



Fall 2024

Piper L-4H Grasshopper

44-79780 Restoration



L-4s lined up on an apron with several A-20 attack bombers in the background, Photo National Archives.

Between 1941 and 1945, the USAAF procured 5,413 L-4s for U.S. forces. 1,801 of that number were L-4H versions. Thousands of L-4s remained in the US for the duration of WWII, training pilots and serving liaison duties for Army units in training. The little Piper L-bird is common in the United States and Canada, but combat veteran L-4s are rare in the United States.

L-Birds accompanied the advance of the troops until the war ended. While many of the fighters and bombers were repatriated to the United States post war, most small planes were decommissioned on the spot. These aircraft were then used after the war for training thousands of pilots in the former European and Pacific theaters.



Instructions for Army Models L-4A, L-4B, and L-4H, AN 01140DA-1)

PIPER J3C SERIES
AIRCRAFT SPECIFICATION NO. A-691 October 30, 1953, Revision 22 Sheet 2

IV - Model J3C-65 (Army L-4, L-4A, L-4B (Navy NE-1), L-4H, L-4J (Navy NE-2)), 2 PCLM, Approved July 6, 1939

Army L-4 (previously Army O-59) is the same as Model J3C-65. Army L-4A (previously Army O-59A) and Army L-4B are the same as Model J3C-65 except for transparent turtle-deck enclosure, revised rear seat with seat back belts, addition of rear shelf and rear floorboard. Army L-4H is same as L-4A except for G.F. radio equipment and revised method of installing the transparent cockpit enclosure.

Army L-4J (Navy NE-2) same as any L-4, L-4A, L-4B and L-4H except for installation of propeller, Item 1.

See NOTE 7 regarding conversion to 2 POLM.

Engine	Continental A-65-1 (See Item 311C for optional engines).
Fuel	73 min. octane aviation gasoline.
Engine limits	For all operations, 2350 rpm (65 hp)
Airspeed limits	Level flight or climb 90 mph (78 knots) True Ind. Glide or dive 122 mph (106 knots) True Ind.
Propeller limits	Static rpm at maximum permissible throttle setting (no additional tolerance permitted): (a) With A-65-1 engine: Not over 2300, not under 2000. (b) With optional engines (Item 311C) and propeller Item 2 or 101: Not over 2300, not under 1950. Diameter: Not over 81 in., not under 69.7 in. (with fixed pitch wood propeller). Not over 74 in., not under 72 in. (with propeller Item 2).

C.G. range	(+10.6) to (+22.7) See NOTE 3 for restricted limits on certain serial numbers below 4502.
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Empty weight C.G. range	if placard "Solo flying in rear seat only." is installed (See NOTE 2): (+8.5) to (+20.3) When empty weight C.G. falls within range given, computation of critical fore and aft C.G. positions is unnecessary. Range is not valid for non-standard arrangements.
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Maximum weight	A. Serial numbers 7842, 7845 to 7883 inclusive, 7912 and up are eligible for 1170 lb. maximum weight. These airplanes are also eligible for 1220 lb. maximum weight provided the landing gear is revised in accordance with Piper Dwgs. No. 31472 and 31423. B. Serial numbers prior to 7912 and not included above, are eligible for 1100 lb. maximum weight. These airplanes are also eligible for 1170 lb. maximum weight provided the lift struts and attachments are revised in accordance with Piper Dwgs. No. 12352, 13233 and 21642 and for further increase to 1220 lb. upon revision of the landing gear in accordance with Piper Dwgs. No. 31472 and 31423. C. Serial numbers 10339 and up and 2356-A and up of Model J3C-65 eligible for 1220 lb. maximum weight.
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No. seats	2 (one at +9 and one at +36)
Maximum baggage	20 lbs. (+49)
Fuel capacity	12 gal. (-18)
Oil capacity	1 gal. (-29)
Control surface movements	Elevators 34° up 29° down Rudder 30° left 30° right Aileron 18° up 18° down Stabilizer 2.5° up 4° down

