



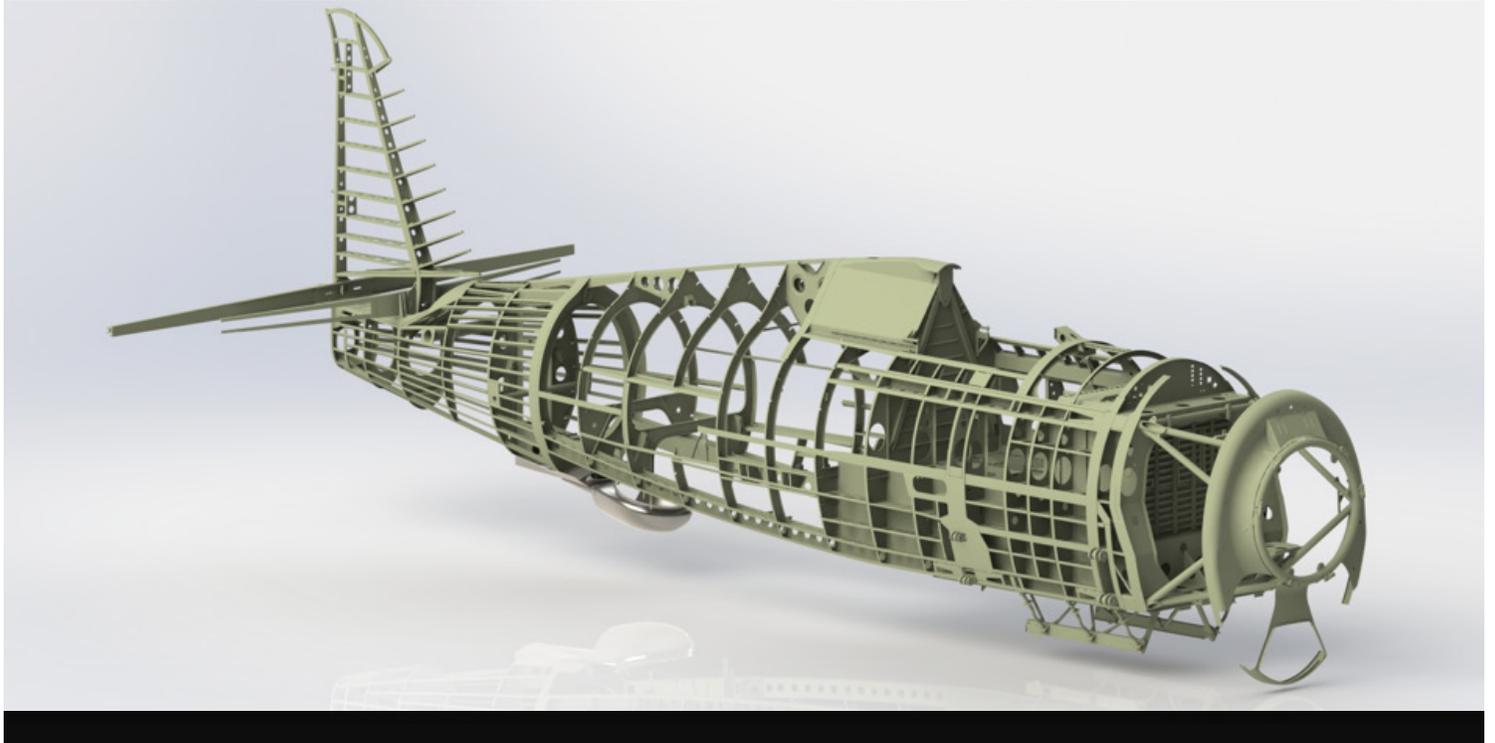
Feb/March-2018

FEB/MARCH

Texas Flying Legends' P-47 Update
by Chuck Cravens



AIRCORPS AVIATION



The CAD rendering becomes reality in these two images.



