P-51B SHILLELAGH SPRING UPDATE

AIRCORPS AVIATION

Dakota Territory Air Museum's P-51B Mustang

by Chuck Cravens

Video screen capture of Shillelagh taking off, still wearing invasion stripes before the refurbishing of the paint scheme in early August 1944, video screen capture of USAAF film

In recent weeks, work has progressed on installing systems in the fuselage. Control system, electrical, and hydraulics installations take a long time on a restoration like this one.

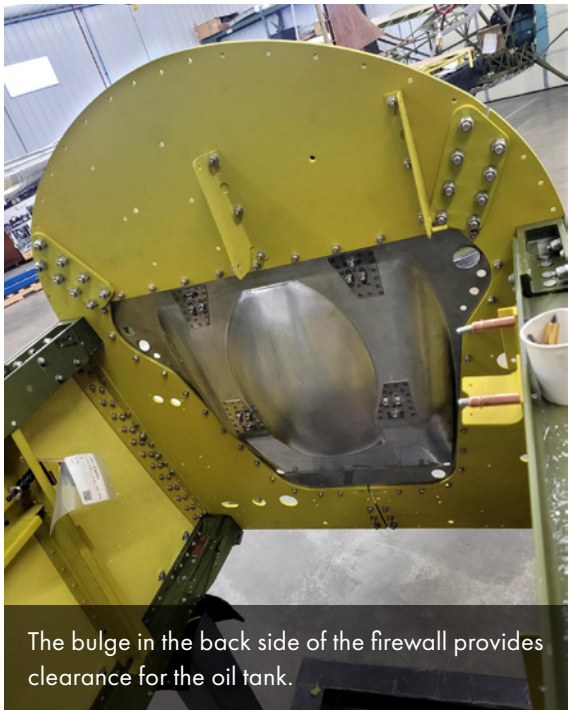
Also progressing are the wings. The structural framework is coming together.

DAKOTA TERRITORY AIR MUSEUM

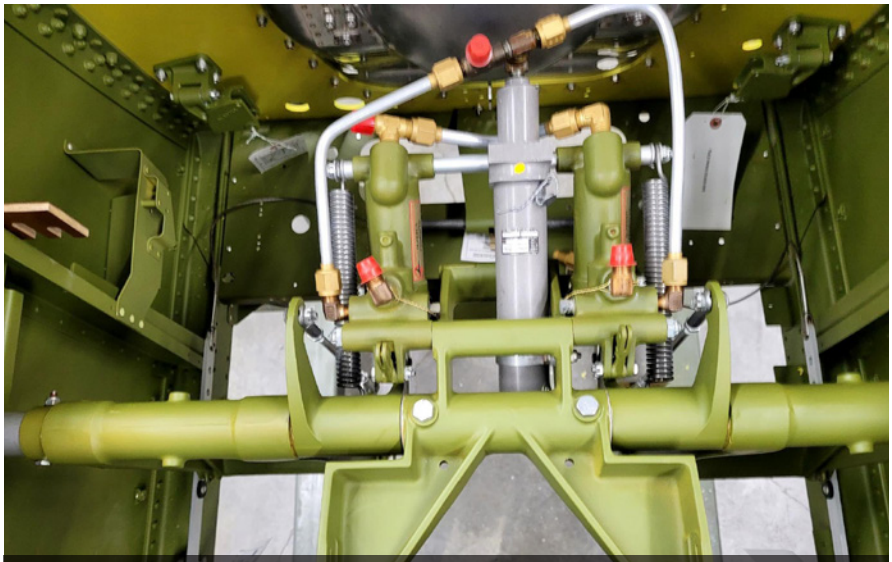
www.dakotaterritoryairmuseum.com

Fuselage

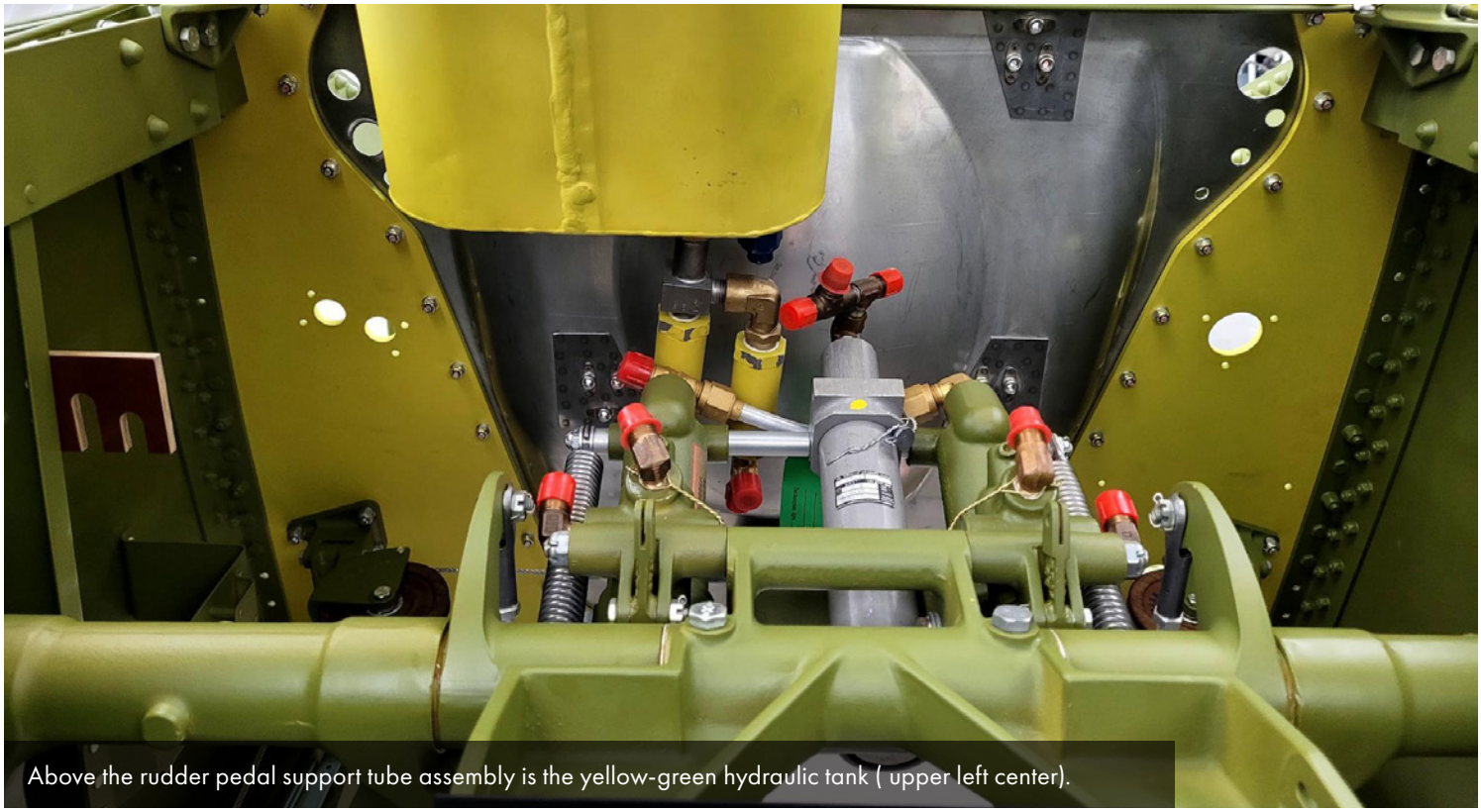
Hydraulic systems, engine control pedestal, and flight control cables were the focus of fuselage work in recent weeks.



