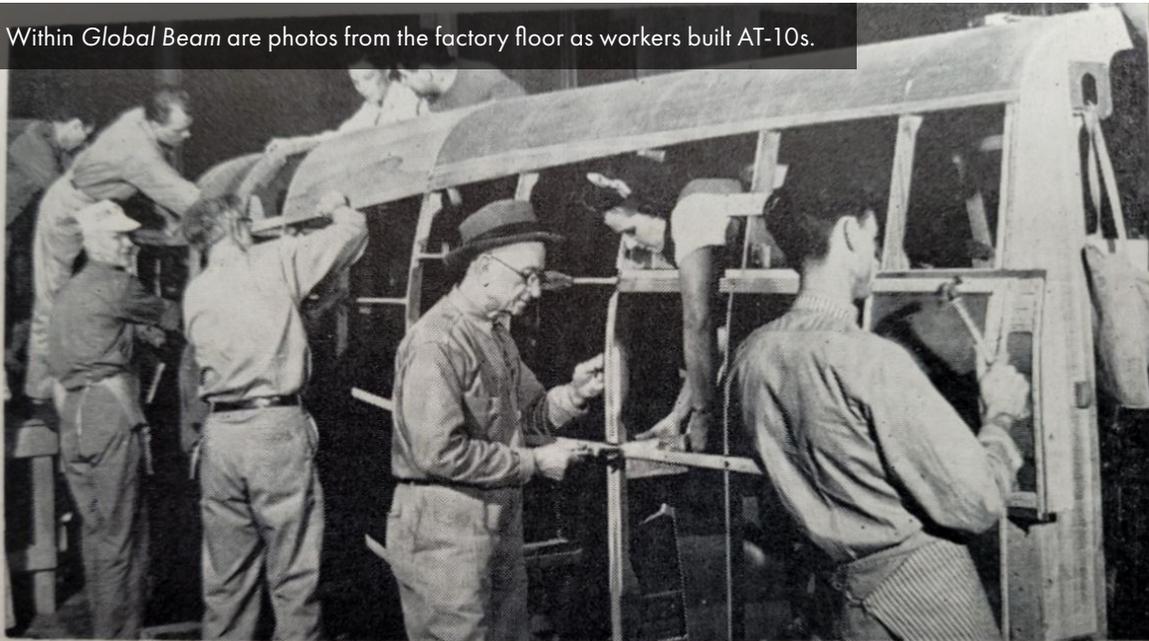
The wings will be carefully reskinned on one side with the original skin in place on the other surface. Once the first skin is in place, the second side will be removed and replaced. This procedure keeps the wing in alignment throughout reskinning, acting as its own fixture.



Also among the treasure trove Sam has collected were several pieces of AT-10 ephemera. This cover of the Globe Aircraft Corporation's company newsletter *Global Beam* depicts AT-10s on the runway.