4



L-4H Specifications:

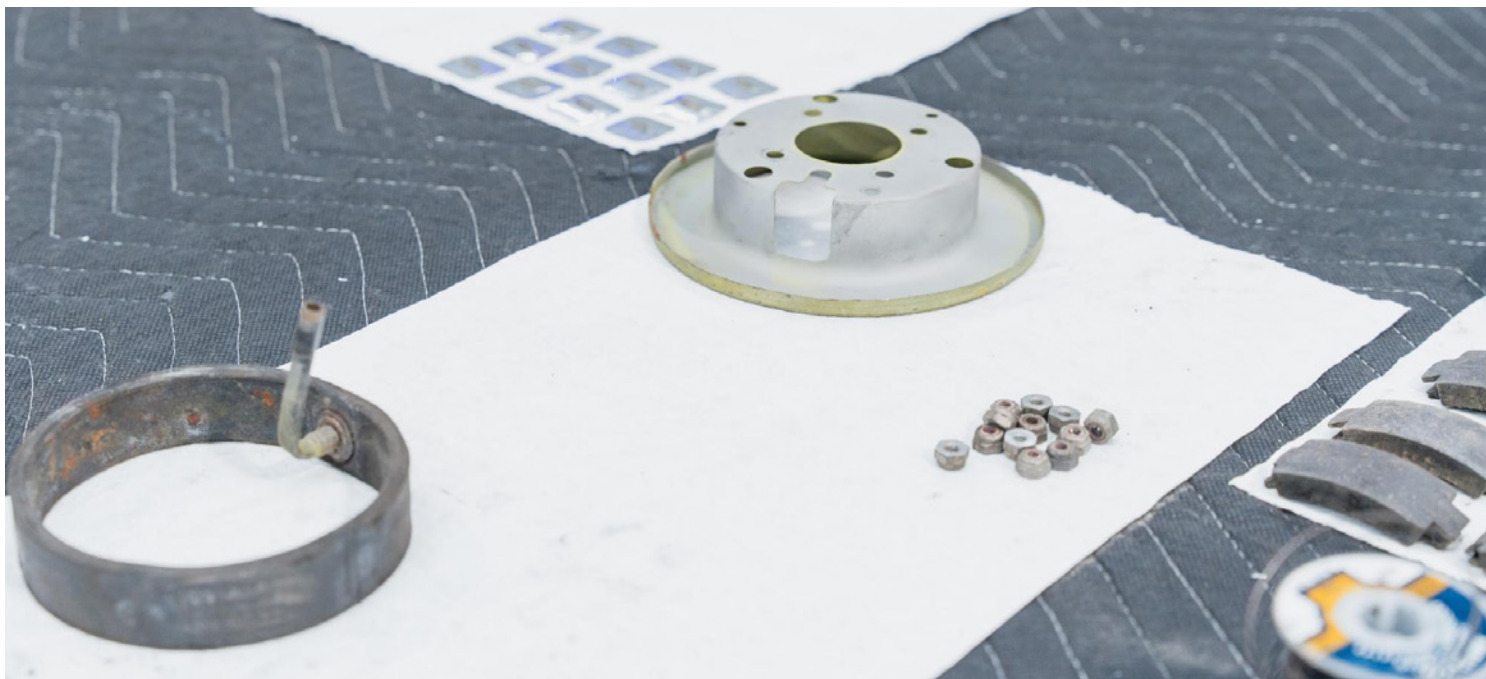
Overall Length:	22' 4 1/2"
Wingspan:	35' 3"
Engine:	Continental A65-8 (AAF designation 0-170-3) rated at 65 hp at 2,250 at sea level
Maximum Permissible Engine Overspeed:	2,530 rpm
Fuel Capacity:	12 gal
Fuel Flow:	5.8 gph at take-off (2,300 RPM), 4.27 gph at standard cruise (2,100 rpm)
Empty Weight:	708 lbs., basic weight includes oil and trapped fuel
Gross Weight L-4H:	1,220 lbs
Full Load Stall Speed:	37.5 mph
Standard Cruise Speed:	75 mph at 2,150 rpm
Climb at Gross Weight:	300 fpm at 55 mph
Maximum Dive Speed:	122 mph
Take Off Distance From Sod At Sea Level:	352 ft.; to clear 50" object, 737 ft
Landing Approach Speed:	60 mph
Landing Distance, Firm Dry Surface:	390 ft.; to clear 50" object, 605 ft.



