N-3129E

Aeronca 7AC
SN 7AC-6726
T.C. 759
Manufactured 12-6-1946
Lasher STC
C-85-12-F
Aircraft Specialty O-200 STC

Owner
John and Joyce Propst
RR 3 Box 24 A
Elizabeth, WV 26143

Aircraft Based at Hales Landing 2WV3
Elizabeth, WV

Aeronca History (extracted from pilotfriend.com website)

Aeronca

The Aeronautical Corporation of America (Aeronca) was incorporated by the Lunken family of Cincinnati, Ohio on November 11, 1928. Backed by the financial and political support of the prominent Taft family—future Ohio senator and U.S. Supreme Court Chief Justice Robert A. Taft was one of the firm's directors—Aeronca became the first company to build a commercially successful light aircraft.

Powered by a tiny two-cylinder engine, the Aeronca C-2 debuted in 1929. It was flying at its most basic—the pilot sat on a bare plywood board. Originally known as the *Roche Original* after its designer Jean A. Roche (who sold the design rights to Aeronca), the C-2 featured an unusual, almost frivolous design with an open-pod fuselage that inspired its nickname, “The Flying Bathtub.”

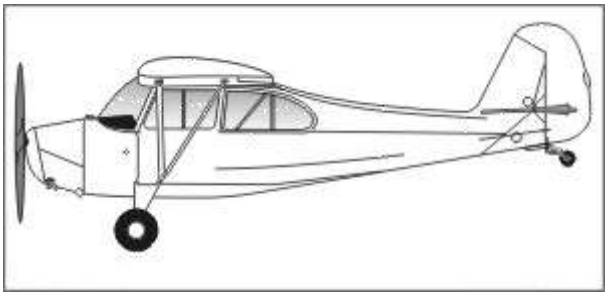
Equipped with only five instruments, a stick, and rudder pedals (brakes and a heater cost extra), the C-2 was priced at a low $1,495, bringing the cost of flying down to a level that a private citizen could aspire to and perhaps reach. Aeronca sold 164 of the economical C-2s at the height of the Great Depression in 1930-1931, helping to spark the growth of private aviation in the United States.

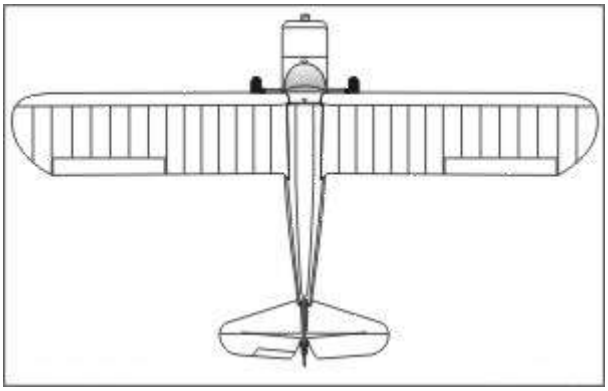
Aeronca Defender

The Aeronca C-2 also holds the distinction of being the first aircraft to be refueled from a moving automobile. A can of gasoline was handed up from a speeding Austin automobile to a C-2 pilot (who hooked it with a wooden cane) during a 1930 air show in California. A seaplane version of the C-2 was also offered, designated the PC-2 and PC-3 (“P” for pontoon) with floats replacing the wheeled landing gear.

The more powerful Aeronca C-3 was introduced in 1931, featuring room for a passenger seated next to the pilot. Powered by a new 36-horsepower (27-kilowatt) Aeronca E-113 engine, the seating configuration made flight training much easier and many Aeronca owners often took to the skies with only five hours of instruction—largely because of the C-3's predictable flying characteristics. Both the C-2 and C-3 are often described as “powered gliders” because of their gliding ability and gentle landing speeds—it was almost impossible to make a hard landing with an Aeronca because the pilot could easily see his wheels approach the runway.

The C-3's distinctive razorback design was drastically altered in 1935 with the appearance of the “roundback” C-3 Master. Retaining the tubular fuselage frame construction, the C-3 Master featured a smaller vertical stabilizer and rudder with a “filled out” fuselage shape that created the new “roundback” appearance and improved the airflow over the tail. With an enclosed cabin (brakes and wing light still cost extra), the 1935 C-3 Master was priced at only $1,890—just a few hundred dollars more than the primitive C-2 of 1929. The low price generated significant sales; 128 C-3 Masters were built in 1935 alone and the 500th Aeronca aircraft also rolled off the assembly line that same year.





A version of the C-3 with fabric-covered ailerons (instead of metal), designated the Aeronca 100, was built in England under license by Light Aircraft Ltd. (operating as Aeronautical Corporation of Great Britain Ltd.) but the expected sales never materialized—only 24 Aeronca 100s were manufactured before production was halted.

Production of the C-3 was halted in 1937 when the aircraft no longer met new U.S. government standards for airworthiness. Many of the C-3's peculiarities—external wire braces, extensive fabric construction, single-ignition engine, and lack of an airspeed indicator—were no longer permitted. Fortunately for the legion of Aeronca owners, a “grandfather” clause in the federal regulations allowed their airplanes to continue flying, although they could no longer be manufactured.

Aeronca developed a low-wing aircraft in 1935, the Model L (produced with two different engines) with side-by-side seating and a completely enclosed cabin, but the true successor to the popular C-2/C-3 line was the Aeronca Model K Scout, first introduced in 1937. Powered by a dual-ignition Aeronca E-113C engine, the Model K Scout brought the Aeronca design up to modern aviation standards. Eliminating the Aeronca's traditional “bathtub” appearance, the Scout featured a strut-braced wing with a fully enclosed cockpit seating two side-by-side. A total of 357 Aeronca Model K Scouts were built.

Consumer demand for more comfort, longer range and better instrumentation resulted in the development of the Aeronca Model 40 Chief in 1938, powered by a 50-horsepower (37-kilowatt) Continental, Franklin or Lycoming engine. A 65-horsepower (48-kilowatt) Continental engine powered the Model 65 Super Chief, which was also built in a flight trainer version, the Model TC-65 Defender, with its rear seat positioned nine inches (23 centimeters) higher than the front for better visibility.

Aeronca 15AC Sedan

Aeronautical Corporation of America formally changed its name to Aeronca Aircraft Corporation in 1941, and the onset of World War II ushered in a new era for Aeronca aircraft. Production of the TC-65 Defender was increased for use by the U.S. government's new Civilian Pilot Training (CPT) program, created to train new pilots for possible wartime service.

The high-wing TC-65 Defender was soon pressed into wartime duty as Aeronca's version of the U.S. Army's “liaison” aircraft, designed to operate from small, primitive airfields. Sporting a wider fuselage, larger windows, and military instrumentation, the aircraft was designated by the Army as the O-58 and is often referred to by the liaison aircraft's generic nickname of “Grasshopper.”

In 1942, Aeronca developed a three-seat training glider, the TG-5, based upon the O-58 design. This aircraft retained the O-58's rear fuselage, wings, and tail while adding a front fuselage in place of the engine. In all, Aeronca built 250 TG-5 gliders for the Army.

The O-58 was later redesigned for the Army and designated as the L-3. More than 1,400 Aeronca O-58 and L-3 Grasshoppers saw service in all theaters of the war. Aeronca also built the PT-19 and PT-23 trainer aircraft under license for the aircraft firm Fairchild during the war.

After war's end, Aeronca resumed production of its three most popular models, the Chief, Super Chief and the Defender, and introduced a new model in 1945, the Model 7AC Champion. Certified on October 18, 1945, the “Champ” became Aeronca's most popular aircraft.

The Champion was a tandem two-seater trainer that incorporated components (wings, landing gear, tail, and 65-horsepower (48-kilowatt) Continental engine) from the existing Chief line, reducing manufacturing costs. Selling for $2,095, the Champ outsold the Chief by an 8 to 1 margin. Engine upgrades in 1948 and 1949 resulted in the Models 7DC and 7EC. Between 1945 and 1950, Aeronca was producing 50 light aircraft per day and by the time production ended in 1951, the company had sold more than 10,000 Champions.

The Arrow, an experimental low-wing cabin monoplane with retractable landing gear, was unveiled in 1947 but never went into full production. Another U.S. Army liaison aircraft, the L-16, was developed and saw extensive service during the Korean War.

The four-seat Model 15 Sedan, also introduced in 1947, proved to be a popular addition to the Aeronca product line. The Sedan featured all-metal wings but retained the traditional tube and fabric construction techniques of all Aeronca aircraft. It also became quite successful as a floatplane. Ultimately, 561 Model 15 Sedans were built. It was the last aircraft manufactured by Aeronca.

Aeronca ceased producing light aircraft in March 1951, selling the rights for the Champion design to the Champion Aircraft Company of Osceola, Wisconsin. In its 23-year history, Aeronca manufactured 17,408 aircraft spanning 55 different models but the company will be forever best known as the creator of “The Flying Bathtub.”

Aeronca 7 AC Champ

Aeronca 7AC Champ

The 7AC Champ was Aeronca's most popular aircraft. Certificated on October 18, 1945, the Champ was produced in greater numbers than any other Aeronca design. The original Champ sold for $2,295 in 1946 and 7,190 were produced before production ceased in 1951.

The first Champs had a Continental 65-hp engine and no electrical system. Hand propping the engine to get it started was standard procedure for these planes, like most other simple two-seat airplanes of that time. Aeronca added design improvements to the 7AC series, mostly engine horsepower increases and changes to enlarge the dorsal fin. With increased horsepower to 85, the Champ became the 7BCM and the 90-hp 7CCM. Aeronca also produced the 7DC and 7EC models with larger dorsal fins and 85-hp and 90-hp engines, respectively.

In all, more than 10,000 Champs of various model designations were produced. Today more than 1,800 of the original 7AC Champs are still flying, providing hours of cheap, fun flying for their owners.

Aeronca Champ

by Budd Davisson

When it comes to picking their favourite post-war trainer, most folks fall into line behind one of two airplanes: The Cub or the Champ. Both have their supporters and detractors, but all will admit that the little Aeronca Champ is the only classic of the period to give the Cub a run for its money in the learning-to-fly game.

The first lines for the new airplane, the Model 7 Champion, were laid on vellum early in 1944 and the airplane flew in May of that year. Chief test pilot Louis Wehrung did the honours. The official designation of the airplane was 7AC (Model 7, first variation, Champion) and it used the A-65 Continental.

In laying out the configuration of the Champ, designer Ray Hermes took square aim at his primary competition, the J-3 Cub, which by that time, was nearly a decade old. He made a list of every one of the Cub's shortcomings and designed them out of his new airplane. The final lines of the Champ are the net result of Anti-Cub design goals.


Later Champs with bigger engines also had enlarged vertical fins

Forward visibility had always been a Cub weak point and Hermes solved that in two ways. First, he put the pilot in the front seat and, second, he raised the seating position and dropped the nose so the pilot could see straight ahead while on the ground. This is why a Champ appears so high in the cabin, when compared to the Cub. The Cub may have finer, sleeker lines, but the Champ pilot can not only see where he's going but sits up in real comfort (relatively speaking).