Update

Remarkable progress has been made on the forward fuselage structure this month. While the guys have spent some time on the final touches to the tail cone, the main emphasis has been building the internal structure that gives the fuselage that curvaceous, immediately recognizable Thunderbolt form.

Tail Cone

Though the aft fuselage or tail cone is substantially complete, there are always little finishing touches that prepare for later tasks, like equipment or systems installation.



Rob McCune's CAD rendering of the aft fuselage served as a great resource for visualizing how all the parts on the engineering drawings were to go together.



Hunter is getting ready to go inside the tail cone to buck a rivet while Dave waits with the rivet gun.



Hunter works on the elevator lever support station installation.



The green tubular part running transversely across the fuselage at station 321 is the lifting tube.



Here we have a view from the rear of the tail cone.



The mounting area for the horizontal stabilizer shows in detail in this closeup shot of the aft fuselage.

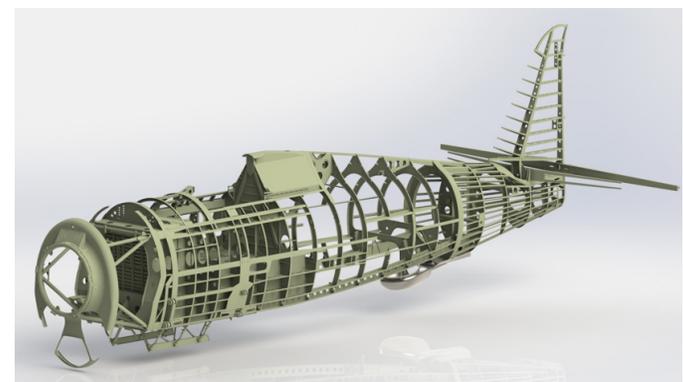
When placed inside the tail cone during riveting, the nap of the black cloth catches shavings that might otherwise scratch the aluminum.



The tail cone in its fixture positioned correctly in relation to the forward fuselage.



You can see the rear upper skin forms the very aft peak of the razorback.



One of Rob's CAD renderings shows the joint between the aft and forward fuselage as a wider former just ahead of the many aft fuselage stringers.