Restoration Progress

The past weeks have seen the L-4's wings rebuilt, the wheels and brake parts inspected and restored, and the fuselage tube frame has been repaired and returned to the AirCorps restoration shop.

Wheels and Brakes



The original brake system expander (left) and brake drum (right). The bladder expands against the brake shoes and produces friction as the shoes are pressed against the brake drum.

An L-4B and L-4H are nearly identical. A primary difference between them is the brake system manufacturer. L-4Bs used Goodrich brakes and L-4Hs used a Scott system. The original expander tube brake system in an L-4 is quite simple. Pressure on the wheel brake lever pushes on a diaphragm which in turn forces brake fluid in the line to inflate the expander tube which pushes the brake pads against the brake drum.

The original L-4/J-3 brakes aren't very effective. However, this can be an advantage in a Cub because in typical operations the J-3/L-4 needs almost no brake use. With expander tube brakes it's hard to brake it hard enough to pick up the tail.

More effective replacement brake systems are powerful enough to make a brake-induced nose over a real possibility. But current L-4/J-3 Cub owners are not inexperienced cadets so they often choose to accept the nose-over risk and retrofit their airplanes with Grove disc brakes under an FAA-approved Supplemental Type Certificate and that's the case with 44-79780'.

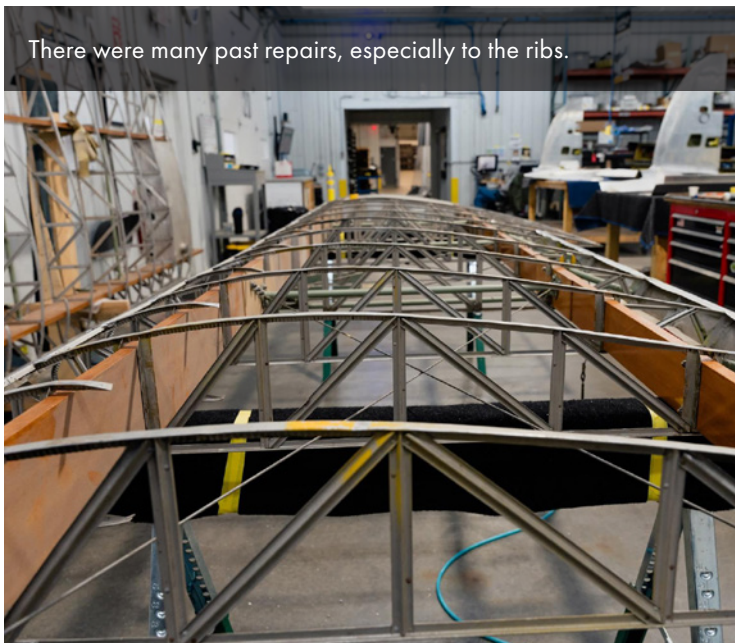


Wings

The original L-4 wings required extensive repairs after many years in storage.



The condition of the L-4 wings when they were received by AirCorps.



There were many past repairs, especially to the ribs.



Disassembly begins.



A view from the tip of the left wing as disassembly progresses.



As the left wing is disassembled the right wing waits in a wing rack.