Cubs also came in for criticism in the drafty arrangement of the door. While the split door may be perfect for viewing sunsets today, when the Cub was working for a living, instructors and students alike cursed the leaky doors. The Champion used a hinged, single-piece door not unlike an automobile.

A little over 8,100 Champs were produced, most of which were the 65 hp 7ACs which ended production in April of 1948 to be replaced by the 85 hp 7BCM (it was fuel injected and had a larger dorsal fin, as well) which was ordered by the military as the L-16A. The military then went to 90 hp (fuel injected) and the nearest civilian counterpart was the 7CCM. The most common civilian version to come out of all of this was a combination of the A and B model L-16, the 85 hp 7DC which had the larger dorsal and an additional fuel tank in the right wing. Only 166 7DC's were built before the final Champ was introduced, the 90 hp 7EC. The final Champ rolled off the Aeronca line in January of 1951. It was Champ 7EC, SN96, N4749E. Anyone know where it is today?

A good design has a way of surviving and the 7EC is one of those. In 1954, Champion Aircraft of Osceola, Wisconsin, put the 7EC back into production where it continued to be up-graded, eventually becoming the 7ECA Citabria in the early 1960's.


Real doors set Champ apart from Cub

Mechanical Description

Champs use the triangular aft-fuselage Gene Roche originally designed for his little C-2 in the late 1920s. Because most Champs have probably spent more time tied down outside than in hangars, the plywood formers which fair the fuselage into a square shape have to be considered suspect. Bad fuselage wood isn't a major safety concern but it takes time and money to replace it.

Other than being triangular in cross section, there is little about a Champ's fuselage structure that presents unique inspection concerns. All steel tube fuselages share the same corrosion concerns, especially in the rear of the fuselage and in the strut carry-through tube under the floor.

The trim system is something else that the designer worked at to make more efficient than that on a Cub. When twisting the Cub trim crank, the stabilizer is being screwed up and down while the overhead knob in a Champ, which moves fore and aft in a slot, runs a trim tab on the elevator. The arrangement is quicker and easier, although, since it is located over the front pilot's left shoulder in the ceiling, it's a stretch to reach from the back seat.

To absorb landing shocks, the Champ uses an oleo-spring arrangement in the front leg of the landing gear "V" frame rather than bungees. In speaking with Buzz Wagner of the International Aeronca Association, he said the landing gear is the area in which they see the most problems, mostly because people don't maintain them or don't understand the system. The system is designed to use exactly eight and a half ounces of fluid. Let it get a half an ounce down and the gear will be damaged. According to Wagner, the majority of Champs in operation need the landing gear rebuilt to one degree or another and the difference in ground handling, when all the worn parts are replaced, is significant.

Mags and carb heat canbe reached from either seat, but not easily

There were two different oleo's installed, the original straight oleo, and the "no bounce" oleo which came out of the military's desire for an airplane that could be dropped from ridiculous heights without damage. The original oleo is less complicated and easier to handle in a crosswind. Wagner, among others, has new and rebuilt replacements for either.

All Champs prior to the 1954 re-introduction of the 7EC used mechanical brakes. These brakes, if properly adjusted, work just fine. There are two distinct different types, the Van Sickle/Cleveland type which is a traditional drum and shoe set up where a rotating cam actuates them and the Goodyear which is a form of mechanical disk brake. In neither one is there no an adjustment to move the shoes or pads closer to the drums to compensate for wear, as in a car. This is a weakness in the design and adjusting the cable tighter (most mechanics' initial urge) won't help. All that does is rotate the cam closer to its limits. Wagner says, if shoe brakes are no longer holding, replace the shoes. In the calliper brakes, replace the pads, and if they still don't hold, have the cam built back to its original dimension by welding.

The post-1954 American Champion 7EC's used hydraulic drum brakes which eliminates most of the problems. Fortunately, none of the brake types are expensive to rebuild.

The wings are a combination of wood spars and formed-aluminum ribs. There is no rib stitching, as with most fabric airplanes, as the fabric is screwed or pop-riveted to the ribs. Generally speaking, Champ wings give little or no trouble.

The wing struts are welded closed which makes them less susceptible to rust than some others. Rust, however, is still a definite concern and they should be carefully inspected as per FAA guide lines. The end fittings are welded bushings, not adjustable forks, so there is no concern in that area.

Flight Characteristics

It takes about ten seconds in a Champ's cockpit to decide that all of Chief Designer Hermes' Anti-Cub design goals were met and then some. Some argue the Champ cockpit is too modern. Too civilized. Those are usually Cub pilots speaking.

Once on board, the immediate impression will be of visibility and a cheerful airiness. The wing and skylight is so high and the pilot sits so far forward, there is none of the "Man trapped in an airplane" feeling of so many of the Champ's contemporaries. This is definitely the airplane for a big person.

One of the cockpit's niceties is that all of the major engine controls, i.e. carb heat, fuel on/off, mags are in a panel by the pilot's left hip. This makes them available from both seats, although the front seat pilot has to squirm around a bit to get a hand down there.

Incidentally, the later airplanes have most of the fuel in the wings and do away with the fuselage tank, while the original airplanes have a fuel gage peeking out of the top of the boot cowl for the fuselage tank.

If it's a 7AC, you'll be doing the "Brakes! Contact!" routine with an Armstrong starter. If a 7EC, there's a "T' handled on the right half of the instrument panel that eases the starting chores.

In most areas, there's a big handling difference between the A and E models because of the difference in weight. An original, lightly finished A model with its 65 hp Continental weights about 710-725 pounds or about the same as a Cub. The 90 hp E models sometimes weigh as much as 200 pounds more because of electrical, interior, tanks, etc.

There's some difference of opinion as to how to start a take-off in a Champ, stick forward or stick back. A lot of the flight schools that used later 7ECs with the No-Bounce gears routinely started the takeoff roll with the stick full forward. Presumably, this was done to get the tail up as soon as possible to keep the oleos from extending. If the pilot waits too long to pick the tail up, the weight will come off the oleos while in a three-point position allowing them to extend. When they're extended, they have little to no resistance so they'll compress easily. When one compresses, even though the airplane is headed straight, the illusion is that the airplane is turning and pilots often poke in rudder that's not needed causing a swerve where there was none. Bear in mind, however, that all of this is happening in slow motion as the airplane will fly-off somewhere in the neighbourhood of 45 mph.

Theoretically, the bigger engine Champs will climb better than the lowly 7AC, but not by much. The books say an AC is supposed to give 500 rpm and the EC 800 rpm. In real life, the difference isn't that great. Because of its lighter weight, the 7AC floats off the ground compared to the 7EC which feels more like it's on rails. Only the very lightest 7AC, however, has the feather-like feeling of a Cub when it separates.

Most of the Cub's resemblance to a feather is probably because the Cub has just enough more wing area that its wing loading at gross is a little lower, 6.8 lb/sq. ft to 7.1 lb/sq. ft. The books say a 7EC weighs 890 pounds empty (1450 pounds gross, more than a C-140) compared to a 7AC at 710 pounds (1220 pounds gross, about the same as a Cub).

Note that the 7EC, despite its much bigger engine has about the same useful load as the 7AC.

Once up to cruising speed, the 7AC (65 hp) can generally be depended on to be 5-8 mph faster than the similarly powered Cub, or a good solid 85-90 mph. The 7ECs seem to run about 90-95 mph.

Ask any who fly a Champ and they'll all say its a "...rudder airplane...". That's because its adverse yaw is so pronounced, you either coordinate with rudder or slip and slide around on the seat. It's much more noticeable than in a Cub. This makes it a superb trainer.

When you start trying to compare things like roll rate and aileron pressures between airplanes like Cubs and Champs, you're dealing more with perceptions than actual differences. For one thing, the Cub control stick juts up higher, especially in the front seat, and has an innately "bigger" feel to it. The mechanical advantage means the stick moves further than a Champ's in the same situation, but the response is probably close to being the same. The pressures, also, are close, but it is very difficult to say. The perception is that Cub controls are heavier, when they really aren't.

There is, however, a difference to the overall "feel" of the controls. Somehow, a Cub feels a little more precise and a touch quicker. We're splitting some very slow-speed hairs at this point, but that seems to be the general opinion.

Compared to a C-152, the roll performance will seem leisurely at best. The pressures are slightly lighter than a Citabria and the roll rate about the same.

The Champ stalls normally, with just a tiny bit of edge to it. Release the stick and it's flying again. Kick a rudder hard and it rotates into a surprisingly comfortable spin that stops as soon as you release back pressure and punch a rudder. Just letting go will bring it out almost as quickly as doing something deliberate.

Depending on the model, a Champ is happy to approach at just about any speed, but keeping it under 60 cuts down the float. Three-point landings happen almost automatically once you get used to a nose that's not in the way. The sight picture isn't that much different than landing a C-152 on its mains and holding the nose off. Actually, you can probably see more out of the Champ.

In a no-wind situation, the airplane will track perfectly straight. Given a good cross wind, the pilot will have to work a little harder but the airplane will handle it as long as the pilot keeps the wing down and the nose straight.

Wheel landings are also automatic and probably easier than in any other type of taildragger. Just don't force it on. Let it find the ground, pin it in place and the landing is over.

The controversy between those who love the Cub and those who swear by the Champ will never be resolved. The important thing to remember is they are both terrific airplanes and the Champ wouldn't have survived as long as it has if it hadn't had the Cub as a role model.

Original
Bill of Sale

ORIGINAL
To Be Filed
With C.A.A.

AERONCA AIRCRAFT CORPORATION

290605

Certificate of Transfer
BILL OF SALE

NOT ACCEPTABLE FOR RECORDING
DATE JAN. 29, 1947
BY

KNOW ALL MEN BY THESE PRESENTS, that on this 9th day of DECEMBER 1946 the AERONCA AIRCRAFT CORPORATION, Municipal Airport, Middletown, Ohio, a corporation existing under the laws of the State of Ohio, Manufacturer and Sole Owner of the below described airplane:

WASHINGTON, D. C.
FEB 13 10 22 AM 1947
CIVIL AERONAUTICS ADMINISTRATION

Manufacturer's Trade Name AERONCA Type 7AC

Manufacturer's Serial No. 7AC-6720 Civil Aeronautics Administration No. NC 3129E

in consideration of One Dollar ($1.00) and other good and valuable consideration to it paid by

VERHOSTRA AVIATION SALES & PARTS CO.

1002 E. JEFFERSON BLVD., of SOUTH BEND, INDIANA
Street or Airport — City — State

receipt of which is hereby acknowledged, has bargained, sold, granted and conveyed, and by these presents does hereby grant, bargain, sell and convey unto the said

VERHOSTRA AVIATION SALES & PARTS CO.

his/their executors, administrators, and assigns all its rights, title and interests in and to the afore-described airplane, to have and to hold the same unto the said

VERHOSTRA AVIATION SALES & PARTS CO.

his/their executors, administrators and assigns forever.