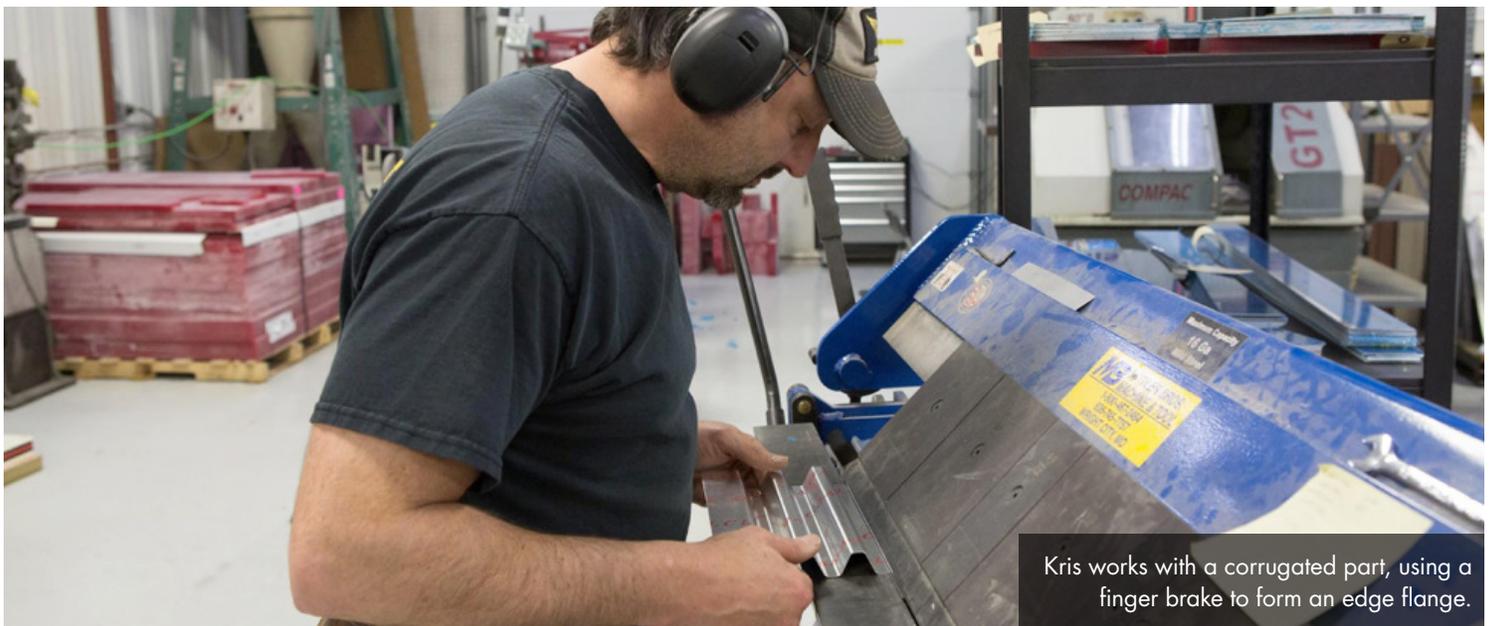


Corrugations

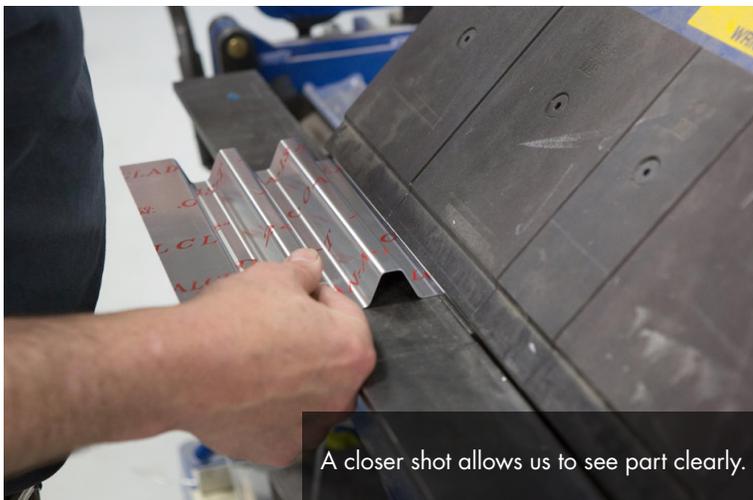
One design element used in the P-47 can be characterized as a carry-over from the early metal airframes dating way back to Hugo Junkers' J series in WWI and on through the Ford trimotor, many 1930s airframes' structures, and the Junkers Ju52. That element is corrugated aluminum. The corrugations are there to stiffen the skin in the early examples listed, but in the Thunderbolt it was commonly used on bulkheads inside the fuselage to stiffen those parts.

The use of corrugation in the P-47 shouldn't be thought of as outdated for the time, though. The technique is still used today: the Piper PA-28 family's tail surfaces have stamped indentations on the vertical and horizontal tail surfaces for stiffening.

The corrugations are created using a die in a press brake.