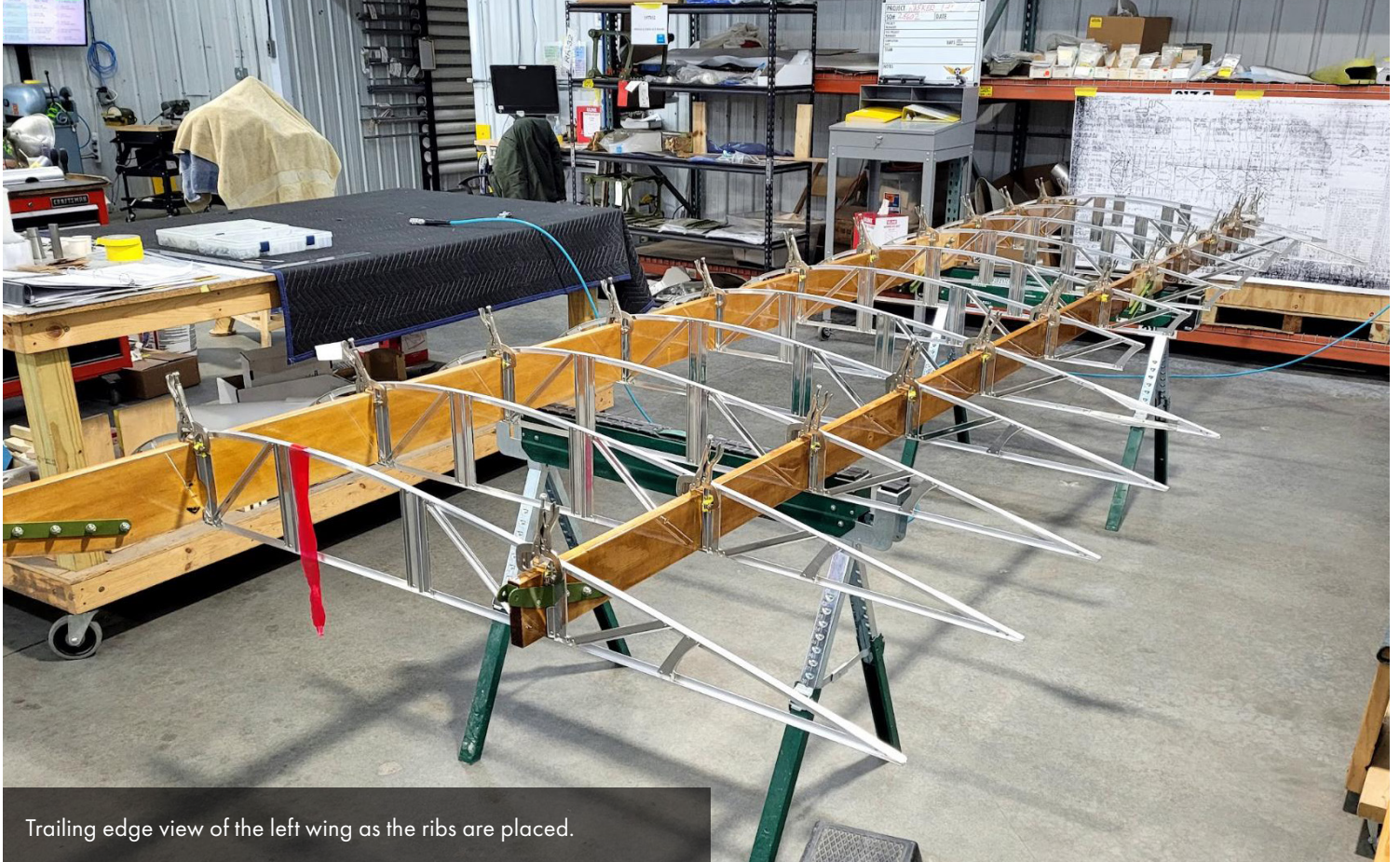
The wings have been disassembled and the spars inspected. They needed refinishing but were otherwise airworthy.



Mike Izzi works at refinishing the L-4 spars.