IN WITNESS WHEREOF the said AERONCA AIRCRAFT CORPORATION has caused its corporate name to be hereunto subscribed and its corporate seal hereunto affixed by H. R. CAUSEY, JR., its ASSISTANT SECRETARY, thereunto duly authorized by resolution of its Board of Directors, this 9th day of DECEMBER, 1946.

AERONCA AIRCRAFT CORPORATION

By H. R. Causey Jr.
H. R. CAUSEY, JR. ASSISTANT SECRETARY

STATE OF OHIO, COUNTY OF BUTLER, SS:

Be it remembered, that on this 9th day of DECEMBER, 1946, before me the subscriber, a Notary Public, in and for said County and State, personally appeared H. R. CAUSEY, JR. ASSISTANT SECRETARY, of AERONCA AIRCRAFT CORPORATION, the corporation whose name is subscribed to and which executed the foregoing instrument, and for himself and as such officer, and for and on behalf of said corporation, acknowledged the signing and execution of said instrument; and acknowledge that he executed said instrument by authority of the Board of Directors, and on behalf of said corporation; and that the signing and execution of said instrument is his free and voluntary act and deed, his free act and deed as such officer, and the free and voluntary act and deed of said corporation for the uses and purposes in said instrument mentioned.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my Notary Seal on the day and year last aforesaid.

Hilda Curtis
Notary Public for Butler County, Ohio

Bill 7
REVISED 5-21-46

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMIN

Original Application for Airworthiness

FORM ACA-305
(3-7-46)

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION

BUDGET BUREAU NO. 41-R041.2
APPROVAL EXPIRES FEBRUARY 15, 1947

APPLICATION FOR AIRWORTHINESS CERTIFICATE AND/OR ANNUAL INSPECTION OF AN AIRCRAFT

INSTRUCTIONS
Please submit this form to the Civil Aeronautics Administration Field Representative.

APPLICATION (Check)
[X] AIRWORTHINESS CERTIFICATE
[ ] ANNUAL INSPECTION

CAA IDENTIFICATION
[X] NC [ ] NX [ ] NR [ ] OTHER (Specify) _____

AIRCRAFT

MAKE	MODEL	
AERONCA	7AC	
REGISTRATION NO. 3129E	MANUFACTURER'S SERIAL NO. 7AC-6726	DATE MANUFACTURED 12-6-46

ENGINE

MAKE	MODEL	RATED H.P.
CONTINENTAL	A65-8F	65
(Check whether) [X] NEW [ ] USED [ ] OVERHAULED	IF OVERHAULED, STATE BY WHOM	DATE OF OVERHAUL

(Check which)
[ ] AIRCRAFT NOW REGISTERED WITH THE ADMINISTRATION
[X] APPLICATION FOR REGISTRATION AND BILL OF SALE (FORMS ACA-501 AND 502) ATTACHED

OWNER'S NAME	PERMANENT ADDRESS (Street and No., City, Zone, State)
AERONCA AIRCRAFT CORPORATION	MIDDLETOWN, OHIO

ATTACHMENTS (Check which)
[ ] ACA-319 [ ] WEIGHT AND BALANCE REPORT
[ ] ACA-337 [ ] SPECIAL APPROVALS
[ ] ACA-805 [ ] DATA, DRAWINGS, ETC.
[ ] ACA-317 [ ] UNAPPROVED DEVIATION DATA

I CERTIFY THAT THE ABOVE STATEMENTS ARE TRUE

H. R. CAUSEY, JR.
OWNER OR AUTHORIZED AGENT

12-9-46
DATE

ASSISTANT SECRETARY
TITLE

FORM ACA-305a (FORMERLY ACA-307) **AIRCRAFT INSPECTION REPORT**
(To be completed by a CAA inspector or a designated inspector or representative)

IT HAS BEEN DETERMINED THAT THE AIRCRAFT DESCRIBED IN 305 ABOVE IS IN CONFORMITY WITH THE FOLLOWING

LISTING IN INSPECTOR'S HANDBOOK, CHAP. XVIII		AIRCRAFT SPECIFICATION		AIRWORTHINESS DIRECTIVE	
PAGE NO.	T.C. NO. 759	SERIAL NO. A-759-2	EFFECTIVE NOTES	NO.	EFFECTIVE NOTES

OTHER (Describe)

EXCEPTIONS, IF ANY (If additional space is required, use reverse)

[ ] FORM ACA-319 (Return to owner)	APPROVED BY	MECH. CERTIF. AND RATING NO.	DATED
[ ] FORM ACA-1362 ISSUED	CERTIFICATE VALID TO (Specify date)		

[X] AIRCRAFT AIRWORTHINESS CERTIFICATE WITH OPERATION LIMITATIONS FORM (ATTACHED) WAS ISSUED

FINDINGS

[X] AIRWORTHY	DESIGNEE'S SIGNATURE AND NO. HAROLD J. ETHERIDGE 300		DATE 12-9-46
[ ] UNAIRWORTHY	CAA INSPECTOR'S SIGNATURE	[X] ACCEPTED [ ] REINSPECTED	DATE 12-9-46

REASON FOR DISAPPROVAL, OR REMARKS (Indicate if you have used the reverse to continue this or other item [ ] Yes [ ] No)

21666 GPO—Con. 2—p. 1

Original Equipment List

Form ACA-800—Page 2 (5)

UNITED STATES OF AMERICA DEPARTMENT OF COMMERCE CIVIL AERONAUTICS ADMINISTRATION	SPECIFICATION No. A769-2	CAA IDENT. No. 3129E

EQUIPMENT No. — SPECIAL EQUIPMENT

NUMBER	NUMBER	NUMBER	NUMBER	ITEM (DESCRIPTION)	WGT.	ARM.
1	102	202		600 CLEVELAND PROD.		
101	103			MODEL DMB	33	0
E.W.(COMPUTED) 770.5				(WHEELS - BRAKES)		
USEFUL LOAD 449.5						
E.C.G. 15.53 AFT OF DATUM						

C. G. LIMITS

LAND	SEA
+10.9 to +21.5	

DATUM: WING LEADING EDGE

INSPECTOR'S SIGNATURE: HAROLD J. ETHERIDGE 3007

DATE: DECEMBER 9, 1946

16—45710-2

1 – wood propeller
101 – Carb air heater
102 – Carb air scoop
103 – Carb air filter
202 – tail wheel

Original Operation Limitations

Form ACA-300—Page 1 (12-45)

UNITED STATES OF AMER. DEPARTMENT OF COMMERCE CIVIL AERONAUTICS ADMINISTRATION — **OPERATION LIMITATIONS** — DENT. MARK NC3129E

	MAKE	MODEL	DATE MFRD.	SERIAL NO.	DESIGNATION	TYPE CERT.
ENGINE	CONTINENTAL	A65-8F	12-6-46	7AC-6726	2PCLM	759
AIRCRAFT	AERONCA	7AC				

ENGINE AND AIR SPEED LIMITS NOT TO BE EXCEEDED
(All Values Are Maximum and Are NOT RECOMMENDED OPERATING LIMITS)

ENGINE LIMITS	MINUTES	ALTITUDE	IN. HG.	R. P. M.	H. P.	FUEL OCT.
TAKE-OFF	ALL OPERATIONS			2300	65	73
METO* SEA LEVEL	X	TO				
METO* ALTITUDE	FROM					

TRUE INDICATED AIR SPEED	M. P. H. LAND	KNOTS SEA
CLIMB OR LEVEL FLIGHT	95	
GLIDE OR DIVE (Smooth Air Only)	129	
FLAPS EXTENDED	---	

*METO—MAXIMUM EXCEPT TAKE-OFF

TAKE-OFF WEIGHT LAND	TAKE-OFF WEIGHT SEA	LANDING WEIGHT LAND	LANDING WEIGHT SEA
1220		1220	

OPERATIONS AUTHORIZED

CONTACT FLIGHT RULES (DAY)

INSPECTOR'S SIGNATURE: HAROLD J. ETHERIDGE 3007

DATE: DECEMBER 9, 1946

ADDITIONAL OPERATIONS AUTHORIZED — YES ☐ NO ☒ (IF YES—SEE OVER)

THIS PLACARD MUST BE DISPLAYED IN VIEW OF THE PILOT
(FOLD HERE)

STAT.

Original Aircraft Airworthiness Certificate

Form ACA 308-A
(Rev. 6-1-41)

UNITED STATES OF AMERICA
DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
WASHINGTON

THIS CERTIFICATE MUST BE CARRIED IN THE AIRCRAFT AT ALL TIMES

AIRCRAFT AIRWORTHINESS CERTIFICATE NO. 31293

This Certifies that AERONCA - MODEL 7AC

manufacturer's serial No. 7AC-6736, has been inspected and this day found to be in condition for safe operation when operated and maintained in accordance with the regulations prescribed by the Civil Aeronautics Board.

The aircraft for which this certificate is issued (a) shall not be operated unless there is attached hereto the currently effective Aircraft Operation Record issued by the Administrator of Civil Aeronautics for the aircraft, and (b) shall not be operated in flight unless a pilot possessed of a currently effective and appropriate pilot certificate issued by the Administrator is in command.

This certificate is of 60 days' duration and, unless the holder hereof is otherwise notified within such period, shall continue in effect indefinitely thereafter, unless suspended, revoked, or cancelled, except that it shall immediately expire (1) at the end of
after the date of issuance of this certificate or after the date of last endorsement hereof, whichever is later, if within such period this aircraft is not examined or inspected by an authorized Civil Aeronautics inspector, or (2) at any time an authorized Civil Aeronautics inspector shall refuse to endorse this certificate after examination or inspection.

By direction of the Administrator:

Refusal to endorse: _____ Civil Aeronautics Inspector

HAROLD J. ETHERIDGE 5007
Civil Aeronautics Inspector

Date: _____

DECEMBER 9, 1946
Date of Issuance

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding three years, or both. (over)

Recent Aircraft History

John Propst purchased the aircraft from Charles Armbrust August 7, 2008. John is the 23th owner of the aircraft.

The aircraft was manufactured in Middletown, Ohio by the Aeronca Aircraft Corporation and was registered NC 3129E.

On July 17, 1976 the owner Roy Jackson had the registration changed from NC 3129E to N 103RJ.

N 3129E was then reassigned to first a Beechjet 400 and later to a USAF Slingby. The registration number was recently retired and John Propst requested and was successful in getting the registration assigned to N 103RJ.