The bulge in the back side of the firewall provides clearance for the oil tank.



This photo of the rudder pedal support tube shows the left and right brake master cylinders, the two green, vertically oriented objects in the upper center with the gray parking brake compensator between them.



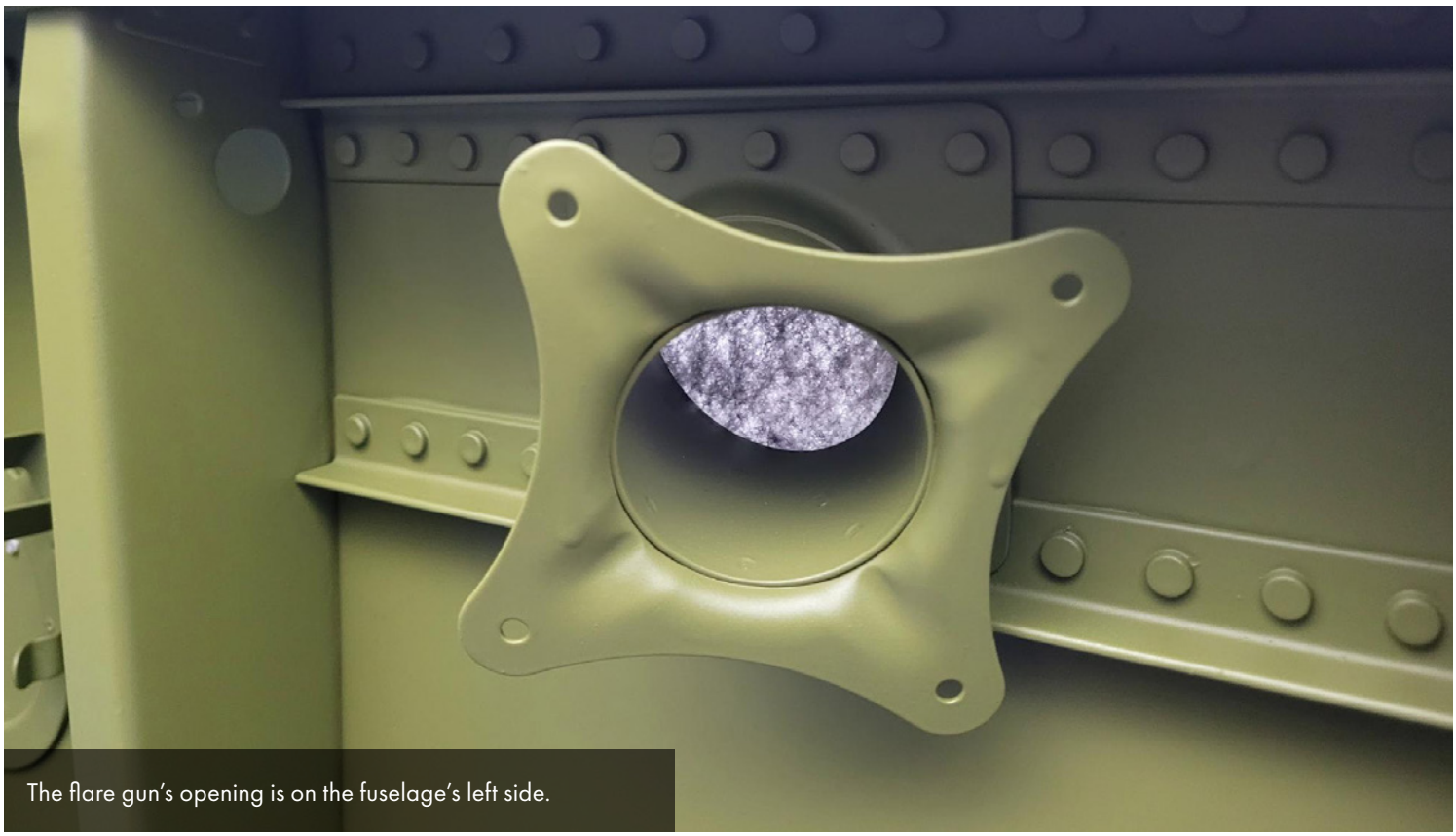
Above the rudder pedal support tube assembly is the yellow-green hydraulic tank (upper left center).

The black painted bulkhead is where the instrument panel mounts.

Progress on hydraulic lines shows here. The two leading off to the lower right go to the hand pump.

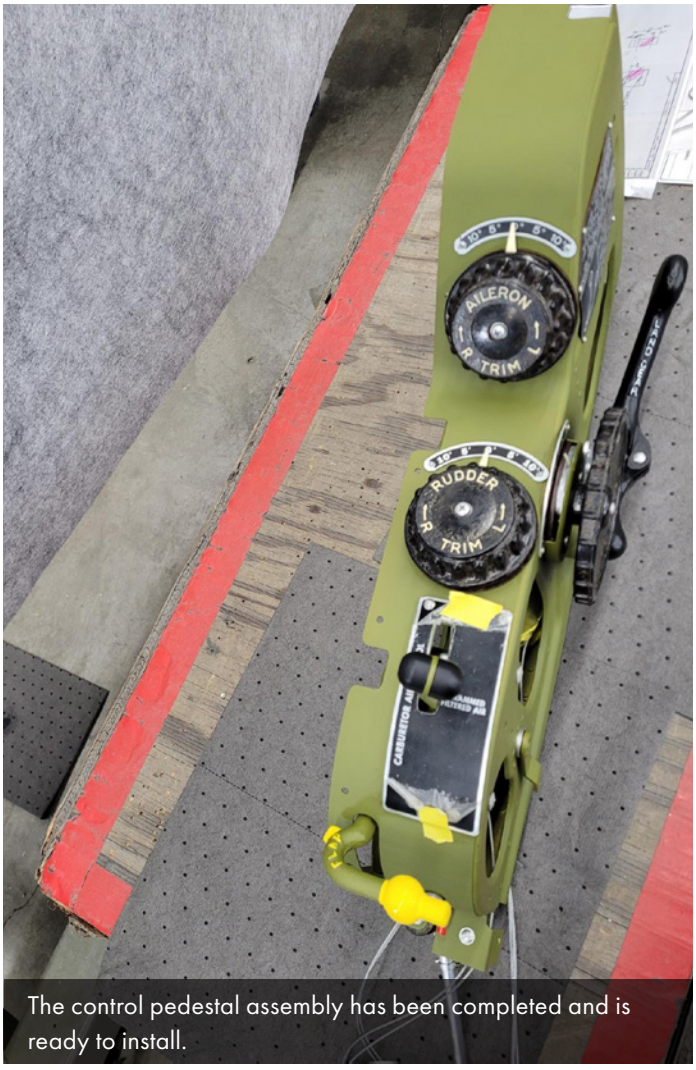
This is the hydraulic hand pump for operating the flaps, radiator scoops, or raising the landing gear in case of engine-driven hydraulic pump failure.

The hydraulic connections to the hand pump are in place.