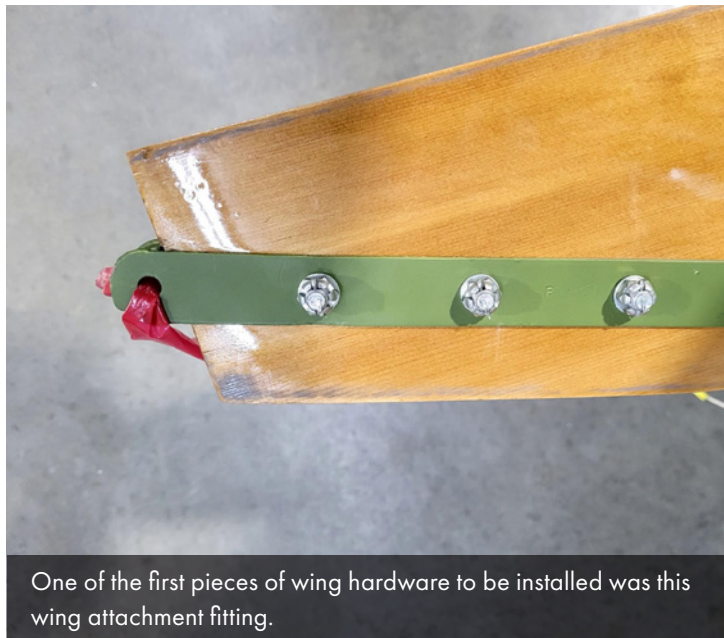
Once the spars were refinished, ribs could be positioned on them.



Trailing edge view of the left wing as the ribs are placed.



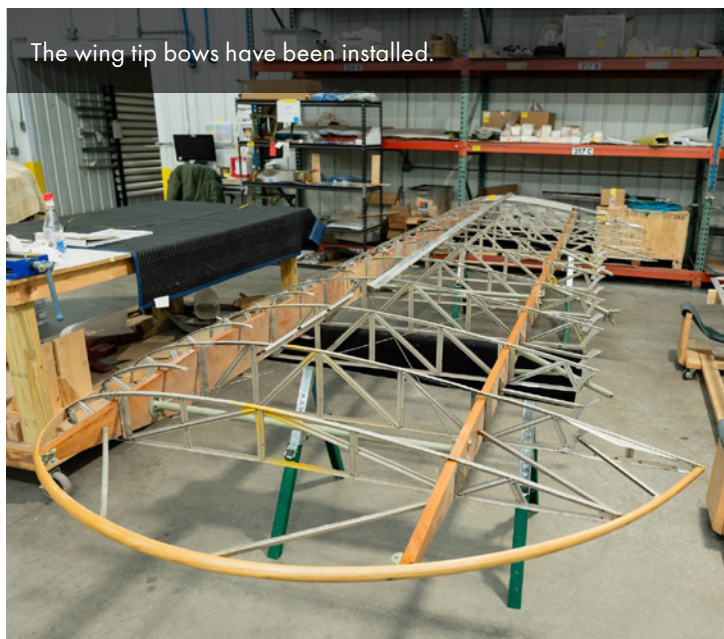
Wing braces, brackets, fuel tanks, and other hardware are organized on shelves so that they are readily available as the wing assembly progresses.



One of the first pieces of wing hardware to be installed was this wing attachment fitting.



The original L-4 wing tanks after cleaning, inspection, and painting.



The wing tip bows have been installed.



The restored left-wing frame is stored in a rack as the right-wing goes through an identical restoration process.



Fuselage Tube Frame

The fuselage frame suffered significant damage in the crash in the early 1950s when it was owned and operated by the Civil Air Patrol. AirCorps subcontracted out the fuselage frame repair.