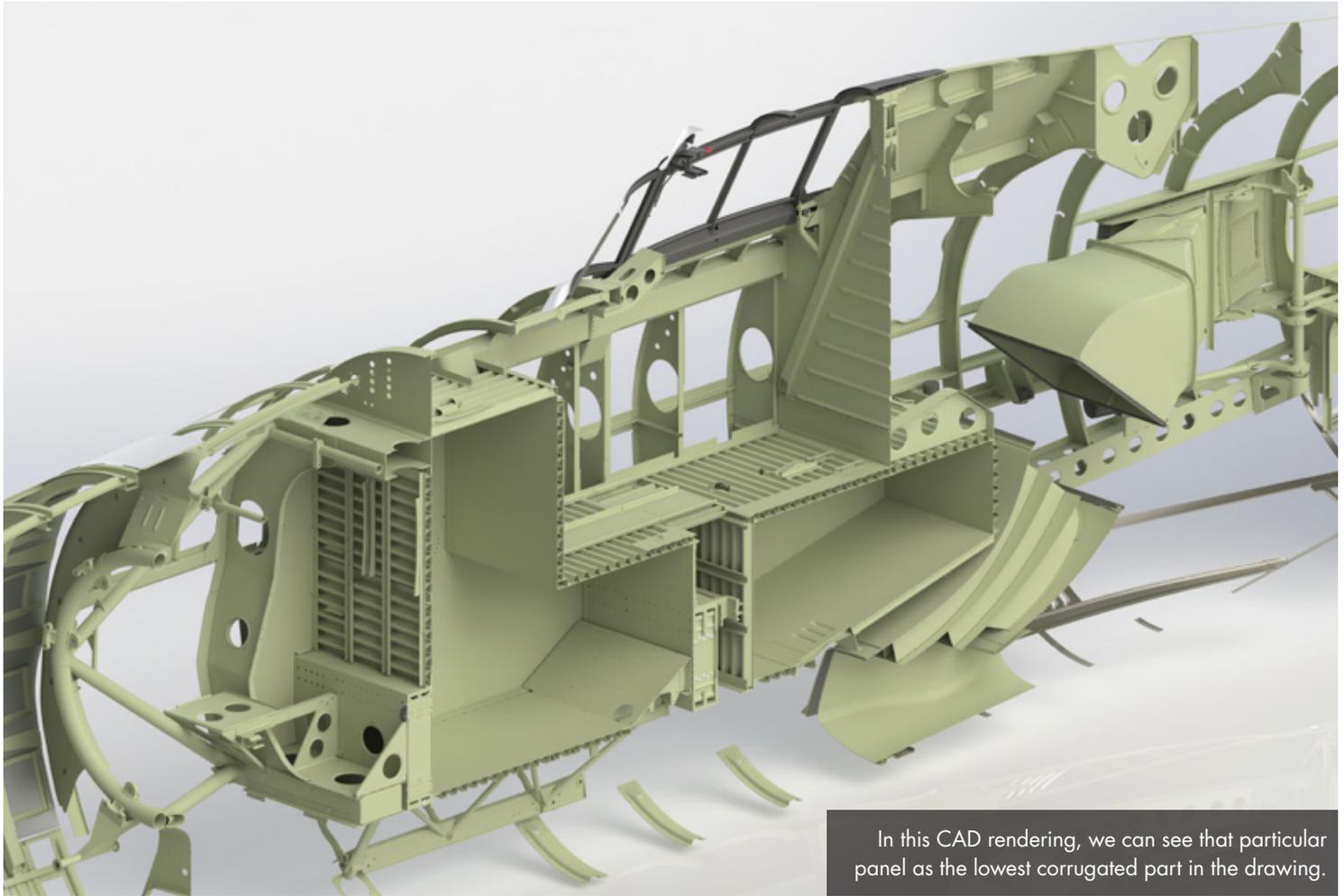
Kris works with a corrugated part, using a finger brake to form an edge flange.



A closer shot allows us to see part clearly.



This assembly will be the front auxiliary tank compartment panel.

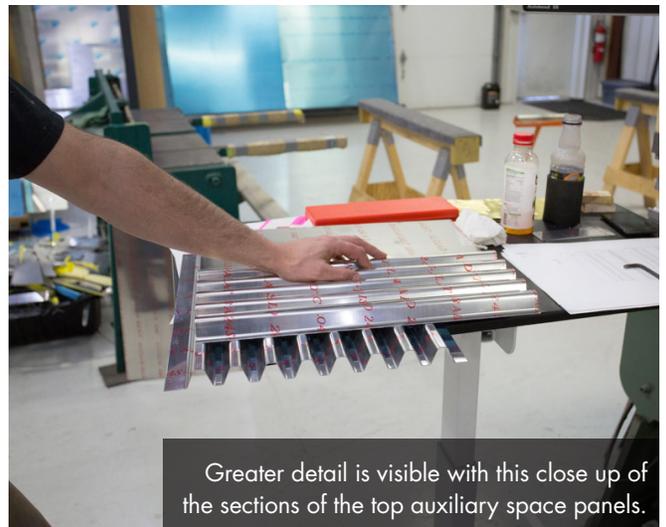


In this CAD rendering, we can see that particular panel as the lowest corrugated part in the drawing.