Around August 1995 the aircraft was converted from a 7AC to a 7BCM/7DC. The 337 covering this conversion indicated that the aircraft was converted in accordance with Service Letter 14. Detailed inspection of the aircraft and documentation prior to restoration revealed a number of discrepancies between the requirements of the service letter and the actual aircraft modifications. This included the use of a C-85-12 engine rather than a C-85-8 engine, the use of a C-90 motor mount rather than a C-85 mount, the use of Cessna exhaust system rather than the Hanlon Wilson system, and the upgrade of the engine with an O-200 crank, pistons, rods, etc. without the required documentation or STC. Following the engine conversion the FAA incorrectly issued a new airworthiness certificate and indicated that the aircraft was a 7AC/BCM. The engine log books indicated that the original engine log books were lost.

At the time of purchase by Propst the aircraft TTAF was 2611.7 hr. and the engine approximate SMOH was 161 hr.

From the time of purchase until December 2008 the aircraft was flown locally about 20 hours.

Initial Restoration Strategy

The initial strategy for restoring the aircraft based on external inspection and documentation review included the following:

1. Purchase Lasher STC to address conversion from A-65 to C-85-12-F
2. Purchase Aircraft Specialty STC to address conversion of C-85 with O-200 components
3. Obtain field approvals for use of the C-90 motor mount and the Cessna exhaust system
4. Strip airframe, bead blast, inspect, and repair as required
5. Replace all fuselage wood components
6. Strip wings, inspect, and repair as required
7. Recover aircraft with Polybrush covering system and paint with aerothane paint.
8. Install two 13 gallon wing fuel tanks
9. Minimal upgrade of the existing engine with lightweight starter and oil filter.

This was the first restoration by John Propst. Guidance, mentoring, inspection, and approval was provided by Joe Henry (I/A) and Bill Pancake (I/A). Joe is a resident at Hales Landing in Elizabeth WV where the aircraft is based, and Bill resides in Keyser WV, which is located about 200 miles east of Hales Landing.

The following listing outlines the actual significant events and activities related to the aircraft restoration.

N103RJ / 3129E Significant events and activates during rebuild

Airframe

1. Change Aircraft registration number from 103RJ to 3129E.
2. Lasher STC to convert to 7AC/Conv (somewhat similar to 7DC) with 85-12F engine. 1300 # Gross weight.
3. Glass bead blasted the entire airframe and primed with epoxy primer
4. Replaced last 8 feet of both bottom longerons due to corrosion of exiting airframe.
5. Replaced all wood (bulkheads, stringers, window frames) with new and varnish with epoxy varnish.
6. Replaced all control cables with galv. steel cables.
7. Disassembled, inspected, and cleaned the oleo struts. Replaced one spring and one packing gland on one strut and purchased one new strut from Univair to replace a non-repairable strut.
8. Glass bead blasted, primed and painted the motor mount.
9. Fabricated new throttle cable clamp for motor mount.
10. Installed tubing and related parts for two Wag wing mounted 13 gallon fuel tanks.
11. Fabricated, epoxy primed, and Aerothane painted new interior panels fabricated in accordance with Aeronca drawings.
12. Installed a new firewall from Wag. Bill and I fabricated a new deflector for the bottom of firewall from galvanized steel.
13. Installed a new firewall blanket from Airtex
14. Installed a new wool headliner from Airtex
15. Installed new Hooker Harness Seat belts and shoulder harness. Installed per STC.
16. Cleaned, inspected, and lubricated all pulleys. Replaced trim cable pulleys on elevator.
17. Field approval for new instrument panel, including next four listed items.
18. New Icom A-210 com radio installed IAW mfgr instructions. New Com antenna mounted on bottom side of wraparound.
19. Installed a new Giszmo mounting frame for Garmin X96 GPS
20. Installed a new Garmin antenna mounted on permanent bracket attached to top windshield support angle.
21. Installed a new Garmin power cable for Garmin GPS.
22. Installed a new Maule SFSA1-2 tail wheel assembly.
23. Installed a .050 X 1” X ½” X ½” non-structural steel channel to support new instrument panel. Channel welded in place facing down and located 3” to 4” in front of rear edge of control panel tube #39.
24. Replaced 5/8” tube #39 located horizontally at front edge of instrument panel.
25. Installed a new .050 X ½” X ½” non-structural steel channel for supporting fuel tank gauge window.
26. Replaced all 4 fly wires on tail with new SS. Purchased new pins for clevis.
27. Re-skinned and rebuild door. Purchased and installed new locking latch.
28. Replaced all major aircraft bolts and nuts.
29. Recovered airframe with Polyfiber system and Ranthane Aerothane paint IAW STC.
30. Installed a new LP 202 windshield.
31. Replaced both rear windows. Made new window frames and new windows for front left windows.

32. Fabricated new battery bracket for mounting new Concorde A-25xc battery on firewall.
33. Reset engine hour meter to 0000.00.
34. Installed Consolidair Model 17 fenders.

Wings

1. Installed two 13 gallon fuel tanks per drawings.
2. Repaired previous splice in spar on left wing
3. Repaired damage on tips of spars where bows attach
4. Glass blasted and epoxy primed wing tip bows.
5. Re-nailed loose and missing rib nails with 14 gauge, stainless steel ring-shank nails.
6. Fabricated new rib tip bracing with 2024-T3 .032 bent to form ½" X ½" angle.
7. On left wing, replaced 4 of the 6 drag wires that have clevis on end. Both drag wires with nuts on both ends were OK. All drag wires on right wing were OK. Primed all with epoxy paint. Purchased new pins for clevis.
8. Purchased, primed, painted, and installed all four new lift struts.
9. Replaced all PK screws on trailing edge of wings and ailerons.
10. Fabric installed on ribs with 4X4 PK stainless steel screws and aluminum washers.

Engine – Major overhaul by Bill Pancake

1. Aircraft Specialties O-200 Crank STC. Joe Henry issues 337. Major overhaul IAW STC.
2. New lightweight Sky-Tec starter. Install IAW STC.
3. New spin on oil filter Installed IAW STC.
4. New spark plugs
5. New ignition wiring harness Aerolite C2-1AS-II
6. All new gaskets
7. New motor mount rubber bushings
8. New 6 quart oil reservoir.
9. Field approval for C-90 extended motor mount
10. Field approval for Cessna exhausts system and mufflers.
11. Major Engine overhaul
    a. Yellowtag crankcase and accessory case by Divco
    b. New Continental O-200 crankshaft
    c. New Continental C-85 cam shaft, lifters, and pushrods. Ground cam shaft to clear connecting rods
    d. Yellowtag crank gear and cam gear by Aircraft Specialty with new bolts.
    e. Yellowtag 8 rocker arms by Aircraft Specialty
    f. Four yellowtag connecting rod by Aircraft Specialty
    g. 4 new ECi Nickel O-200 STC cylinder kits including pistons and rings
    h. 4 new ECi piston pins
    i. Replace all case studs and thru-bolts
    j. New rocker arm covers and cover bolts
    k. New oil pump gears and cover plate.
    l. Factory rebuilt S4LN-21 Bendix mags with new ground terminal kits from ACS.
    m. Major overhaul kit for carb
        i. New float
        ii. New check valve

    iii. New mixture arm
    iv. New throttle arm
    v. New float bracket and pin
    vi. New nozzle and nameplate for carb
    vii. New airbox from Univair

n. New cylinder nuts
o. New case bolts and nuts
p. Repair/replace entire muffler system with one yellow tag muffler, one new muffler, and all new muffler pipes, clamps, etc. by Aerospace Welding Minneapolis, Inc
q. New engine baffles with 2” flanges, scat tube
r. Airwolf mini air/oil separator AFC-W400, pn 08-07189, 5/8” inlet. Modified with Field Approval to add condensation drain bottle on firewall.
s. New blow-by elbow with internal extension to prevent oil carryover.

N 3129E Ratings and limitations

Max continuous hp., r.p.m., full throttle	85 – 2575	type cert E-233
Takeoff hp, 5 min rpm, full throttle	85 – 2575	type cert E-233
Ignition, dual	Bendix S4LN-21	type cert E-233
Timing BTC 29 BTC +/- 1 left, 27 BTC +/- 1 right		Aircraft Spec STC
Max CHT, barrel and oil inlet temp Head 540, Barrel 300, oil 225		type cert E-233

Baggage compartment placard change to 50 lbs per Lasher STC
Gross weight increased to 1300 per Lasher STC and log book entry
Plane converted from 7AC to 7AC/Conv (similar to 7DC) per Lasher STC
Exhaust system converted to Cessna 150 system per Field Approval
Engine mount converted to Aeronca 7AC C-90 system per Field Approval
SkyTec starter installed in accordance with SkyTec STC
Oil Filter installed in accordance with Filter STC
Bolt-on Dorsal fin installed in accordance with Lasher STC
2 X 13 gallon wing mounted fuel tanks and related system installed in accordance with approved Aeronca instructions
Control surface throws changed in accordance with Lasher STC
- Elevator up 24, down 24
- Elevator trim tab up 17.5 down 37.5
- Ailerons up 28.5 down 18
- Rudder right 25 left 25

Oil reservoir increased from 4 qt. to 6 quart IAC Lasher STC since fuel capacity > 24 gal.
Install placard “solo from front seat only” per Lasher STC.
Change instrument markings per Lasher STC, A-759, and continental specs.
- Idle oil pressure 10 psi
- Cruise oil pressure 30 – 60 psi
- Max oil temp 225 F
- Max CHT 540 F

CG range + 16.8 to + 20.0 at 1300 lb per Lasher STC.
Per Lasher STC revise Weight/balance, operation spec. and equipment list ref A-759

Airspeed limit	level flight or climb	95 mph true IAS
	Glide or dive	129 mph true IAS

<u>Airplane Dimensions</u>

Length, overall, (level)	21’ 5 13/16” + 2” = 21’ 7 13/16” (compensate for long mount)
Height, overall, (three point)	7’
Height, (level position)	8’ 7 5/8”
Wing Span	35’ 1 3/4”
Wing Chord	60”
Stabilizer Span	10’ 2 1/4”
Wheel tread (static)	70”
Wheel base (static, level)	16’ 3/16”

Weight and Balance

Aircraft was weighed on certified scales on 5/7/2010 by Bill Pancake
Aircraft with 0 gal fuel, 0 quart oil, and battery
Battery is a Concorde RG-25X Aircraft Battery, 23.5 lbs, 5" deep, mounted on face of firewall.
Datum is leading edge of wing.

	Net Wt	Arm	Moment
Right Wheel	444	-0.25	-111
Left Wheel	427	-0.25	-106.75
Tailwheel	68	193	13124
	939		12906.25

Measured Weight
CG = 13.74 inches

Weight as measured	939	13.74	12906.25
Less battery	-23.5	-26.00	611
Empty Aircraft	**915.5**		**13517.25**

Empty
CG = 14.76 Inches

Aircraft empty weight is 915.5 lbs, moment is 13517.25 in-lbs. and empty center of gravity is 14.76 inches aft of leading edge of wing.

With the addition of the Consolidair Fenders:
Aircraft Empty weight = 922.1 lbs
Aircraft Empty Moment = 13517.25 in-lbs
Aircraft Empty Center of Gravity (CG) = 14.66 Inches

Aircraft Gross Weight per log book entry based on Lasher STC was set at 1300 lbs. This is less than the maximum gross weight permitted of 1320 lbs for Light Sport.