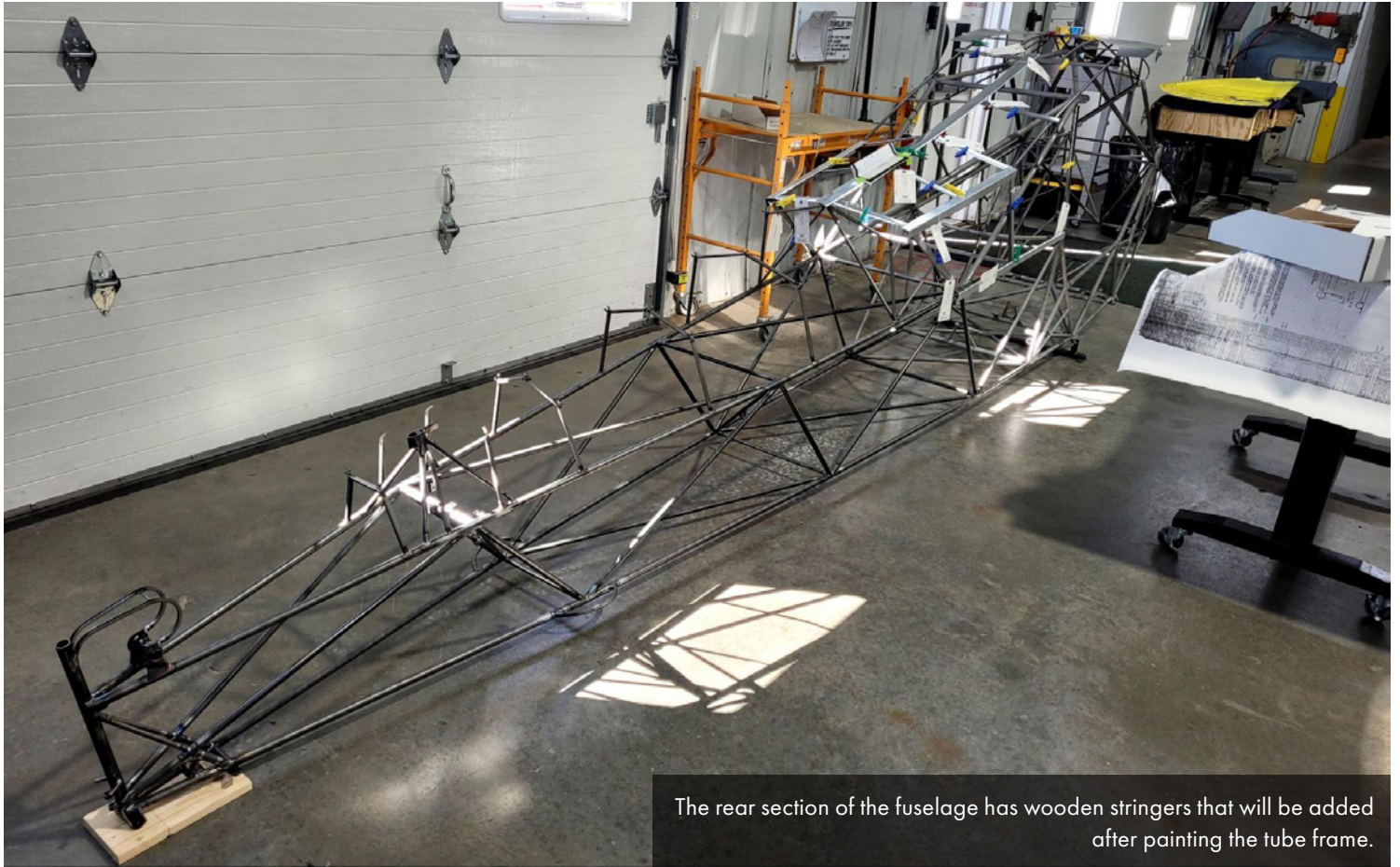
The damaged fuselage frame at the start of the project.