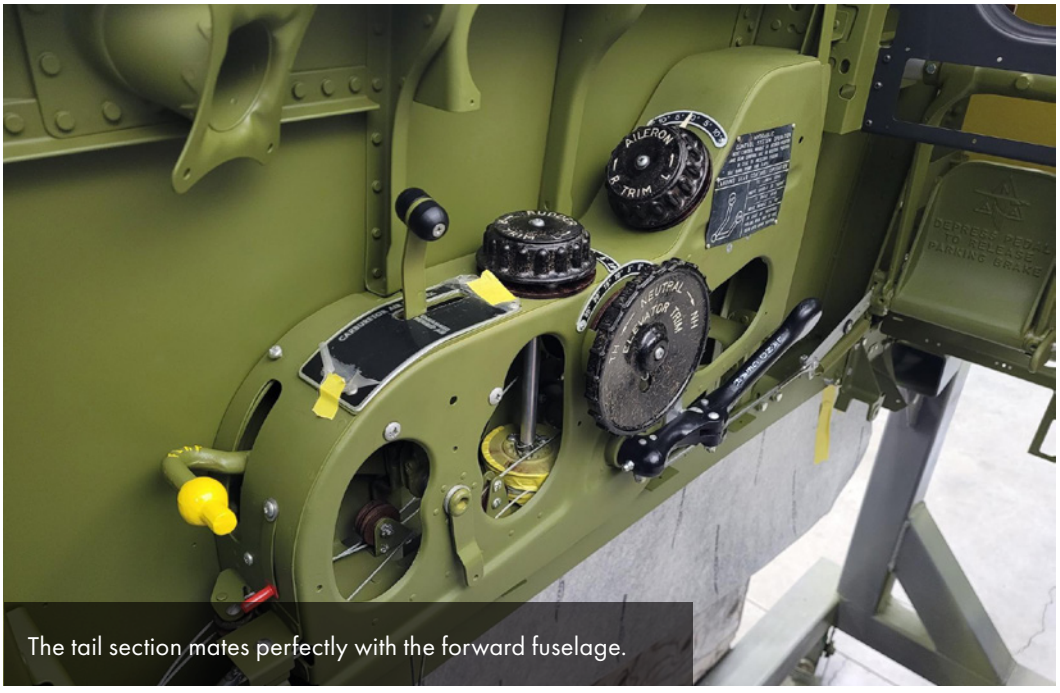


The flare gun's opening is on the fuselage's left side.

This bracket is for a handheld signal lamp mounted on the left rear of the cockpit.



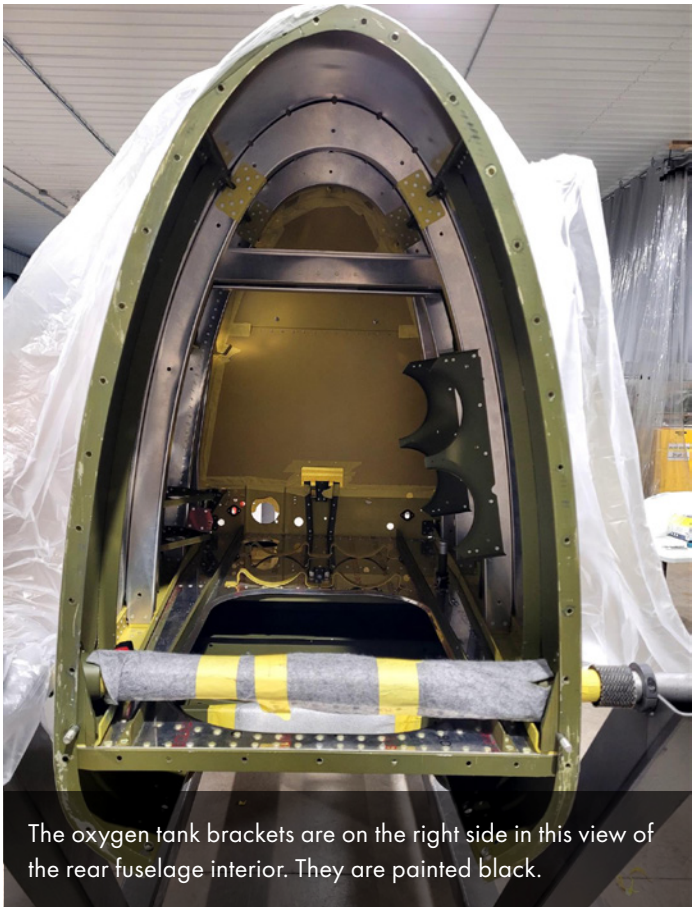
The control pedestal assembly has been completed and is ready to install.



The tail section mates perfectly with the forward fuselage.

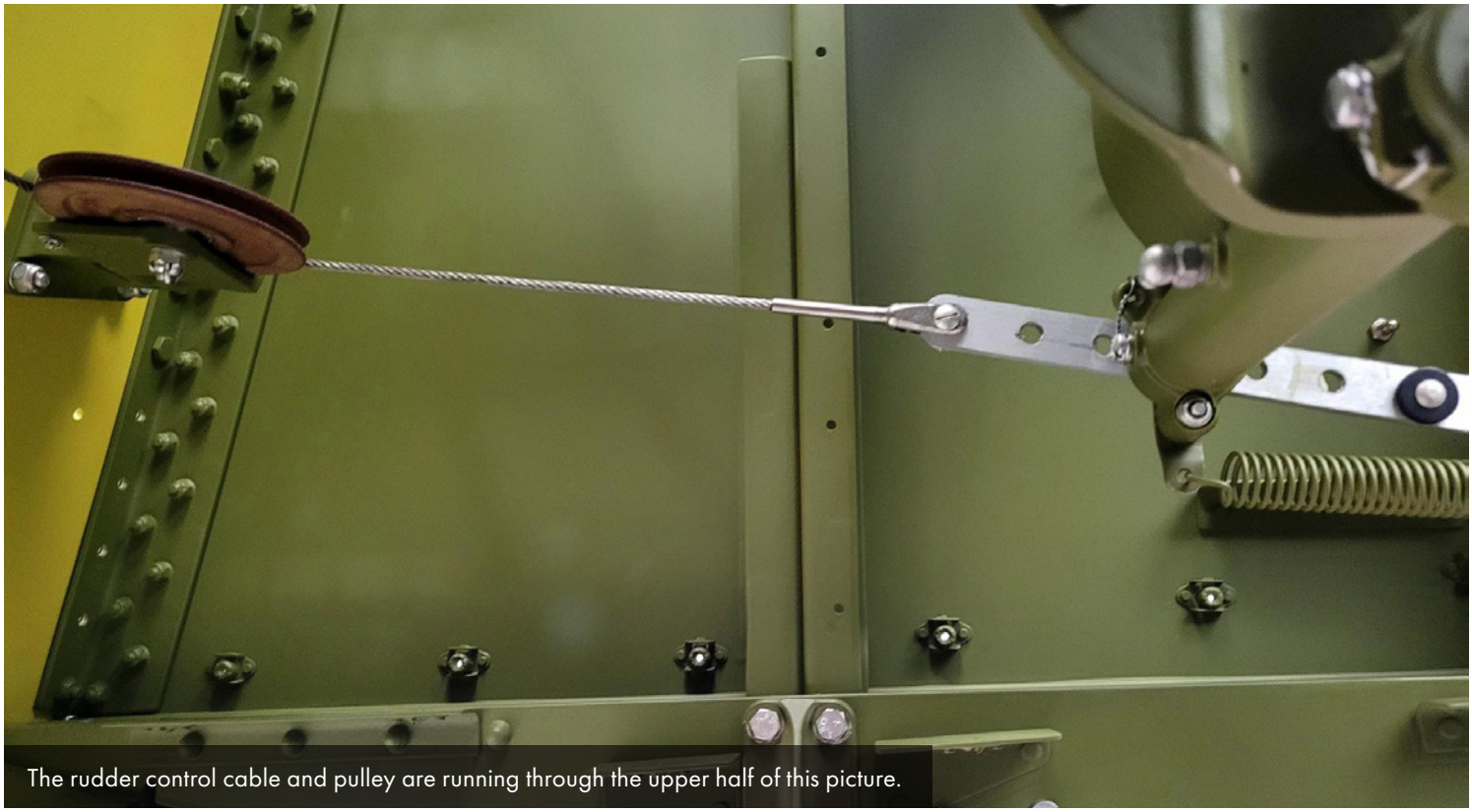
The control pedestal assembly has been installed. The lever with the yellow knob is the flap control lever. The upright lever on the top of the assembly is the carburetor air control. Ahead of that is the rudder trim wheel and the aileron trim wheel. The wheel on the side is for aileron trim. Below that is the landing gear control lever

The flap control torque tube assembly mounts below and behind the cockpit area.