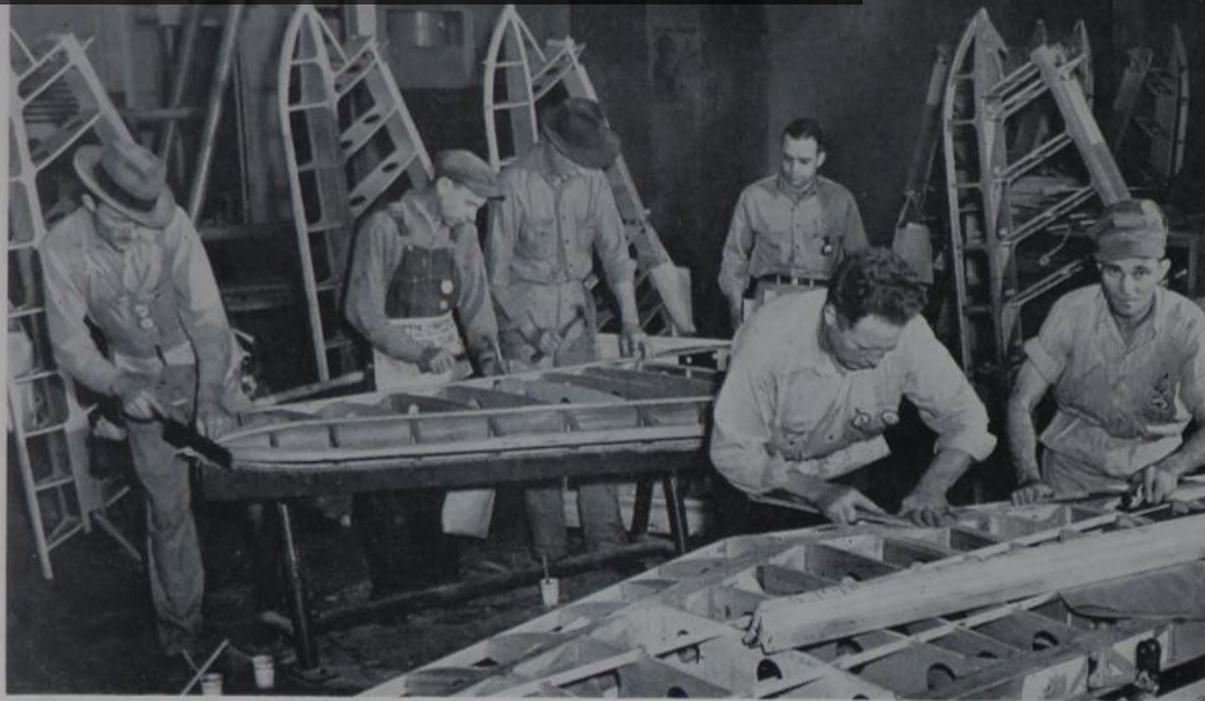


Within *Global Beam* are photos from the factory floor as workers built AT-10s.



WOODSHOP TEAMWORK—Busy building a rear fuselage component. Left to right, Wayne M. Grizzle, inspector; J. B. Wootton, leadman; B. R. Walker, T. R. Smith, A. A. Sullivan, Margie Duncan and Jesse Cash. In upper background, Charlsie Shaw and Joe P. Hubenak.

Workers build horizontal and vertical stabilizers for AT-10s in the Globe factory.