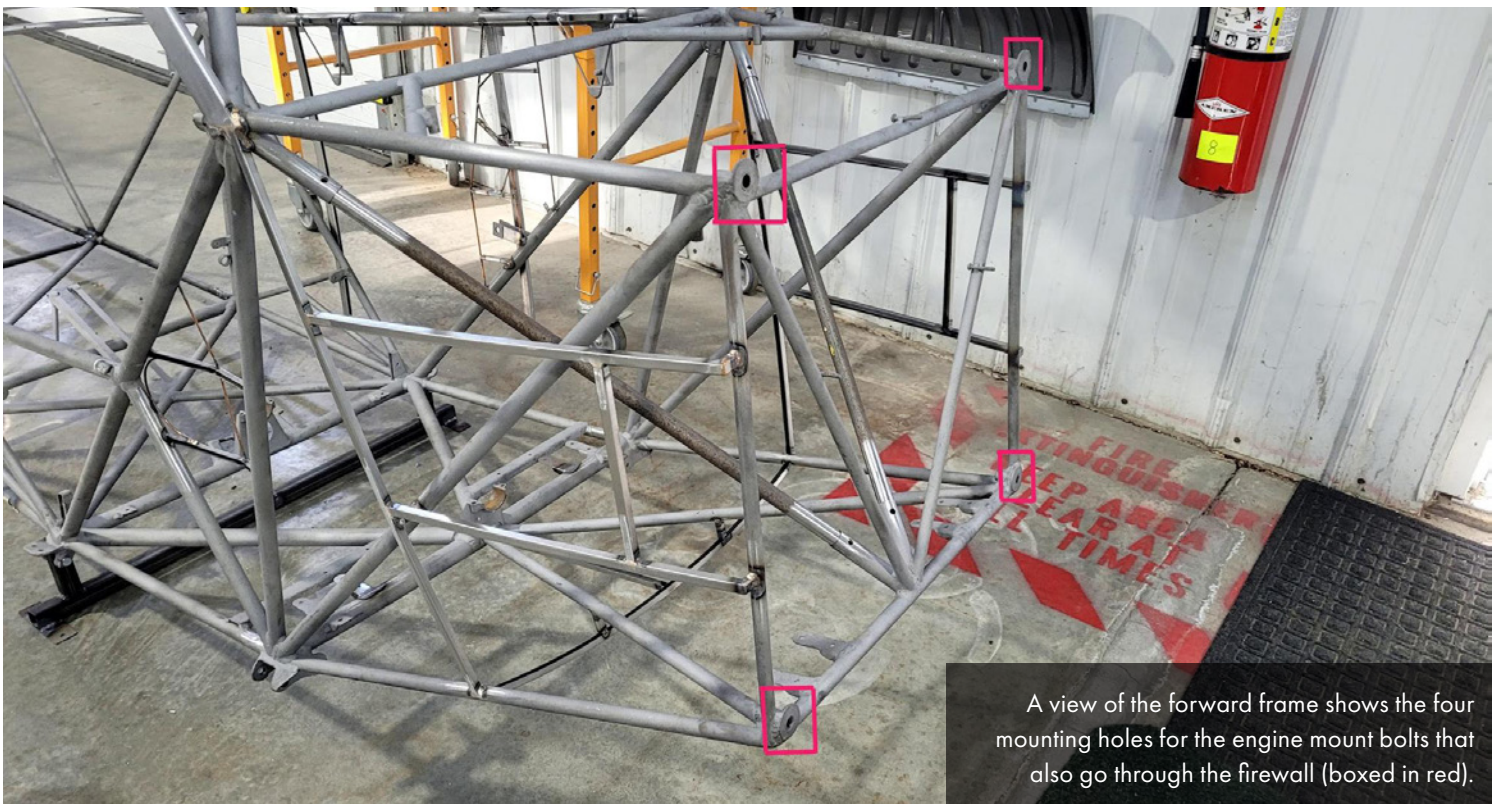
The repaired and straightened frame as it was returned to AirCorps.



The rear window area shows one of the main structural differences between an L-4 and a J-3.