The oxygen tank brackets are on the right side in this view of the rear fuselage interior. They are painted black.

This bellcrank is part of the rudder control system.



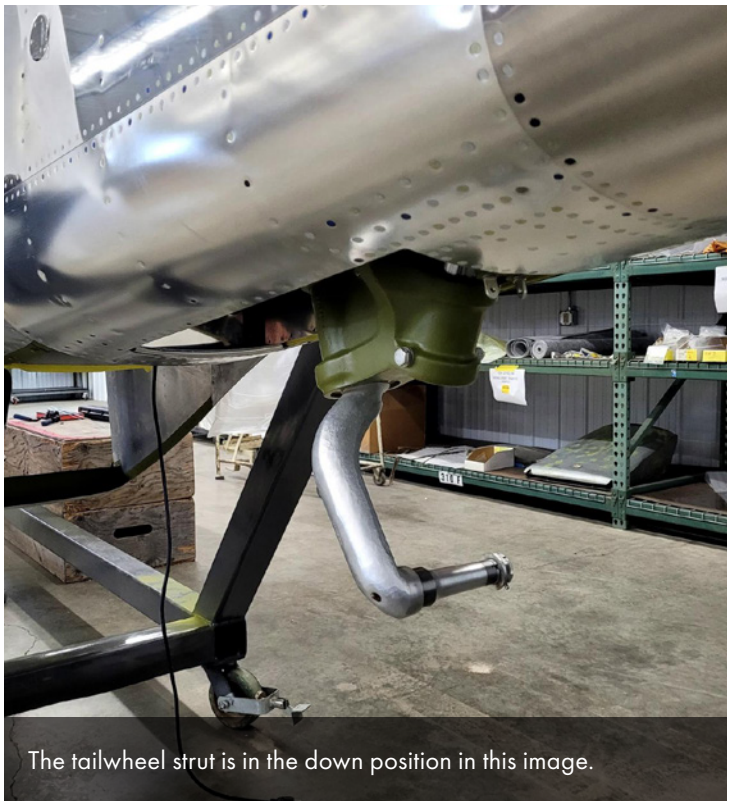
The rudder control cable and pulley are running through the upper half of this picture.

This is the tailwheel hydraulic cylinder.

This is the tailwheel opening looking forward in the fuselage.

The natural metal object is the tail wheel axle in the retracted position.

The uplock for the tailwheel has been installed.



The tailwheel strut is in the down position in this image.

The doghouse components have been painted and are going together permanently in a fixture

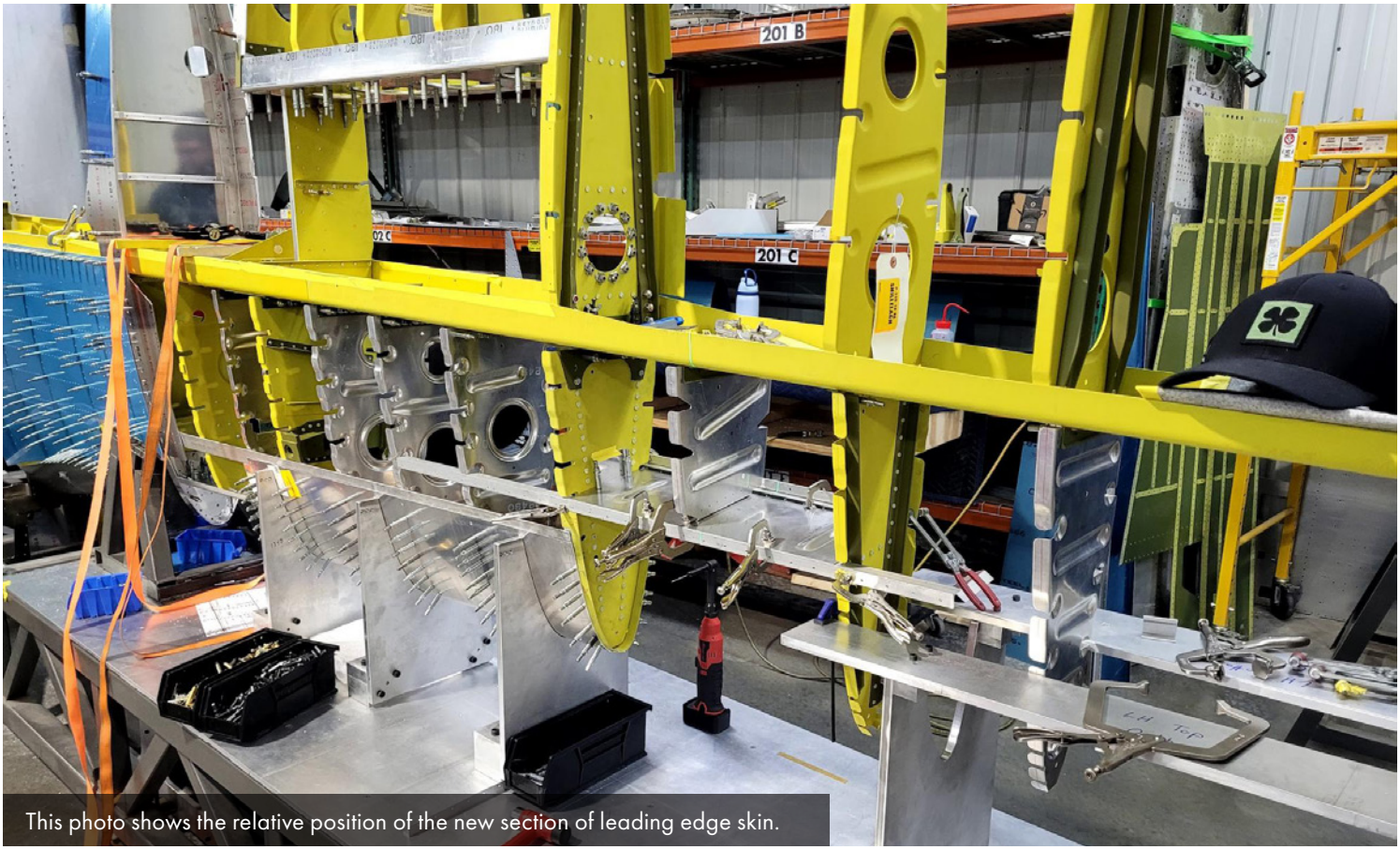
Wings

The wings become more and more complete as structural members like ribs and support stringers are added to the assemblies in the fixture.

Progress continues on the wings.