CG range + 16.8 to + 20.0 at 1300 lb per Lasher STC.

C.G. Range (+16.8) to (+20.0) at 1300 lb.
(+10.0) to (+20.0) at 1087 lb. or less
Straight line variation between points given.

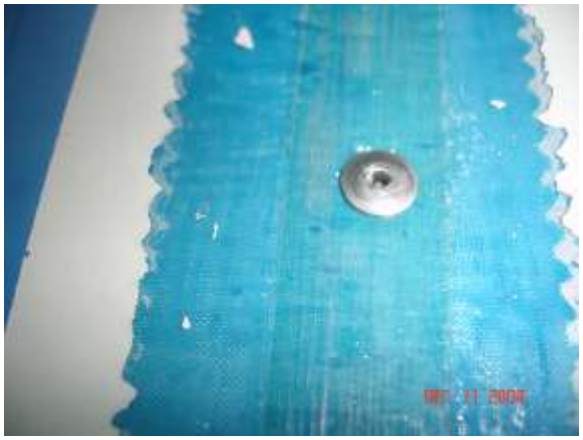
Restoration Photos

Aircraft prior to restoration
The plane was flyable but in rather worn and abused condition.

The C-85-12-F engine had a number of modifications that were not approved under the aircraft and engine type certificates

In general the wood and tubing was in less than acceptable condition

The lower longerons in the back third of the aircraft had significant corrosion and pitting

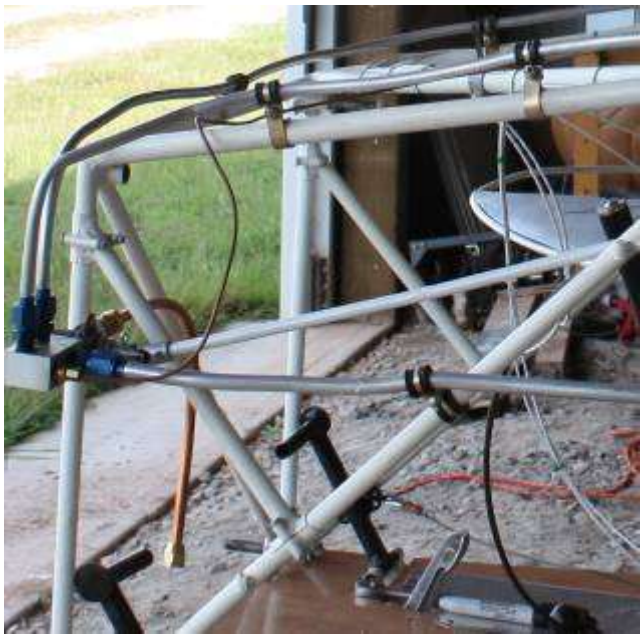


Stripping the wings revealed that the fabric had been illegally attached with pop rivets

Inspection of the wings indicated that with some repair, they could be recovered.

Exiting wood such as the rear window frames were in very poor condition

Lasher STC. In the words used in the Lasher STC documentation, “the completed airplane equates to a model 7DC”, However, it is designated as a 7AC/Conv because it was not manufactured as a 7DC. The gross weight of N 3129E was increased to 1300 lb. in the log book. The plane was modified with a bolt on large dorsal fin shown in the photo below and the addition of two steel tube braces (2-050) behind the firewall as shown in the photos below.



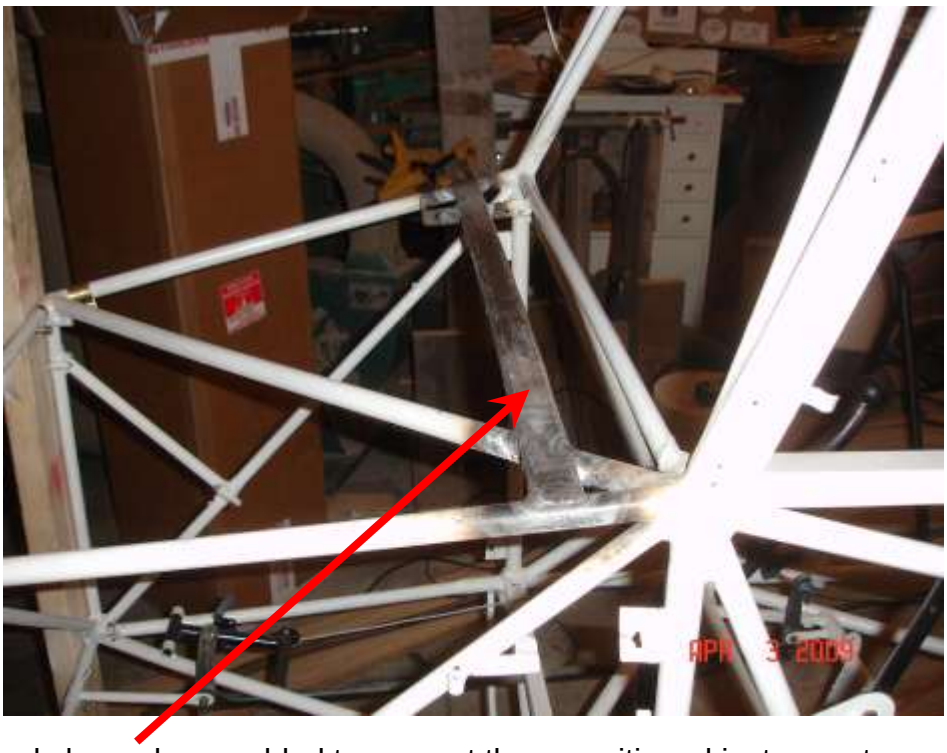
Jigs were fabricated to hold and secure the airframe to the shop floor while the lower longerons were being replaced

The defective longerons were ground out and replaced.

After epoxy priming the airframe all new bulkheads and stringers were fabricated. Aeronca drawings were used to make patterns for the bulkheads and window frames. Stringers were fabricated from local popular lumber. All woodwork was covered with epoxy varnish.

The custom instrument panel was initially fabricated from plywood and cardboard

New floorboards were fabricated and all the interior sheet metal was replaced.



An additional channel was added to support the repositioned instrument panel

New floorboards epoxy varnished prior to installing

Airframe being moved from home shop to airport hangar

Door required significant repair prior to being reskinned. A new door latch mechanism was fabricated for the reskinned door.

New wraparound being fitted to the aircraft and the new firewall.

New 13 gallon fuel tanks installed in both wings.

Windows were added to the airframe to permit viewing of the new fuel tank gauges.

Increasing the aircraft fuel capacity to 26 gallons required the replacement of the 4 quart oil tank with a 6 quart oil tank to meet the required fuel to oil ratio.

New instrument panel being fitted to airframe and wraparound.

Fitting the new Hooker shoulder harness for the front seat


Fitting the engine cowling and nosebowl to the aircraft

The other aircraft registered as N3129E (Photos obtained from the Internet)

Prior to beginning fabric recovering, the aircraft is completely assembled and rigged

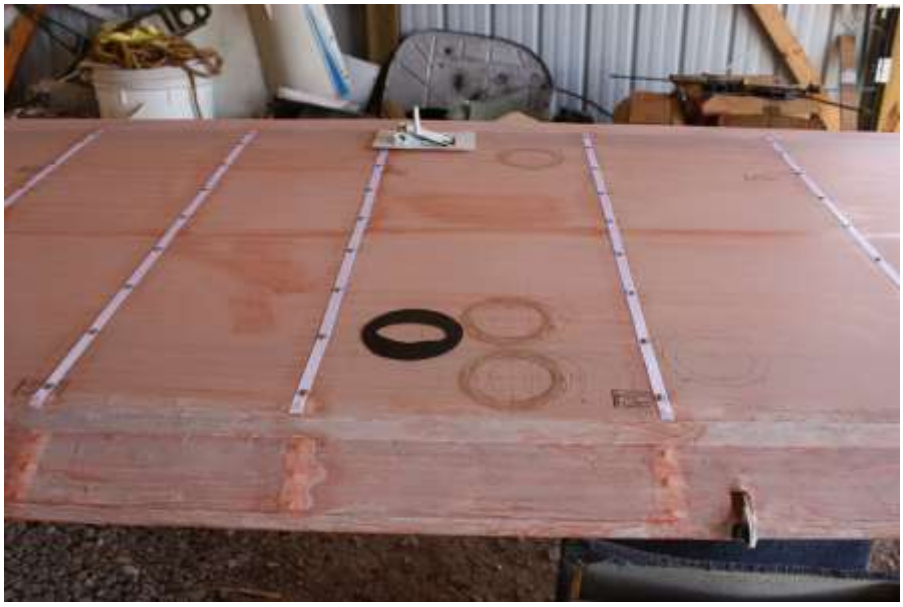
New windshield fitted to aircraft

Begin fabric installation on tail feathers

Mounting bracket for GPS antenna integrated into windshield support.

Padding applied to wing leading edge and top of fuel tanks prior to application of fabric

Fabric envelopes used for covering wings



Stainless steel PK screws and aluminum washers used for attaching fabric to ribs

New front fuel manifold and fuel shutoff valve located on rear side of firewall.

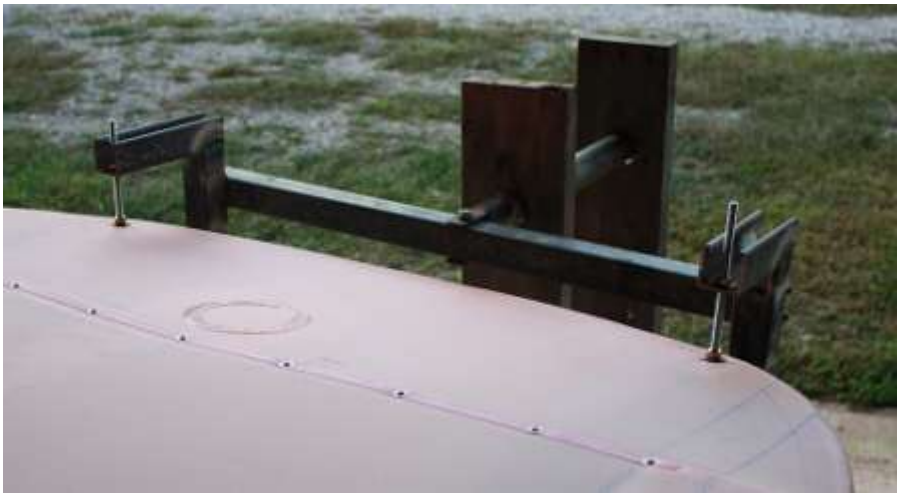
New rear windows being fitted to the new window frames.

Fitting fabric to bottom side of airframe. A two piece envelope was used to cover airframe.