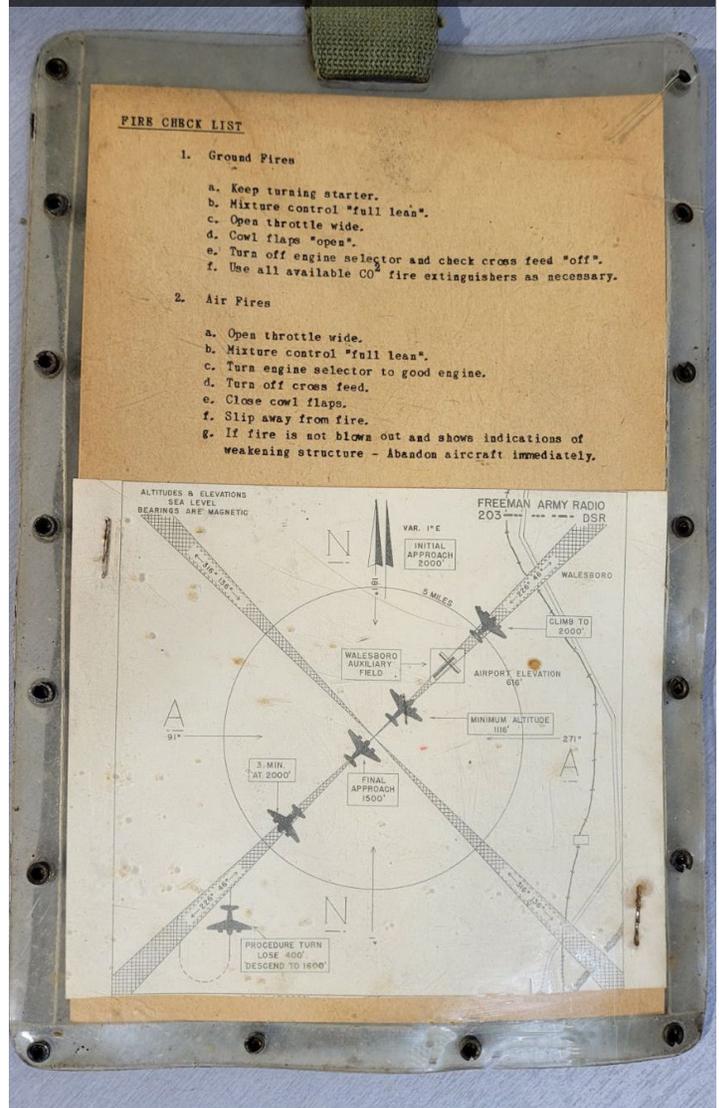
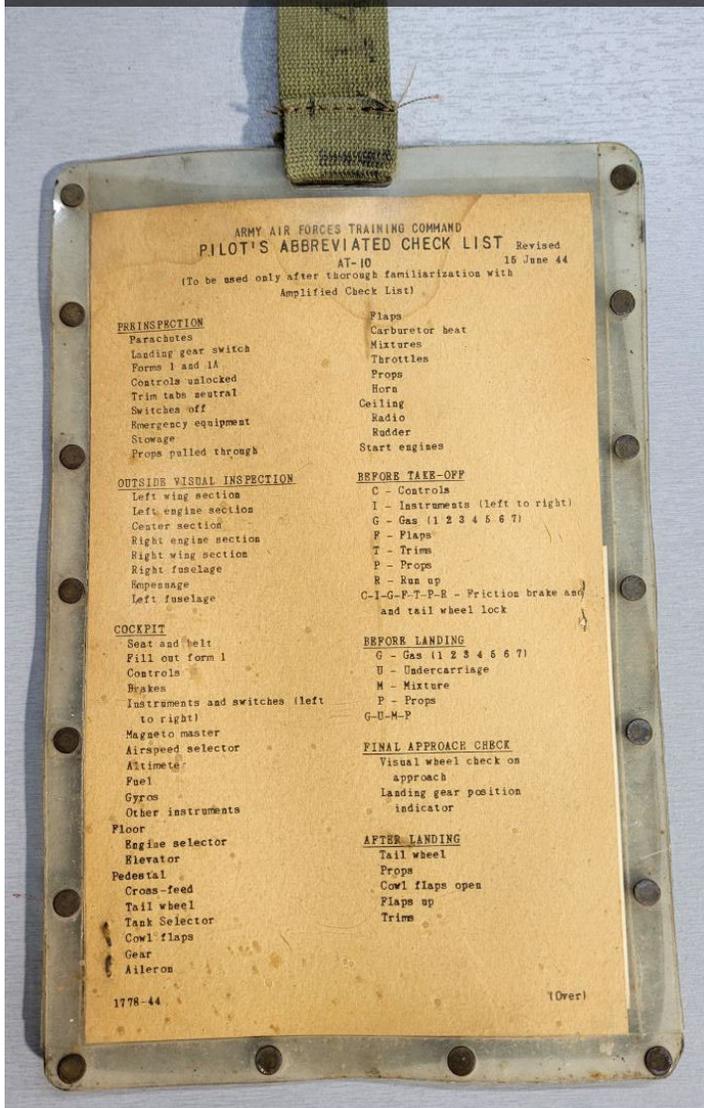


TYPICAL WORKERS—In the Globe Woodshop at Midway, men are shown working on horizontal stabilizers for the AT-10. Left to right, in foreground, Cecil West, leadman; Marvin Rich and J. A. Redd; left to right, M. A. Cook, Johnnie Neace and Carl Albright, leadman, and Jimmy Riggs, foreman.



This Army Air Forces Training Command "Abbreviated Check List" for the AT-10 was used only after the pilot had thoroughly familiarized themselves with the longer "Amplified Check List".