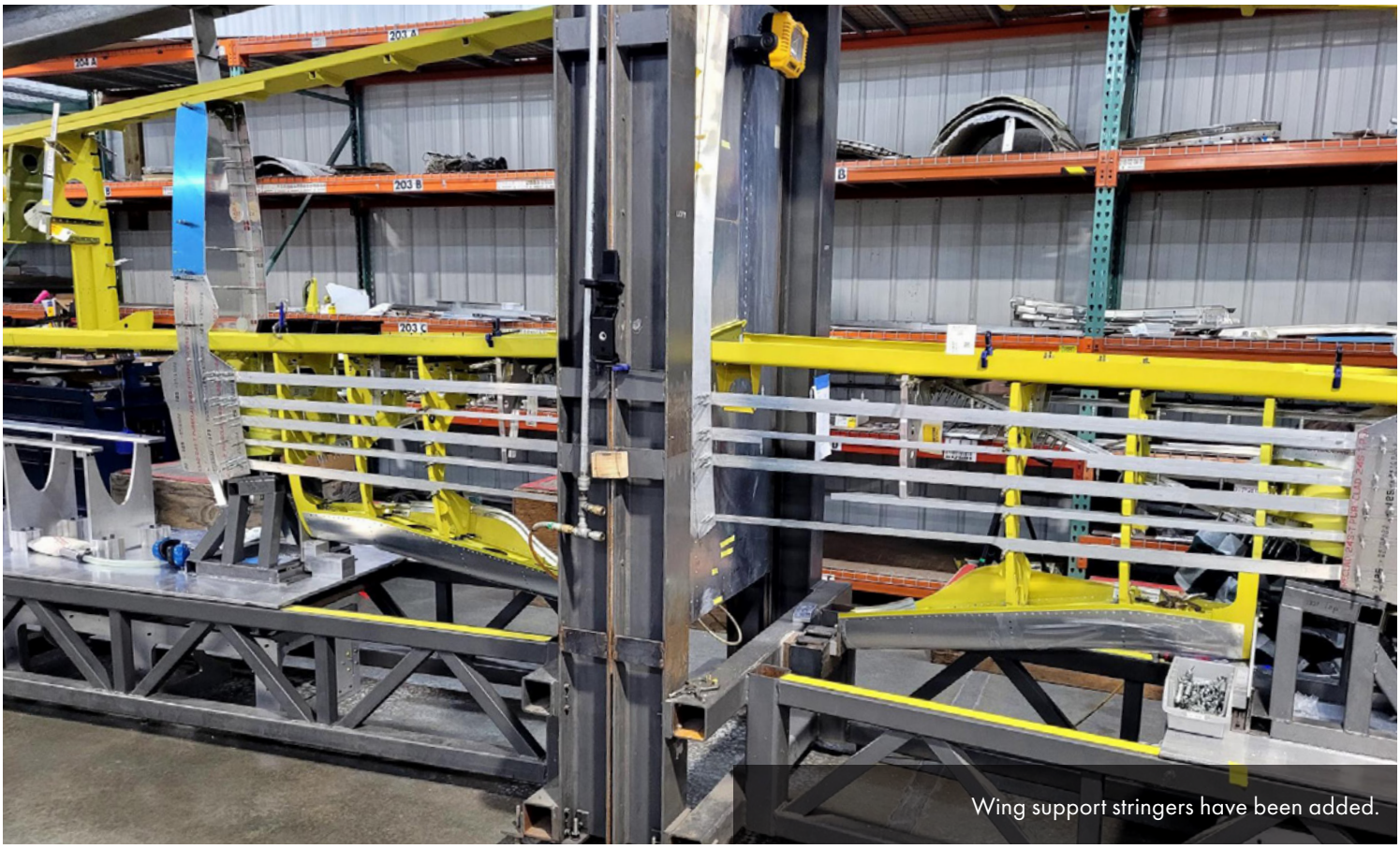
Mark works on deburring holes on a wing skin section.

A leading edge skin is fitted into place.

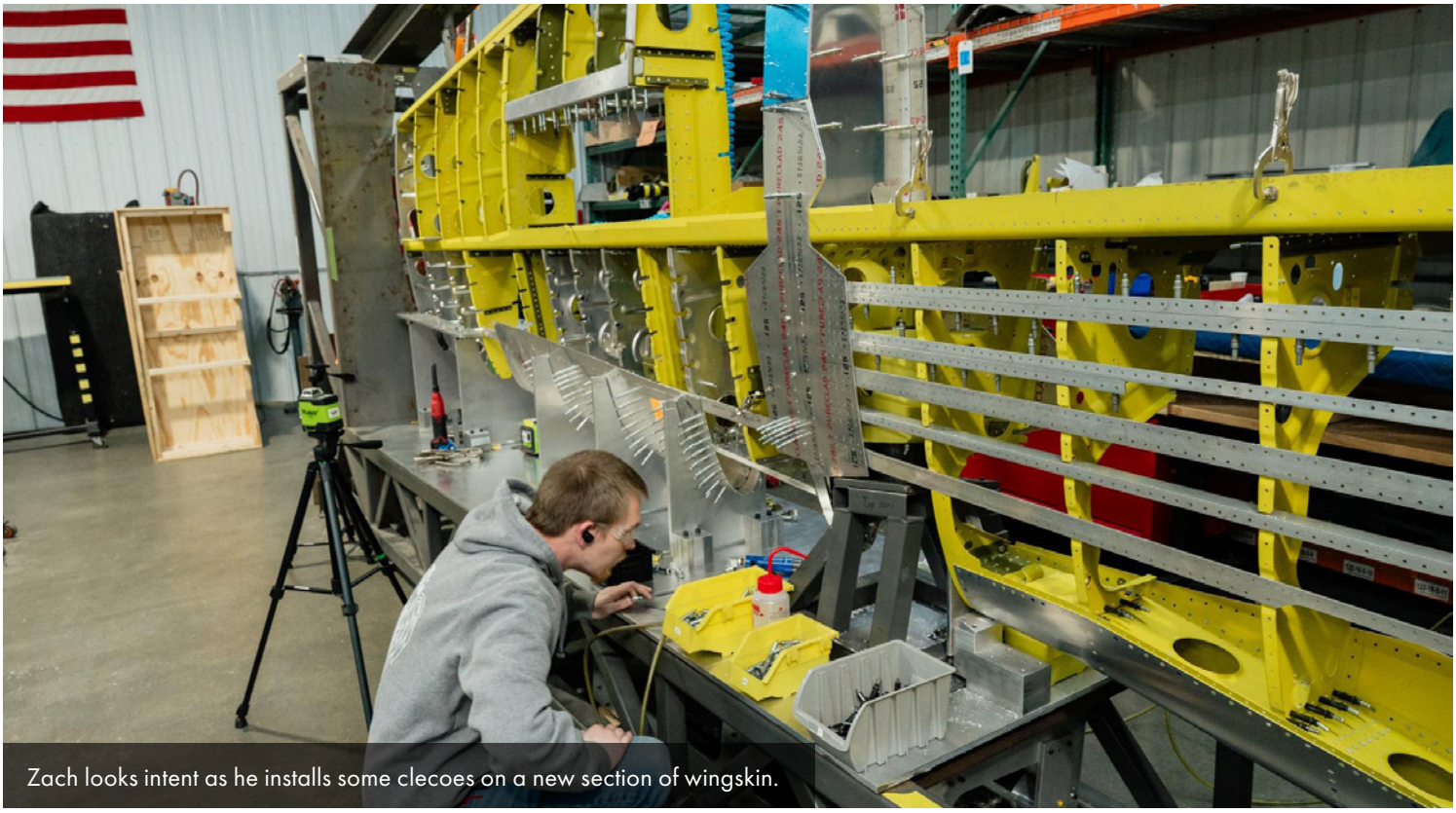


This photo shows the relative position of the new section of leading edge skin.