Sheet plastic used to fabricate reinforcement for openings

Inboard wing rotor fixture fabricated from salvage unistrut, pipe, and lumber.

Outboard wingtip rotor fixture fabricated from salvage unistrut and all-thread.



Applying tapes to wing

Installing the headliner

Apply the Polyspray UV protection to the wing

Installing the front seat Hooker shoulder harness

View looking up with additional bracket stop

Fixture for securing the rear Hooker shoulder harness. Fork ends are connected with cable to provide a flexible connection between the harness bracket and the anchor attached to the top longeron. Additional bracket stop added after this picture was taken.

Baggage compartment installed with PK screws and washers on 2” centers.

Aluminum faced bubble insulation installed above headliner

Upper envelope installed on airframe

Doilies, tapes and reinforcement pads applied to fabric

Rear windows secured to fabric with reinforcement tapes

Dolly fixture attached to rear of airframe for moving. The vertical unistrut bar is part of the airframe tail rotor.

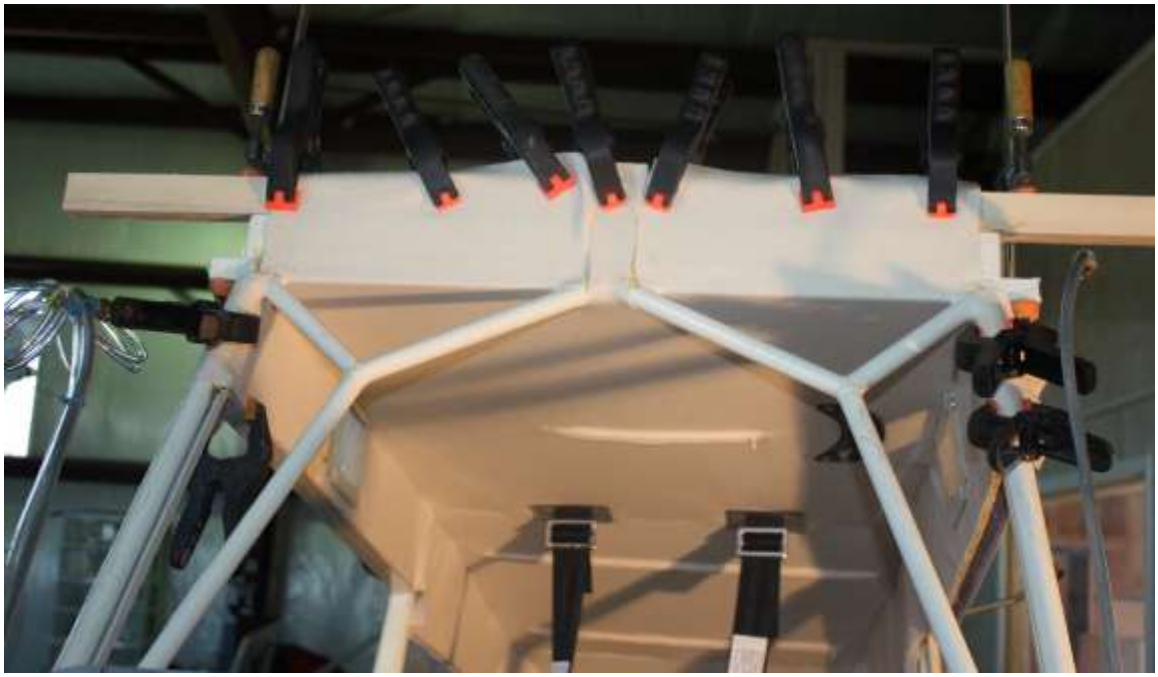
Instrument panel assembled prior to installation in aircraft

Airframe in paint booth. Masked for application of Polyspray UV protection.

Finish paint coats being applied to airframe.

Instrument panel mounted in aircraft

Heat control valve mounted in firewall



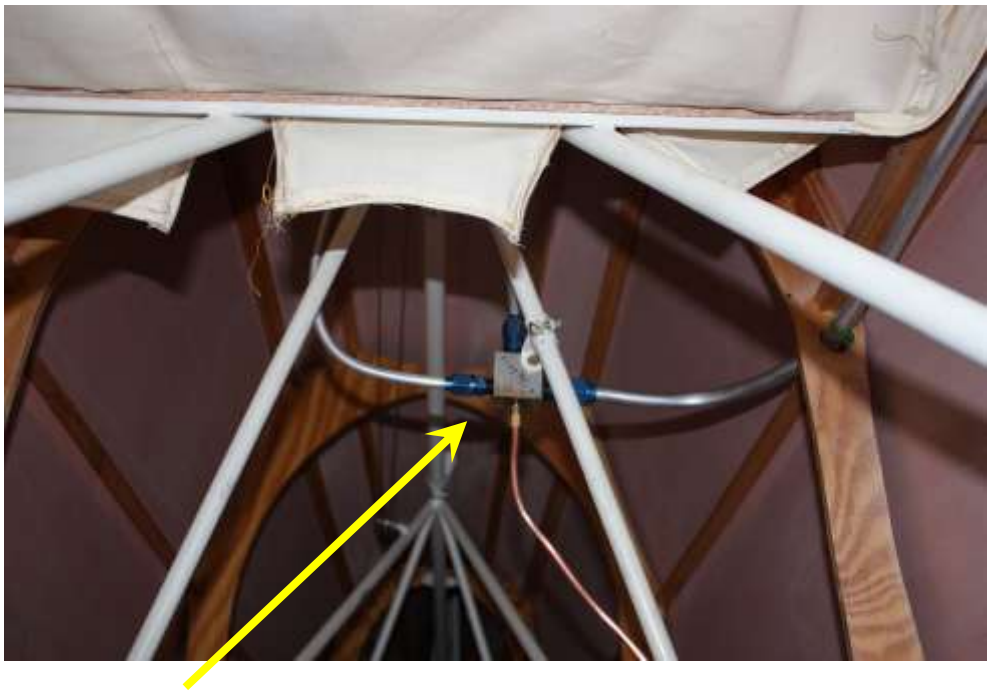
Trimming out the headliner

Fabricate and install left front window frames and windows

Window installed in door and vinyl applied to top of instrument panel

Windshield fitted and installed

Battery mount and hold downs installed



Rear fuel manifold and low point drain

Registration numbers and Aeronca Logo applied

Burgundy stripes and “Champ” logo added. Engine cowling and upper half of door painted blue.

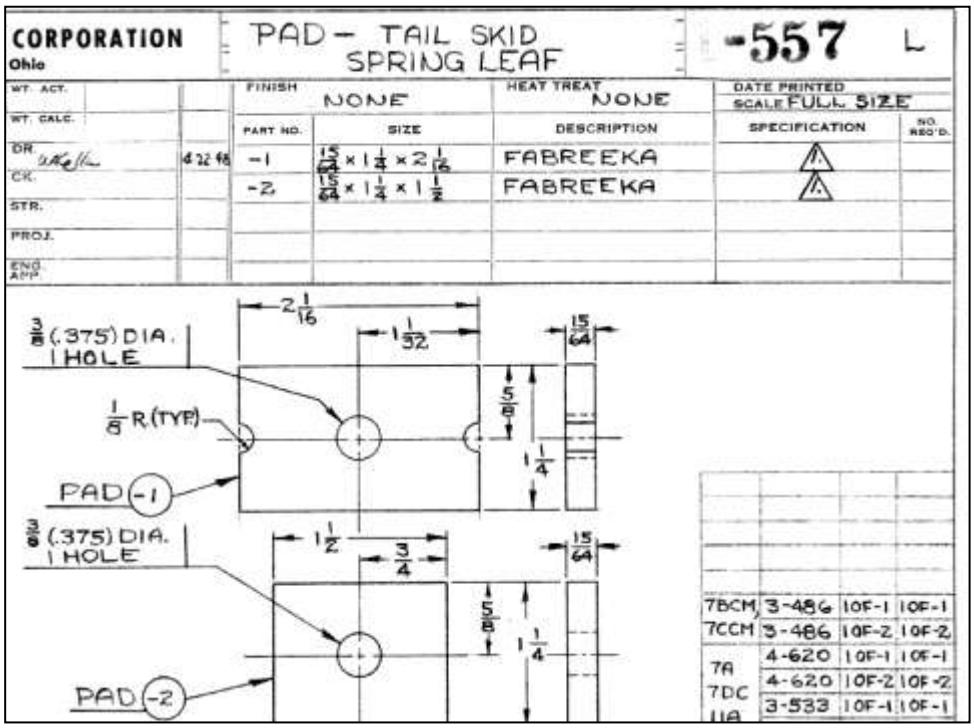
Interior door latch. Rear seat intercom connections and PTT

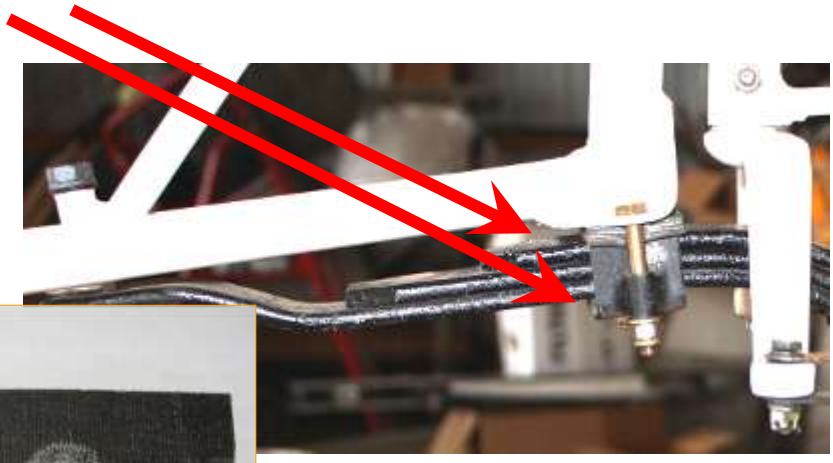
Masking the aircraft in preparation for painting the trim color

Airframe after applying the trim paint

Checking propeller balance. Mandrel fabricated to fit propeller bore. Steel “Parallels” are leveled with shims to within .001” left to right and back to front.
Setup could detect ½ gram weight added to end of blade.
Propeller remained balanced in position shown and also when turned 180 degrees end to end.

Drawing 1-557 specifies “Fabreeka” as the material for fabricating the pads on the tail spring leafs. The owner searched for, found, and contacted Fabreeka International, Inc. in Stroughton, MA to find out if the material was still available.
The material is still manufactured. The owner purchased the material and fabricated spring pads as shown on drawing 1-557.
The photo shows the two pads installed on the aircraft prior to recovering the aircraft.





Installing and rigging the tail feathers.

Installing the windshield. It had been prefit prior to painting the aircraft.

The left wing is painted the base color. This type paint requires a week drying time before applying the next trim color.

After base coat dries, striping and trim paint coat added.

New lift struts are epoxy primed and painted. Struts are then internally treated with CorrosionX corrosion treatment. After misting the struts internally, they are sealed with rubber corks.