The backside of the "Abbreviated Check List" includes a navigation guide for ADF approaches to Freeman Field, near Seymour, Indiana.



ARMY AIR FORCES TRAINING COMMAND
PILOT'S ABBREVIATED CHECK LIST Revised 15 June 44
AT-10
(To be used only after thorough familiarization with Amplified Check List)

PRE INSPECTION

- Parachutes
- Landing gear switch
- Forms 1 and 1A
- Controls unlocked
- Trim tabs neutral
- Switches off
- Emergency equipment
- Stowage
- Props pulled through

- Flaps
- Carburetor heat
- Mixtures
- Throttles
- Props
- Hors
- Ceiling
- Radio
- Rudder
- Start engines

OUTSIDE VISUAL INSPECTION

- Left wing section
- Left engine section
- Center section
- Right engine section
- Right wing section
- Right fuselage
- Empennage
- Left fuselage

BEFORE TAKE-OFF

- C - Controls
- I - Instruments (left to right)
- G - Gas (1 2 3 4 5 6 7)
- F - Flaps
- T - Trims
- P - Props
- R - Run up
- G-1-G-P-T-P-R - Friction brake and tail wheel lock

COCKPIT

- Seat and belt
- Fill out form 1
- Controls
- Brakes
- Instruments and switches (left to right)
- Magneto master
- Airspeed selector
- Altimeter
- Fuel
- Gyros
- Other instruments

BEFORE LANDING

- G - Gas (1 2 3 4 5 6 7)
- U - Undercarriage
- M - Mixture
- P - Props
- G-U-M-P

FINAL APPROACH CHECK

- Visual wheel check on approach
- Landing gear position indicator

AFTER LANDING

- Tail wheel
- Props
- Cowl flaps open
- Flaps up
- Trims

1778-44

(Over)