The assembly pictured in the last photo isn't quite complete; it still needs some stiffeners riveted to it, which explains why it looks a little different in the CAD drawing.



Kris continues to make corrugated parts - these are pieces that will become the top auxiliary tank panels.

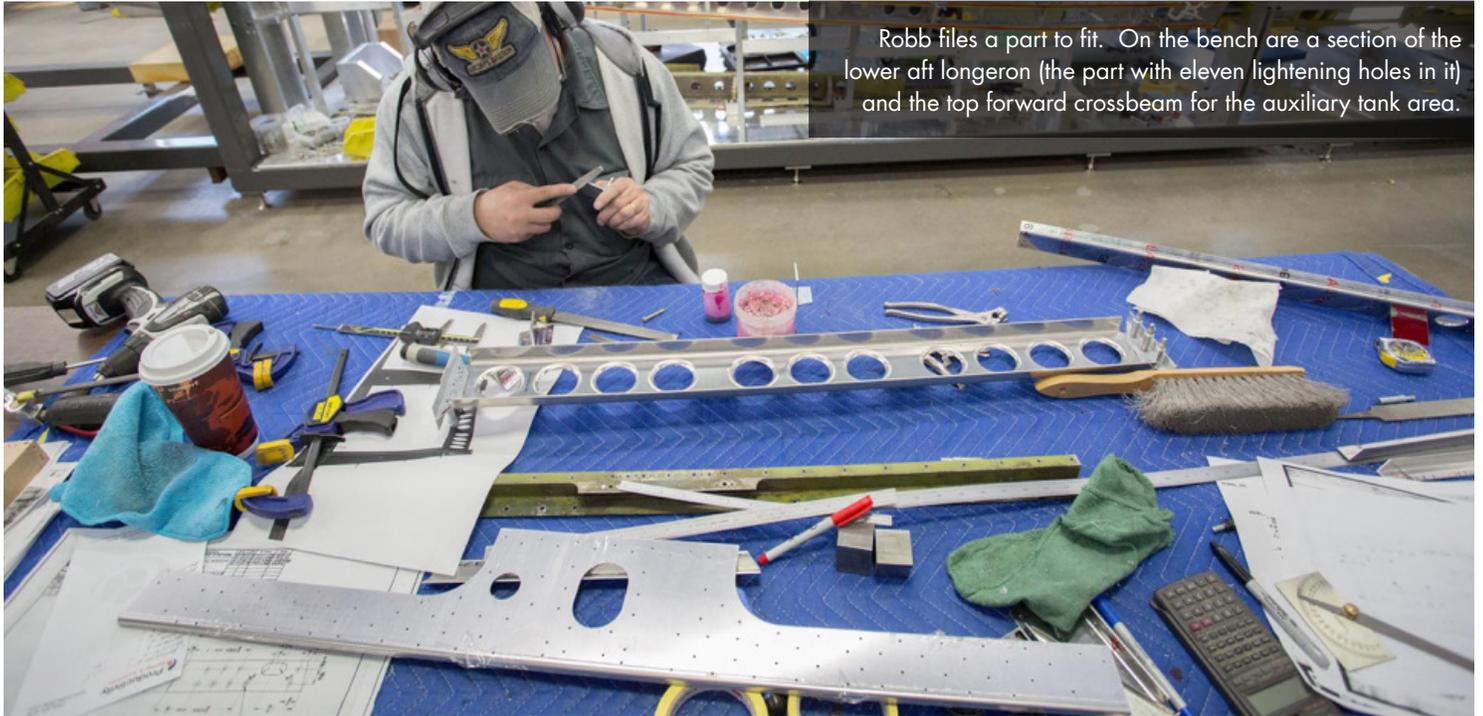


Greater detail is visible with this close up of the sections of the top auxiliary space panels.