Rubber corks are trimmed to fit the ends of the struts. Wooden plugs are used to drive corks into the struts a fixed depth.

CorrosionX mister with long wand

With the rear seat removed, you can see the hole in the floorboard where the lower elevator cable is routed from the stick mechanism to the elevator horn.

To prevent objects from falling into the hole and possibly jamming the elevator controls, a cover is fabricated and installed over the hole. A field approval is obtained for the cover.

Installing the left wing. Tail elevated to level airframe.

Hydraulic jack operated wing support for installing wings.

Both wings and ailerons installed and rigged.

Wing gap seals installed.

Preparing to weigh the completed aircraft on digital aircraft scales.

Engine is prelubricated using a pneumatic oil injection unit designed by Bill Pancake

After adding fuel to the aircraft and testing for fuel leaks the engine was test run at idle RPM. Engine was then shutdown and inspected for leaks. The engine performed as expected during the initial run-ups. (5/7/2010)

Repaired, painted, and installed the Consolidair Model 17 wheel fenders. These are listed as item 208 in the 7AC Type Certificate A-759. The type certificate indicates a weight of 10 lbs. with a 0” moment arm. However, I weighed my fenders just before they were installed and they each weighed 3.3’lbs, or a total of 6.6 lbs with a 0” moment arm.

On June 11, 2010 N3129E was test flown for the first time by Bill Pancake.

On June 17, 2010 N3129E was flown to the 2010 Aeronca Convention in Middletown, OH

Following the initial few flights of N3129E, it was determined that the aircraft center of gravity and the flexibility of the aircraft weight and balance could be improved by moving the battery from the firewall and mount it behind the rear seat. A field approval was obtained for the relocation. Bill Pancake designed and fabricated the brackets for relocating the battery.

This photo to the left displays the various parts that Bill fabricated for relocating the battery.

The photo below shows the clamp with the double holes and nut-plate. The clamp was attached to the tubing below the floor with the inter holes using a flathead bolt and nut.

The photo above left shows the brackets attached to the airframe before installing the floorboard. The photo above right shows the battery assembly with the floorboard installed.

To further improve the aircraft center of gravity and weight and balance options, a field approval was obtained to install mounting rails for the front seat so that it could be relocated aft of the design position up to 2 inches in 1/2 inch increments.

This photo shows the two rails fabricated from .125” 4130 steel. Each end of each rail is drilled with 1/4 inch holes spaced on 1/2 inch centers. After fabricating the rails they were painted black.

With the front seat removed the rails are bolted to the seat lugs. The seat belts remain positioned and attached at the rear lugs.

The front seat is then re-attached to the rails. Here it is shown in the far aft position. After trying the seat in several different positions, it was finally located 1 inch aft of the original position.
Following relocation of the seat the elevator cable turnbuckles were adjusted to assure the rear seat stick did not hit the back of the front seat

Each of the two 13 gallon wing mounted tanks have Model T Ford type fuel gauges visible through windows from the cabin to the butt rib of each wing. It was very difficult to accurately read the fuel gauges in flight and to determine in flight fuel consumption and fuel remaining. To aid in monitoring fuel consumption a JPI FS-450 Fuel Flow analyzer was installed.
A field approval was obtained for the installation only because the Aeronca Champ was not listed in the STC approved model list. Later Aeronca model designed with electrical systems was included in the list. The Aeronca 7A originally never had an electrical system, which is required for operation of the analyzer.

This photo shows the JPI FS-450 fuel flow analyzer mounted in the upper right corner of the instrument panel. This is the location where the dash mounted compass had been located. The dash mounted compass was replaced with a vertical card compass mounted above the dash.

The JPI FS-450 has an inline turbine flow sensor mounted in the fuel line between the gascolator and the carburetor as shown on the left. After testing the sensor is covered with fire-stop material. The sensor puts out about 2000 pulses per gallon. The sensor is connected to the analyzer with three small wires. The analyzer monitors and displays instantaneous fuel flow, fuel consumed and fuel remaining. The analyzer is connected to the portable Garmin 296 GPS and displays fuel required to reach the destination as well as estimated fuel remaining upon reaching the destination. The analyzer also displays the miles per gallon based on fuel consumption and GPS ground speed.

Based on about 35 hours of flight, the layout of the instrument panel has worked out very well. With the removal of the nose fuel tank, the entire panel was moved foreword 4 inches. This was done to improve visibility of the instruments and to provide a ledge for inflight paperwork. Small spring clamps are used to secure 3 X 5 cards to the shelf to provide writing surfaces for notes. The Icom A-210 radio has worked extremely well. The internal memory permits storing frequently used frequencies. The radio has a built in two place intercom which is wired to the two seats. Based upon a recommendation by Bill Pancake, the com antenna was mounted to the bottom side of the warparound cowling.
The Gismo docking station for the portable Garmin 296 GPS has worked out very well. The GPS screen is visible in almost all light conditions and the unit is easily installed and removed. The GPS is wired into the panel power and is also wired into the JPI fuel flow analyzer. The altimeter readings correlate very accurately with the altitude readings in the GPS. The GPS is set to continuously display ground speed, distance to next destination, altitude, and vertical speed. The GPS vertical speed reading is much more useful than the mechanical vertical speed instrument.

The permanent GPS antenna mount is shown on page 35.

Before and After

Before

After

After

Engine Overhaul

The original plans for the engine was to apply a few minor upgrades including the addition of a light weight starter, oil filter, and new ignition cables.
The engine log book indicated that the original engine logs were lost and that the engine was estimated to have about 160 hrs since overhaul.
According to the Aircraft Specialty STC for the installation of an O-200 crank, pistons, and rods the engine should still have a C-85 cam and lifters. The valves for a C-85 cam should have two springs per valve whereas the valves for an O-200 cam should have three springs per valve. Inspection of the engine revealed that the valves had three springs. A decision was made to remove one spring from each valve.
During the removal of the springs, we found that the rocker arm shaft on one of the cylinders was seized to a rocker arm. We determined that this cylinder needed to be replaced. When the cylinder was removed, it was verified that the cam was an O-200 cam rather than the correct C-85 cam.
The remaining three cylinders were removed. Measurement of the cylinders revealed that they were marginally within maximum tolerance for a bored cylinder. It was decided at this point that all four cylinders would be replaced and that a major overhaul would be performed on the engine.
The engine was disassembled. The cam case journals had minimal wiping. The one piece main/thrust bearing had the thrust face broken from the main bearing body.
The crankcase and accessory case were sent to Divco for inspection and yellowtag.
The crank, gears, rods, and rocker arms were sent to Aircraft Specialty for inspection and yellowtag.
The crankcase and accessory case were inspected, reconditioned, and yellowtagged.
The crankshaft was found to have a severe crack near the flange and was rejected. A new O-200 crankshaft was purchased. Three of the rods were rejected and reconditioned yellow tagged rods were obtained. The crank and cam gears were inspected and yellow tagged. The rocker arms were inspected, reconditioned, and yellow tagged. Four new ECi nickel cylinder kits were purchased. Four new piston wrist pins were purchased. Four new valve covers were purchased. All new lifter bodies, hydraulic units, push rod buttons, and push rods were purchased. Inspection of the magnetos indicated that it was more cost effective to purchase factory reconditioned mags rather than rebuild the existing units. Parts and an overhaul kit were used to rebuild the carb. The exhaust system was sent off for inspection and yellow tag. One muffler was reconditioned. The remainder of the exhaust system was replaced with new components. It appeared that something such as a piece of safety wire had passed through the engine oil pump so a new oil pump was purchased.
Because the aircraft fuel system capacity was increased from 13 gallons to 26 gallons, the engine oil capacity needed to be increased from 4 to 6 quarts. A like new 6 quart oil reservoir was purchase, cleaned, inspected and was found to be in serviceable condition. It was primed, painted, and installed.
All of the engine components, both new and reconditioned were inspected, cleaned, and painted (where appropriate) by Bill Pancake. Following Continental procedures and recommendations, Bill assembled the engine.
Following engine assembly, new engine baffles were fabricated and installed on the engine.

Engine Photos

Engine on aircraft when purchased

Engine being disassembled for inspection

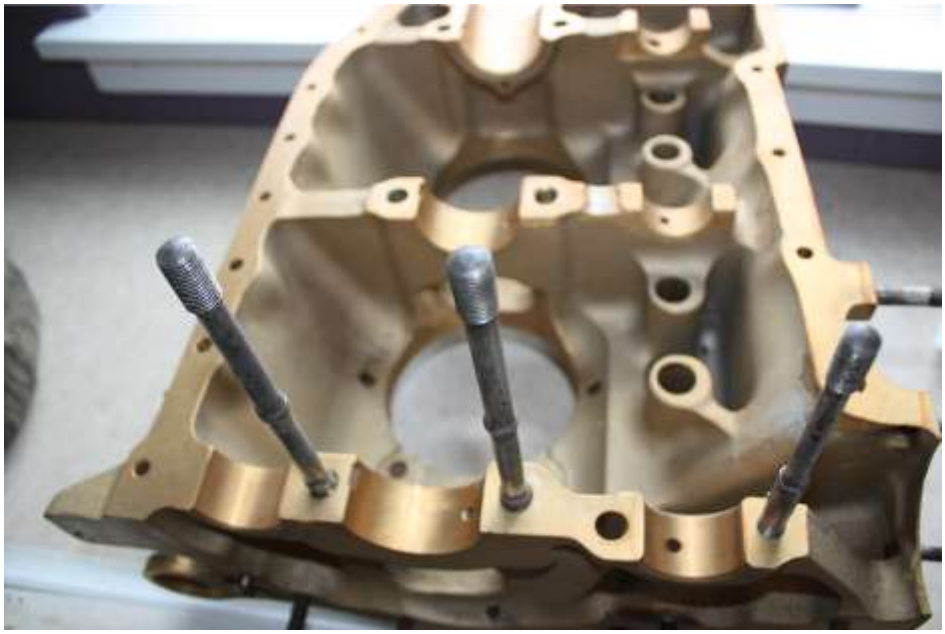
With cylinder removed, inspection of cam and lifters reveals that O-200 cam and lifters were used rather than C-85 cam and lifters

Thrust bearing on one end of the main bearing was broken

Cam journal had some rubbing

Engine case prior to shipping to Divco

Internals were sent to Aircraft Specialty for inspection and yellow tag.
They found that the crank has a severe flange crack and three of the connecting rods were rejected.



Crankcase half after being returned from Divco.

Engine assembly at Bill Pancake's Shop

All parts were thoroughly cleaned and inspected when received and then painted to original Continental colors. Here are the new ECi cylinders after being painted.

Here are additional engine parts after being inspected, cleaned and painted.

Prior to assembly all internal bearing and ring clearances are measured to confirm compliance with specifications. Ring clearance is measured at both the top and bottom of each cylinder and corrected as necessary.