The natural aluminum part forms the rear of the ammunition bay.



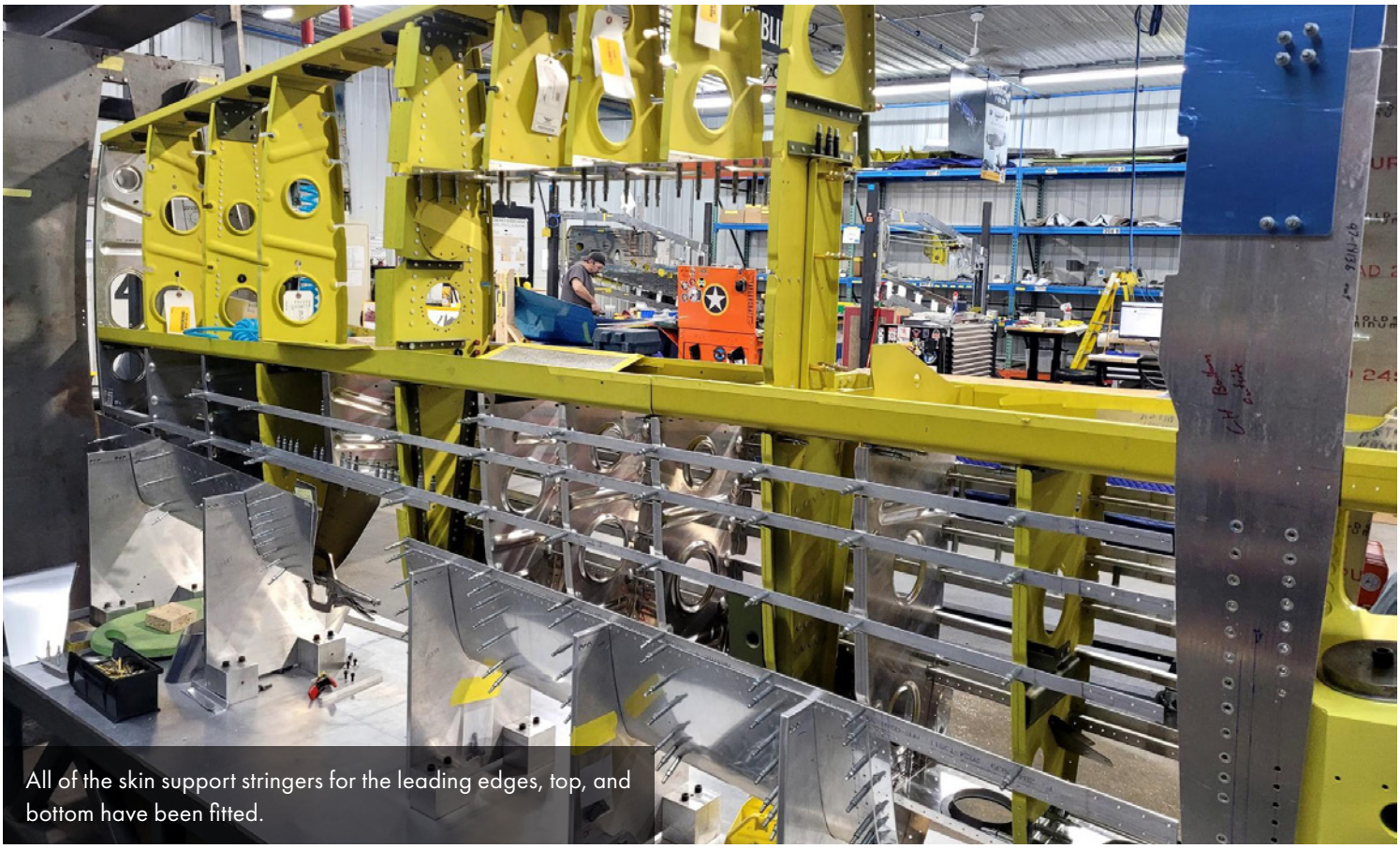
Wing support stringers have been added.



Zach looks intent as he installs some clecoes on a new section of wingskin.

Neil clecoes a leading edge skin section to mark it for trimming.

Zach works at clecoing a leading edge skin in place.



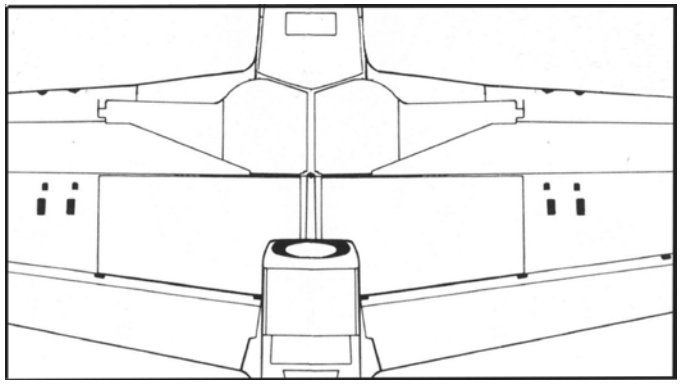
All of the skin support stringers for the leading edges, top, and bottom have been fitted.

Comparing the P-51B/C and P-51D/K Wings

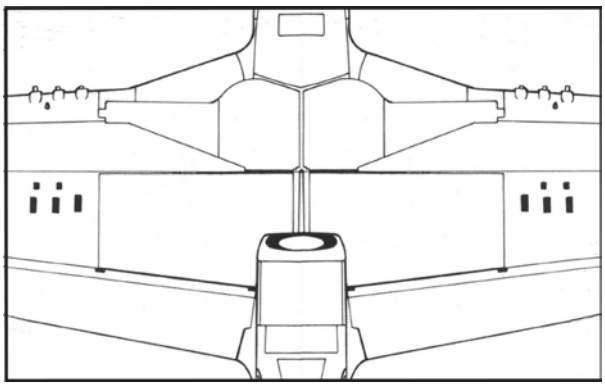
This photo of Dakota Territory Air Museum's P-51C, Lope's Hope the 3rd shows the C/D model landing light and gear doors. Williams Morgan photo

The following photos of completed wing and gun installations are also of Lope's Hope 3rd, one of Dakota Territory Air Museum's other B/C model Mustangs.