Preparing Parts and Assemblies for the Next Steps

As the fuselage work progresses, assemblies and single parts are constantly being put together, trimmed, and readied for the upcoming steps in the restoration.

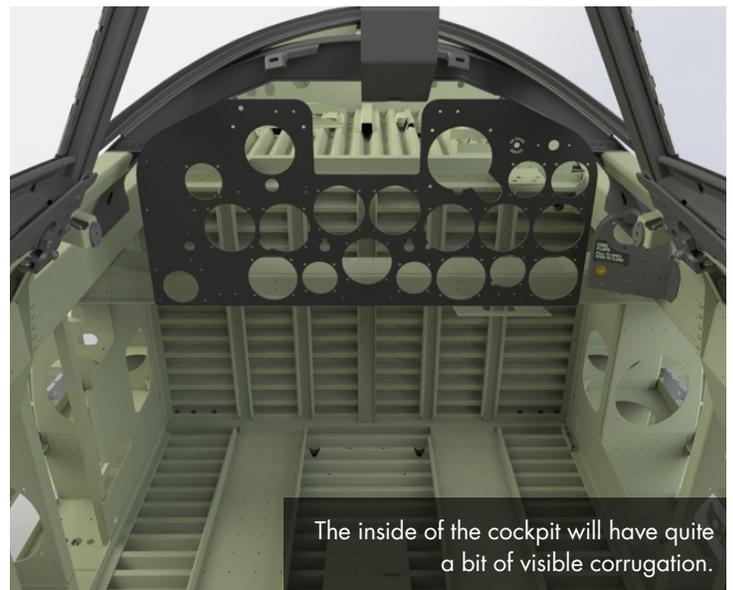


Robb files a part to fit. On the bench are a section of the lower aft longeron (the part with eleven lightening holes in it) and the top forward crossbeam for the auxiliary tank area.