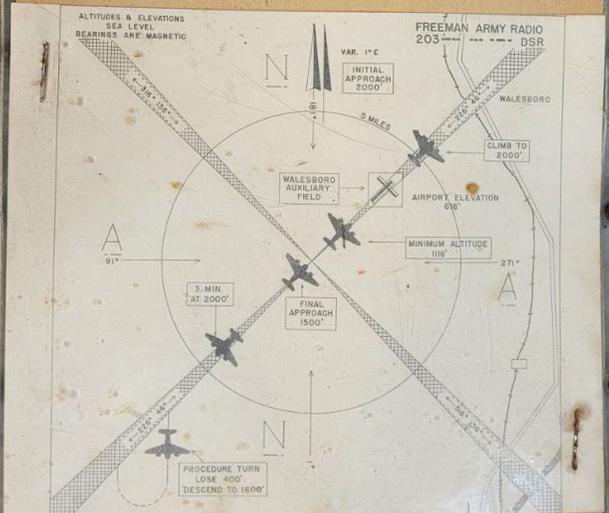
FIRE CHECK LIST

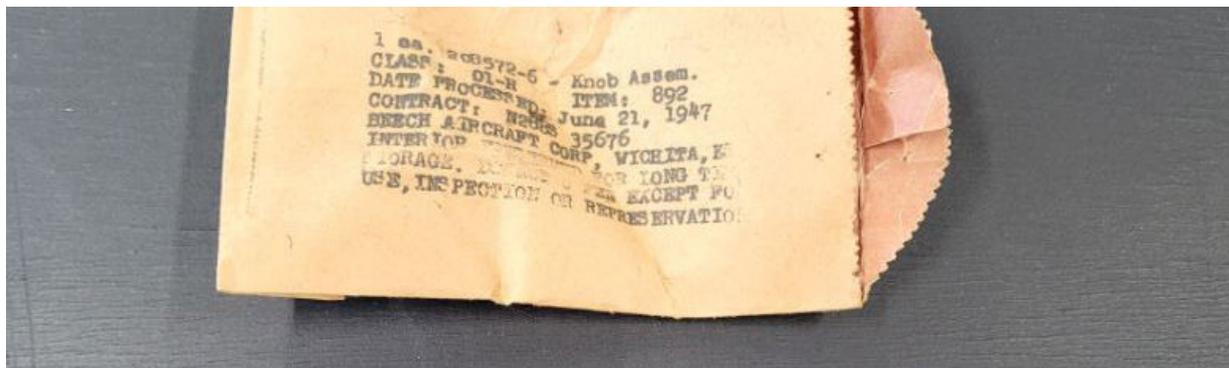
1. Ground Fires

- Keep turning starter.
- Mixture control "full lean".
- Open throttle wide.
- Cowl flaps "open".
- Turn off engine selector and check cross feed "off".
- Use all available CO₂ fire extinguishers as necessary.

2. Air Fires

- Open throttle wide.
- Mixture control "full lean".
- Turn engine selector to good engine.
- Turn off cross feed.
- Close cowl flaps.
- Slip away from fire.
- If fire is not blown out and shows indications of weakening structure - Abandon aircraft immediately.

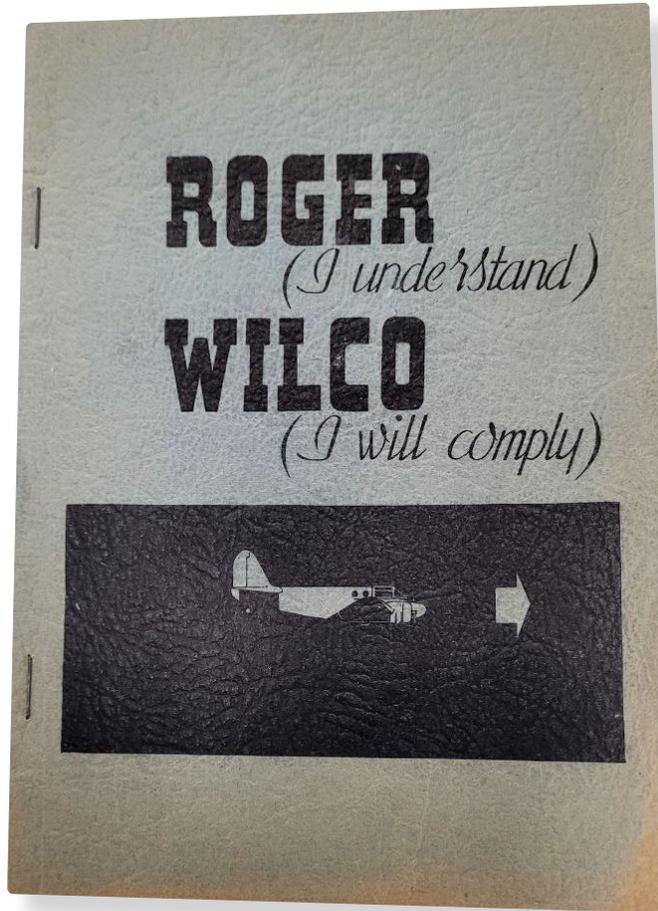




These new, unused original knobs were found and purchased by Sam Graves for the project. They are knobs for the mixture, oil shutter, throttle, and propeller controls. They came in the original parts envelope.



More rare NOS components that Sam has collected are these landing gear position indicator lights.



An AT-10 flight training booklet.

Want to get involved?

We are constantly looking for new technical material related to the AT-10. Due to the rarity of this aircraft, and the relatively low number that were produced, acquiring engineering drawings, parts catalogs, maintenance manuals, and other documentation has been much more difficult than with our past restorations. If you have any AT-10 material, or know someone who does, we'd like to hear from you!

Be a part of helping the AT-10 return to the skies!

Contact Ester Aube, email or phone
estera@aircorpsaviation.com or 218-444-4478



Should anyone wish to contribute to the Cadet Air Corps Museum's efforts, please contact board members Brooks Hurst at 816 244 6927, email at wingnutsflyingcircus@yahoo.com or Todd Graves, todd.graves@pobox.com. Contributions are tax deductible.