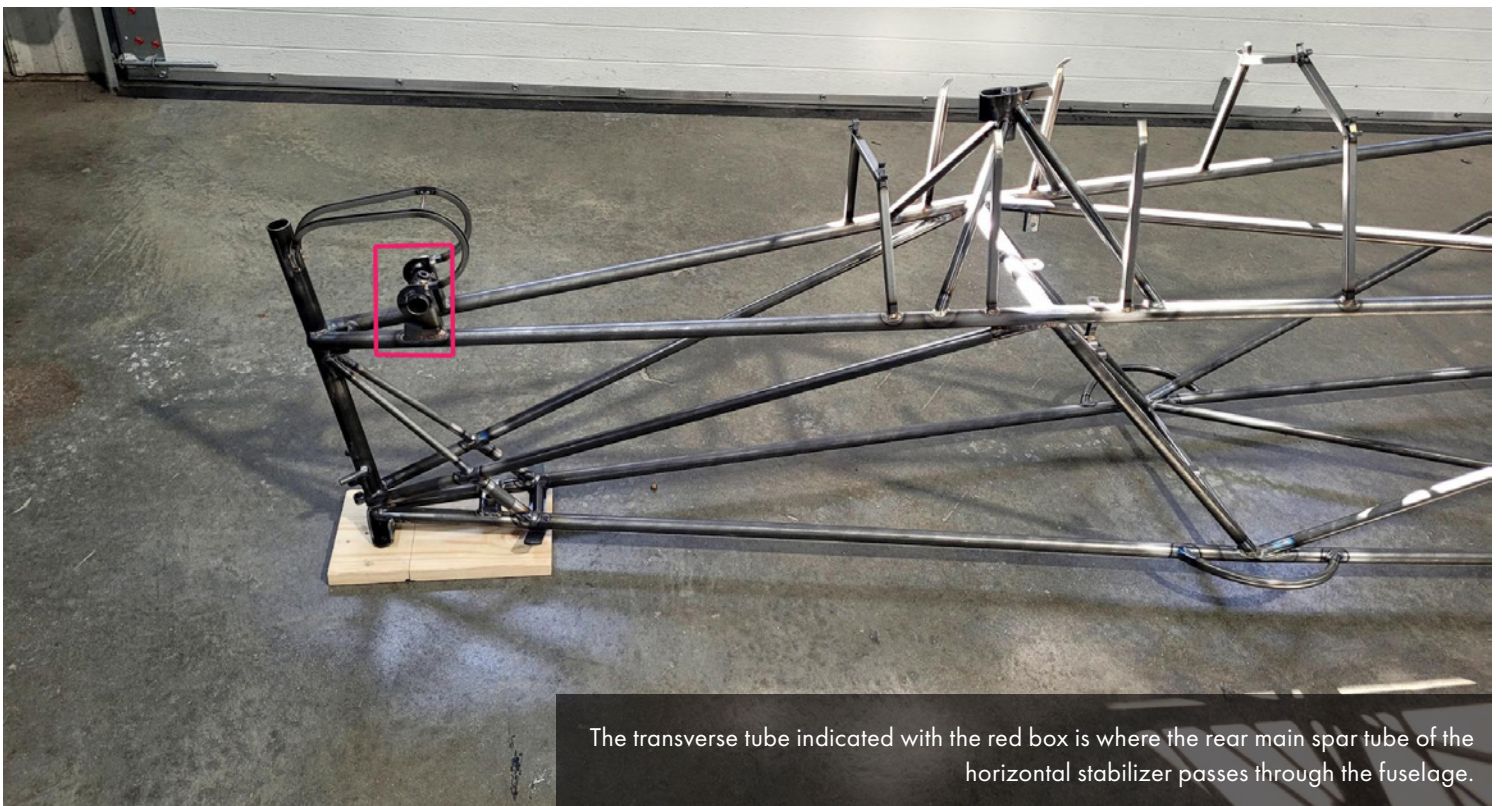
The rear section of the fuselage has wooden stringers that will be added after painting the tube frame.



A view of the forward frame shows the four mounting holes for the engine mount bolts that also go through the firewall (boxed in red).



The view of the upper frame shows where the windows on the top and sides will be.



The transverse tube indicated with the red box is where the rear main spar tube of the horizontal stabilizer passes through the fuselage.



Firewall Forward

The firewall forward sheet metal was sourced from Univair and carefully fitted and assembled. Once this assembly and the fuselage frame is painted, it will be mounted.

The firewall forward section of the L-4 is considered part of the fuselage assembly.



Here is a side view of the firewall forward assembly.



Rear view of the firewall forward assembly.