Forward Fuselage



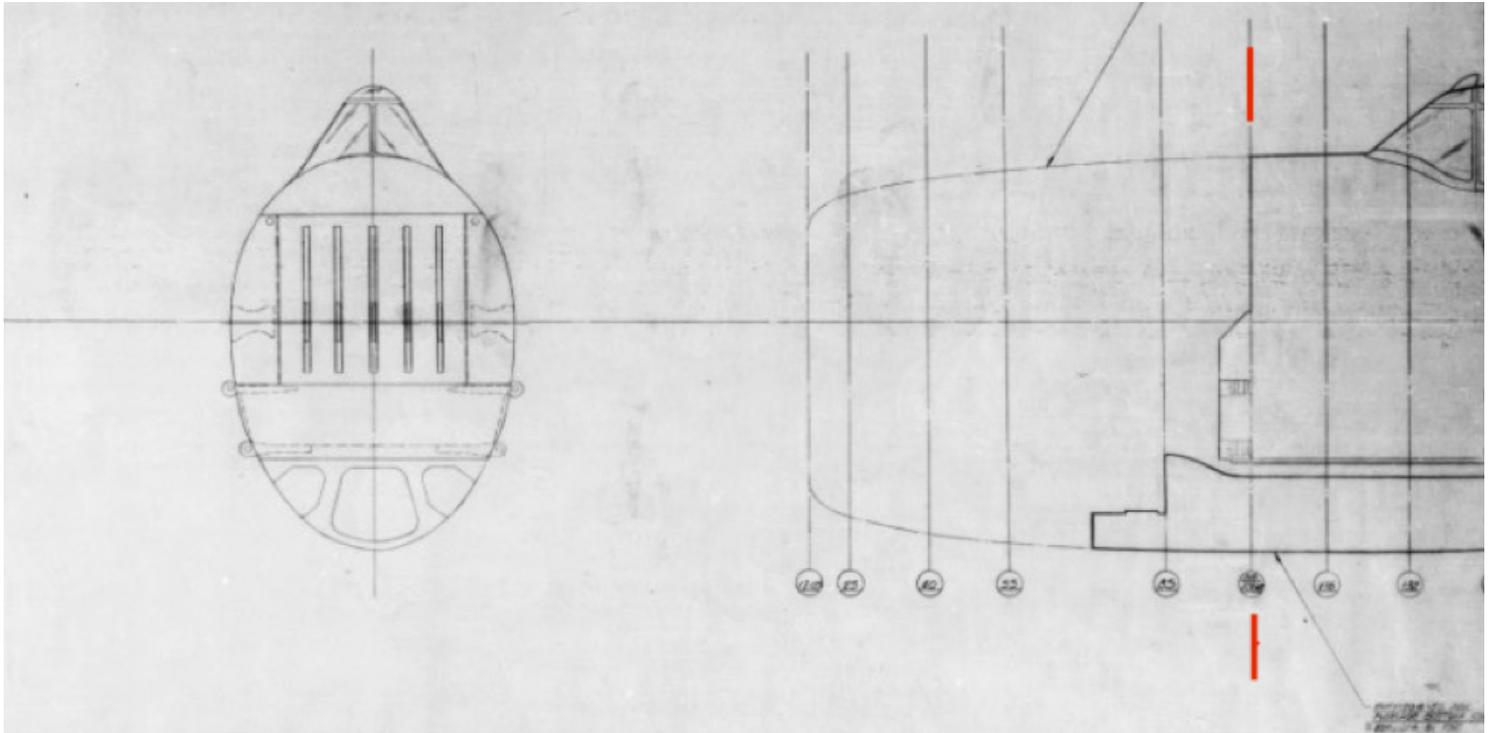
Dave works on the fit of a fuselage former, sitting inside the main fuel tank area of the lower fuselage.



The inside of the cockpit will have quite a bit of visible corrugation.



Station 101.625



This drawings shows some of the fuselage stations. Station 101.625 is between the red marks added to the drawing.



Here is part of the bulkhead at the forward wing cross-tie station or station 101.625.



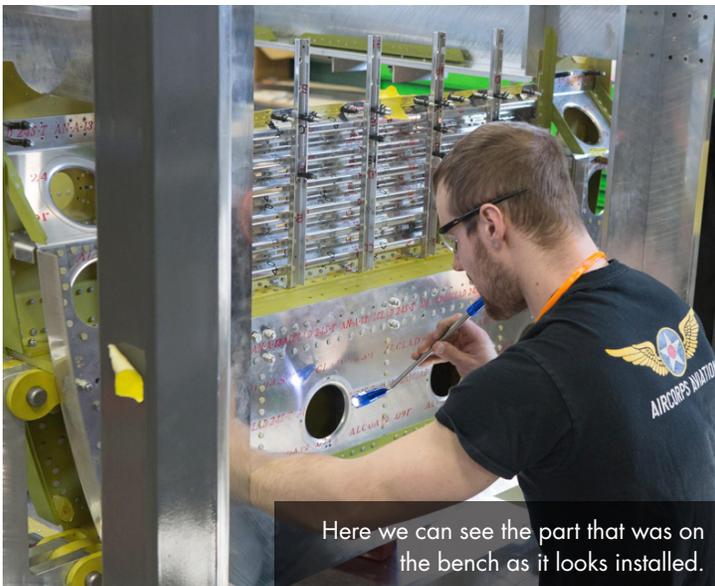
A longer shot lets us see the relationship between the corrugated portion and the rest of the bulkhead.



Another section of the bulkhead awaits installation; it is formed, drilled, and painted on one side.



Robb is working on one of the main longerons.



Here we can see the part that was on the bench as it looks installed.



Notice the curve as the longeron sweeps upward toward the tail.