Comparing the P-51B/C and P-51D/K Wings



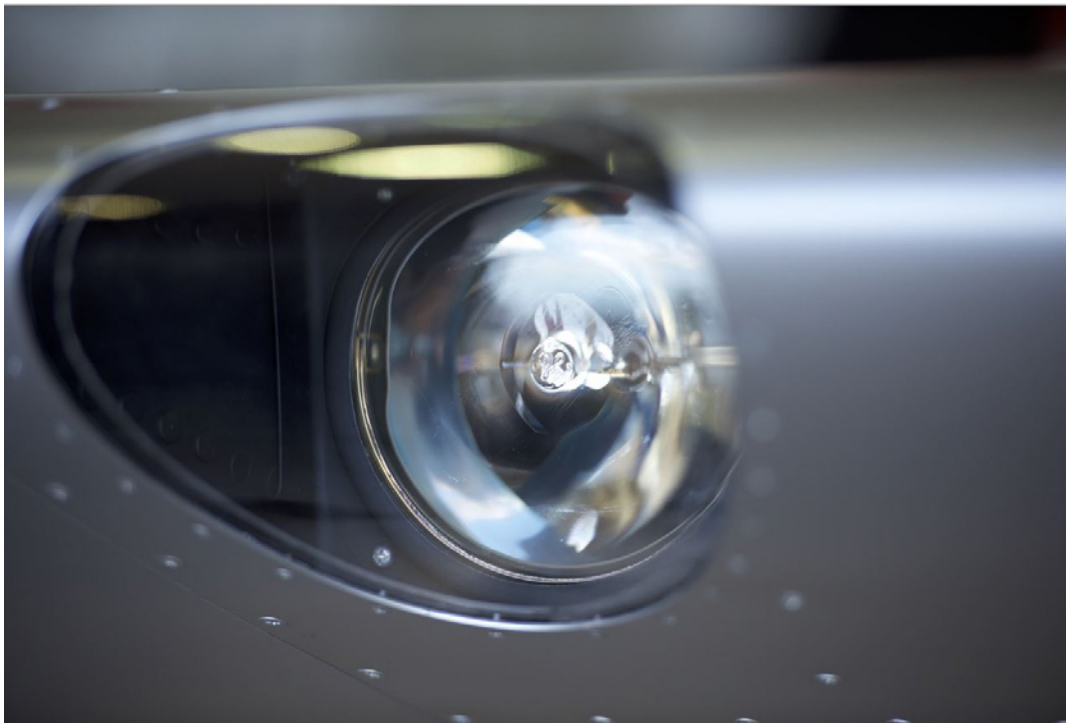
P-51B/C wing



P-51D/K wing

Notice the difference in the wing root. The D/K model has a longer root chord and slightly different gear doors that necessitate a more pronounced "kink" in the leading edge. The uplocks for the landing gear are also different between B/C and D/K Mustangs.

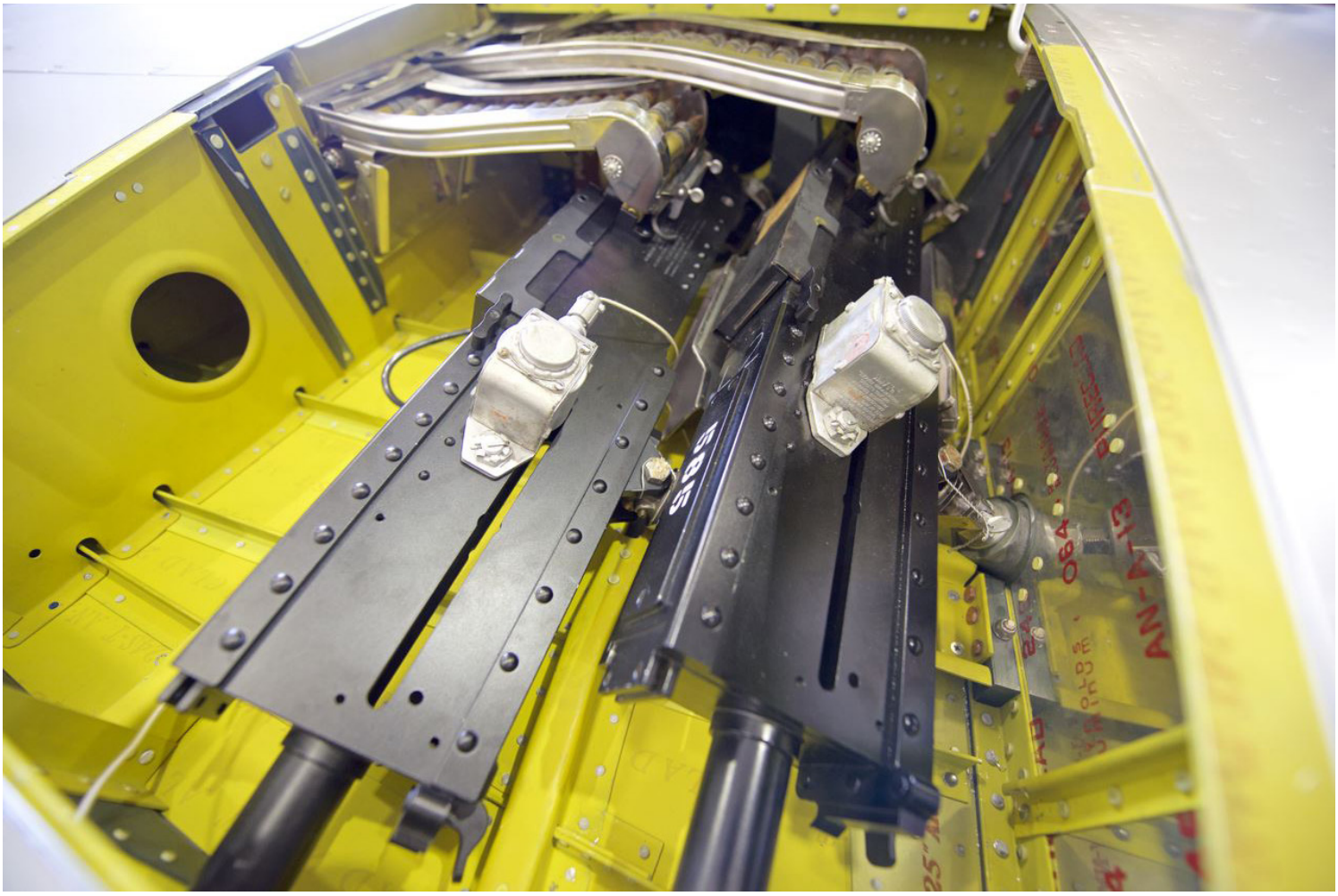
There are four gun ports and 4 spent cartridge ejection ports on the B/C versions and six of the same on the D wings.



The landing light is on the left wing leading edge of a C model Mustang.

The B/C wing has a landing light on the left wing leading edge. The D model landing lights retracted into the wheel well.

P-51 B/C models had a circular gun camera port and used either an N-1 or AN-N4 gun camera. The earliest D models had the same, but models P-51D-10-NA and later used an N-6 camera that called for a rectangular opening.
Scott Slocum photo