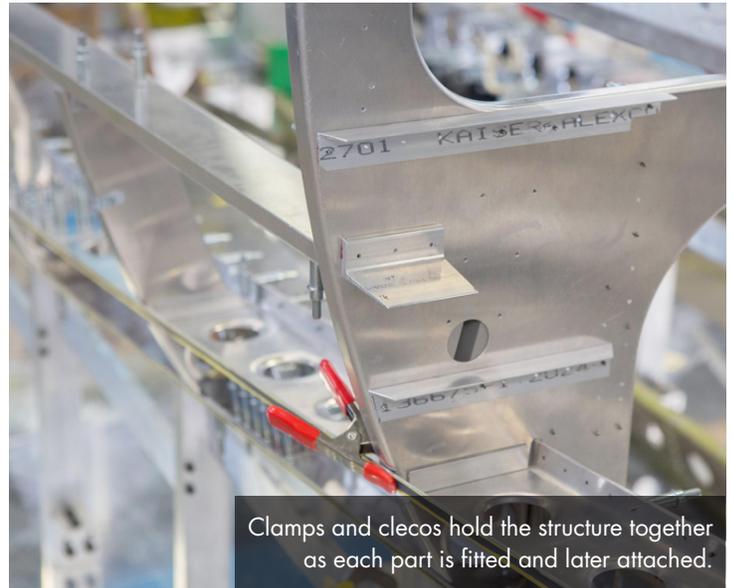
On the backside of the station 101.625 bulkhead is a hole where the cockpit ventilator tube connects via nutplates



Here we can see that the other end of the same longeron extends all the way to the forward wing tie station, 101.625



The structure produced by this kind of engineering is what resulted in the P-47's well-deserved reputation for strength.



Clamps and clecos hold the structure together as each part is fitted and later attached.

These fuselage formers are nearer the tail at station 285. Notice the stiffeners riveted to them.



This view of cross-tie fasteners shows the remarkable number of bolts used to hold the wing fittings in place.



At the left is the station where the tail cone attaches; to the right is the rear wing cross-tie bulkhead.



Aaron checks the alignment of a former.

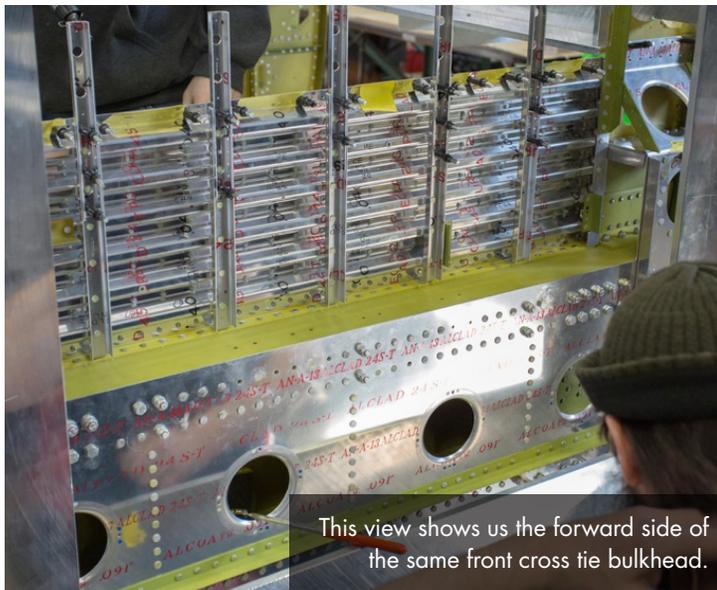


Randy drills the rear cross tie bulkhead for another rivet. This bulkhead is at station 148.375. That makes it 46.7 inches aft of the forward cross tie bulkhead at 101.675.



The large aluminum beams are at the parting line between the bottom half of the fuselage and top half.

When the basic bottom structure has been completed, the beams will be removed and the top half of the fuselage will be built on the bottom half.



This view shows us the forward side of the same front cross tie bulkhead.



This is the backside of the forward cross tie bulkhead.



In this tighter shot, we can see how the structure is attached to the "parting line" beam.