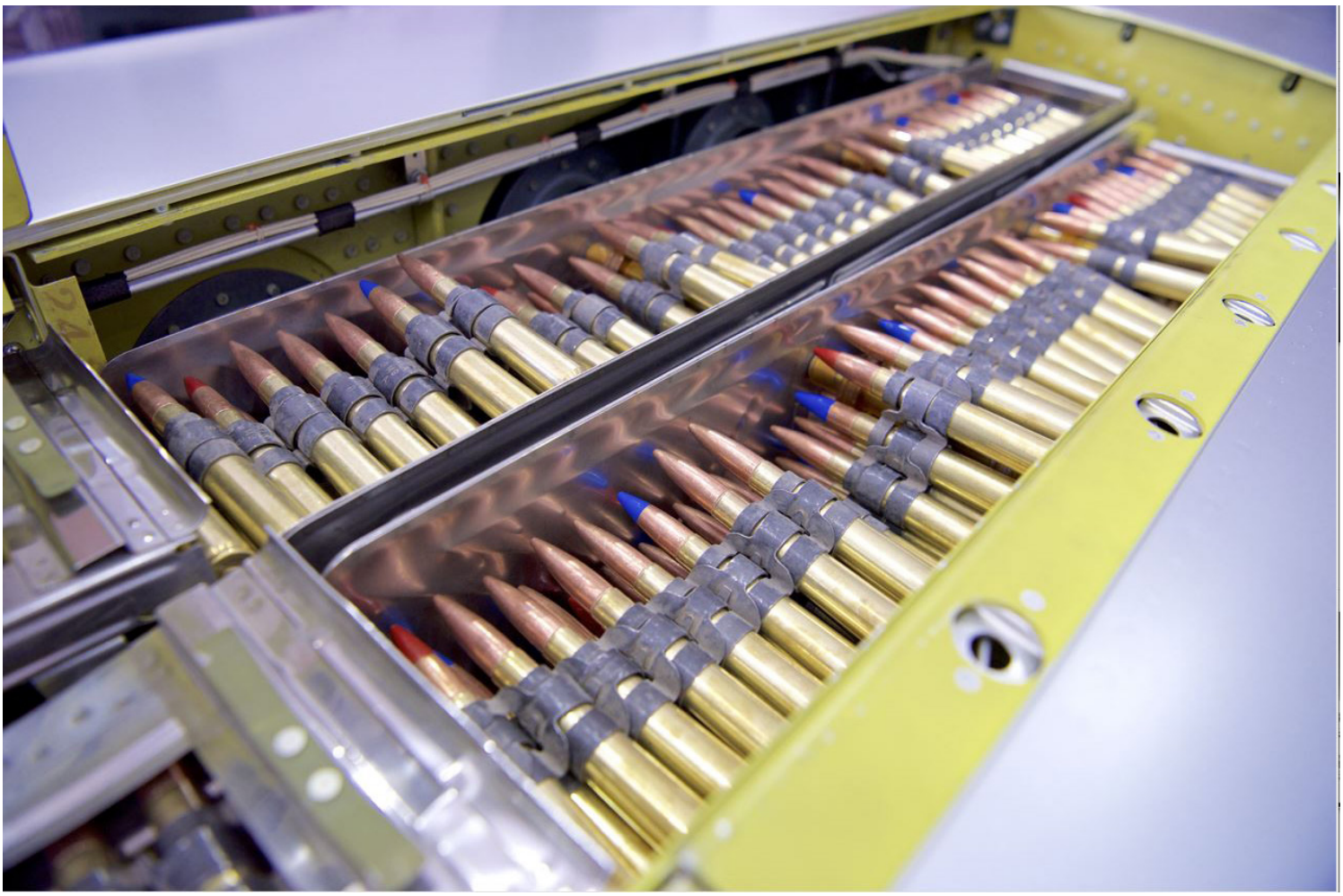


The Browning M2 machine guns were mounted at a slant in B/C Mustangs. Scott Slocum photo

While the B/C versions had only two guns per wing and the D/Ks had three, the dimensions of the gun bay itself are the same. North American was able to fit three upright M2s in the same space as the two slanted mount .50 calibers, only needing to change the holes through the spar and leading edge to accommodate 3 guns instead of two. There is a myth that surfaces periodically that the wing thickness was increased for the D/K model to accommodate the upright machine guns.

The airfoil and wing thickness on all the Mustangs from the prototype NA-73 through the last P-51D-30NA produced had the same wing other than the altered "kink" at the root. The experimental XP-51F, XP-51G, P-51H, and twin Mustangs had a different wing design.[1]

[1] Robert Gruenhagen, Mustang , the Story of the P-51 Fighter, Arco Publishing, N.Y., N.Y, 1969,1976



The two-gun-per-wing ammunition bay of a B/C Mustang had two feed chutes and narrower ammo bay doors than the D model with 3 guns per wing. Scott Slocum photo

"Initially, P-51Bs had problems with gun jams. We learned that the guns had to be absolutely clean and not oiled, as the oil could freeze at altitude. Another problem with the B model guns was that they were mounted on a slant in the wing, which could cause a gun to jam. The P-51D fixed that problem by having the guns mounted vertically. Our P-51B's normal load was 350 rounds for inboard guns and 280 rounds for outboard guns. The P-51D held 400 rounds for each of the two outboard guns and 270 rounds for the center and inboard guns. [2]

North American issued Technical order 01-60JD-44 which included a modification to the ammunition feed chutes and belt holding pawls that cured the jamming issue."

[2] Brigadier General Clarence "Bud" Anderson interviewed at EAA AirVenture, Oshkosh, WI

RESTRICTED

HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 01-60JD-44

21 December 1944

INSPECTION

AIRCRAFT AND MAINTENANCE PARTS

NORTH AMERICAN—REWORK OF FEED CHUTES AND INSTALLATION OF SPLIT BELT HOLDING PAWLS—P-51B AND P-51C SERIES

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished by service activities with the aid of base maintenance facilities, if necessary, when desired by organization commanders. Feed chutes, part Nos. 97-61104 and 97-61105, will be reworked prior to issue.

RESCINDED 15 FEB 1946

1. To insure feeding of the caliber .50 machine gun during combat maneuvers in which the acceleration factor exceeds 3 "g's," the feed chutes will be modified and split belt holding pawl assemblies will replace present caliber .50 machine gun belt holding pawls and springs on P-51B and P-51C series airplanes.

2. The instructions for accomplishing this change are as follows:

a. Remove and rework outboard feed chute assemblies as shown on figure 1.

b. Remove and rework inboard feed chute assemblies as shown on figure 2.

NOTE Stiffeners (figures 4 and 5) installed in paragraphs 2.a. and b. are to keep the feed chutes from bending under load and the guides (figure 6) are installed to keep the ammunition against the rollers. Keeping the ammunition against the rollers eliminates a possible twisting of the ammunition as it enters the feedway of the gun. Twisted ammunition belts are known to cause the gun to fail to feed.

c. Remove all sharp edges, burrs, and rough surfaces from the feed chutes and reinstall in the airplane.

d. Remove belt holding pawl and springs, and install the new belt holding pawls (figure 3), part Nos. B7160626 and B7160625, the belt holding pawl sleeve, part No. A7160627, and the two new belt holding pawl springs, part No. A7160628.

NOTE Care must be exercised to insure that the belt holding pawl springs are properly seated in the recesses provided in the pawls and in the feedway of the gun.

3. a. The following parts are required per airplane to accomplish this change.

QTY	PART NO.	NOMENCLATURE	CLASS	SOURCE
8		Stiffener - Front	01-M	Local Mfr (See figure 4.)
As req		Mfr from: Steel - Chrome nickel corrosion-resisting sheet, .031 inch, class 1, composition G, condition C-1, Specification No. AN-QQ-S-772, stock No. 6800-462975	23-A	AF Stock
8		Stiffener - Rear	01-M	Local Mfr (See figure 5.)
As req		Mfr from: Steel - Chrome nickel corrosion-resisting sheet, .031 inch, class 1, composition G, condition C-1, Specification No. AN-QQ-S-772, stock No. 6800-462975	23-A	AF Stock
4		Guide	01-M	Local Mfr (See figure 6.)
As req		Mfr from: Steel - Chrome nickel corrosion-resisting sheet, .031 inch, class 1, composition G, condition C-1, Specification No. AN-QQ-S-772, stock No. 6800-462975	23-A	AF Stock
*4	B7160626	Pawl - Belt holding LH		Ordnance Stock
*4	B7160625	Pawl - Belt holding RH		Ordnance Stock
*4	A7160627	Sleeve - Pawl belt holding		Ordnance Stock
*8	A7160628	Spring - Pawl belt holding		Ordnance Stock

INSPECTION

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