Prior to assembly Bill pressure checks each hydraulic lifter assembly and cleans and inspects each lifter body.

Even though the lifter bodies were factory new, this wad of magnet shavings was found in one of the lifter bodies. Bill is insistent on cleaning and inspecting all components no matter whether they are new, used, or reconditioned.

Connecting rods are installed on the new crank shaft and Torqued to the correct limits.

The new crank, cam and lifters are assembled to the case. A silk thread is applied to the case half for sealing.

The case halves are assembled to the crank and cam and additional components are added to the engine.

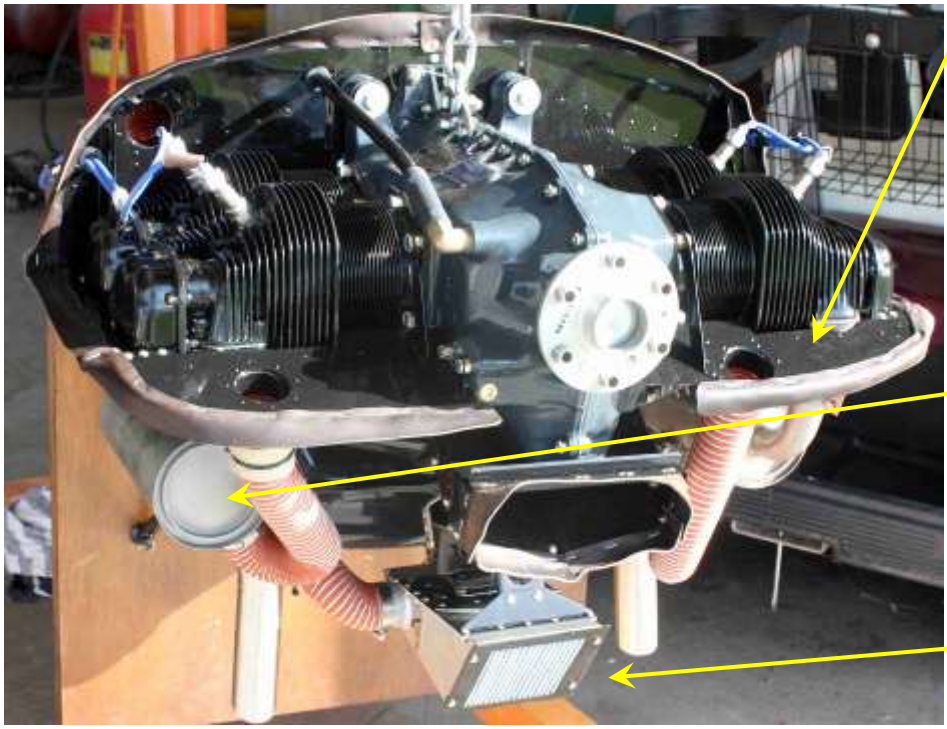
Here Bill is preparing to fit the piston rings to the pistons.

Once the piston is assembled to the connecting rod the cylinder is then slid over the piston and attached to the case.

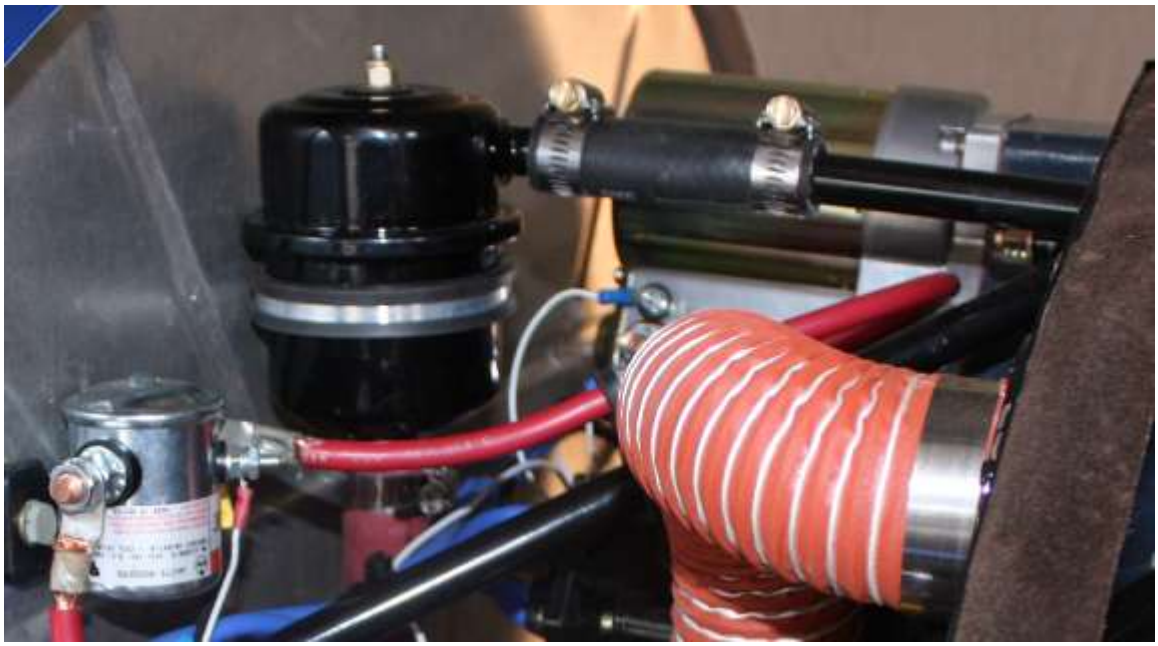
After assembling all the cylinders, the pushrods and rocker arms are installed and the valve lash is measured for each valve. The pushrod length was varied until the correct valve lash was obtained.
The accessory case was then installed.

The remanufactured magnetos were then installed and timed to the Aircraft Specialty O-200 crank STC specifications.

The oil reservoir and light weight starter are then added.
The carb, airbox, intake, and exhaust systems cannot be added until the baffles are fitted to the engine.



Engine mounted to firewall.

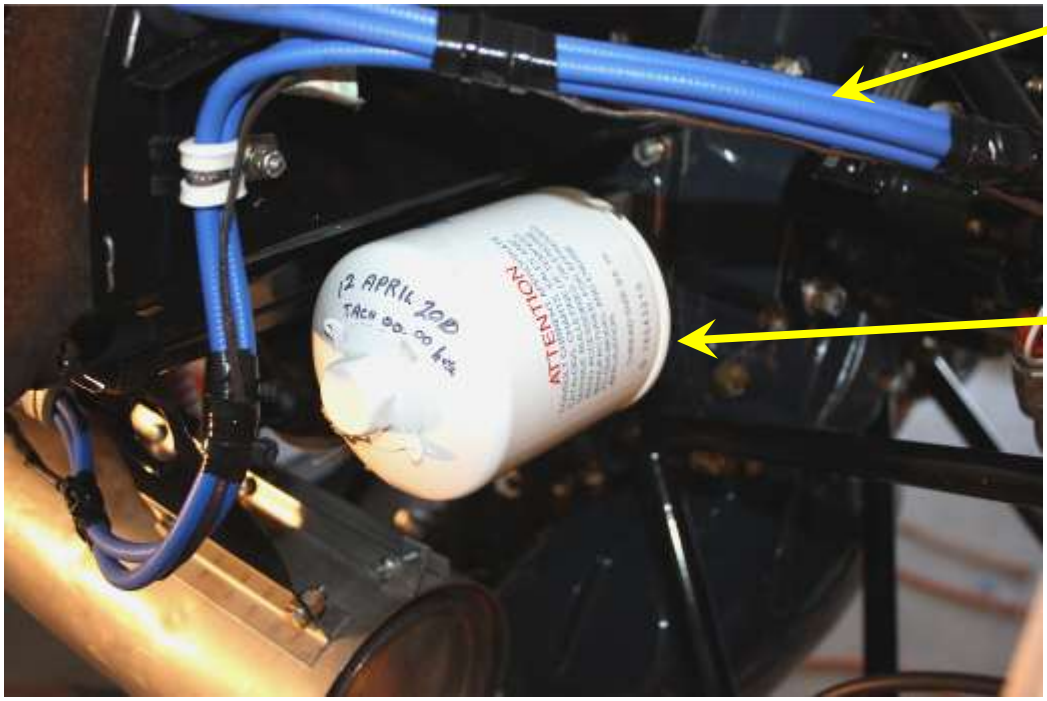


Airwolf mini-air/oil separator installed on engine to remove corrosive vapors and minimize oil blow-by.

Aluminum tubing blow-by pipe extended from the bottom of the Airwolf air/oil separator to the bottom of the firewall.

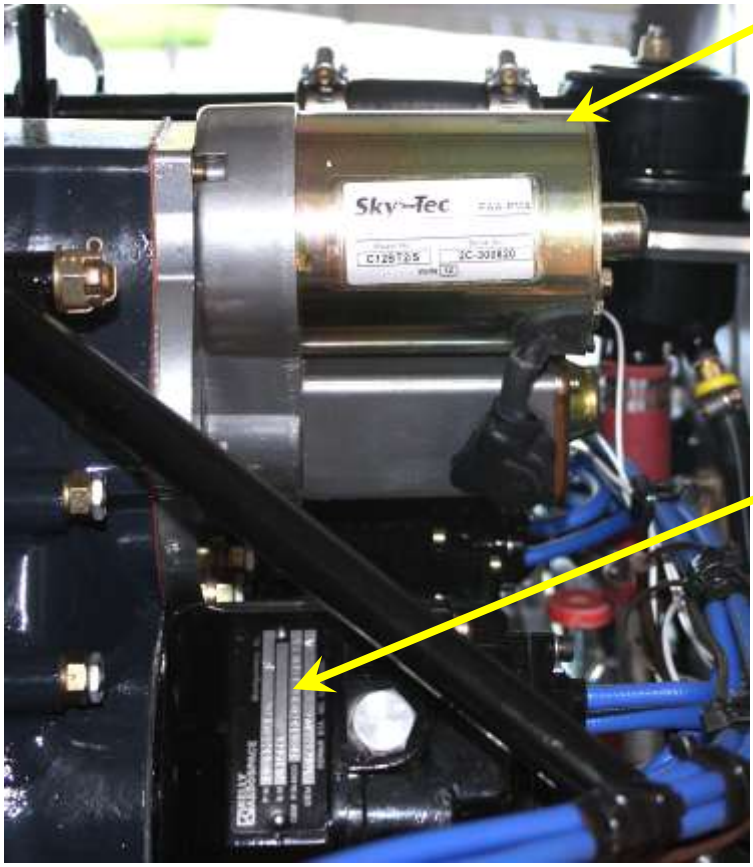
Field approval obtained to install a firewall mounted condensed vapor collection bottle on the vapor outlet of the Airwolf air/oil separator. Airwolf's STC installation method routes the vapors from the separator back to the crankcase. The addition of the external collection bottle prevents the return of water and other corrosive vapors to the crankcase.

Exhaust gas thermocouple installed on outlet of the #4 cylinder.



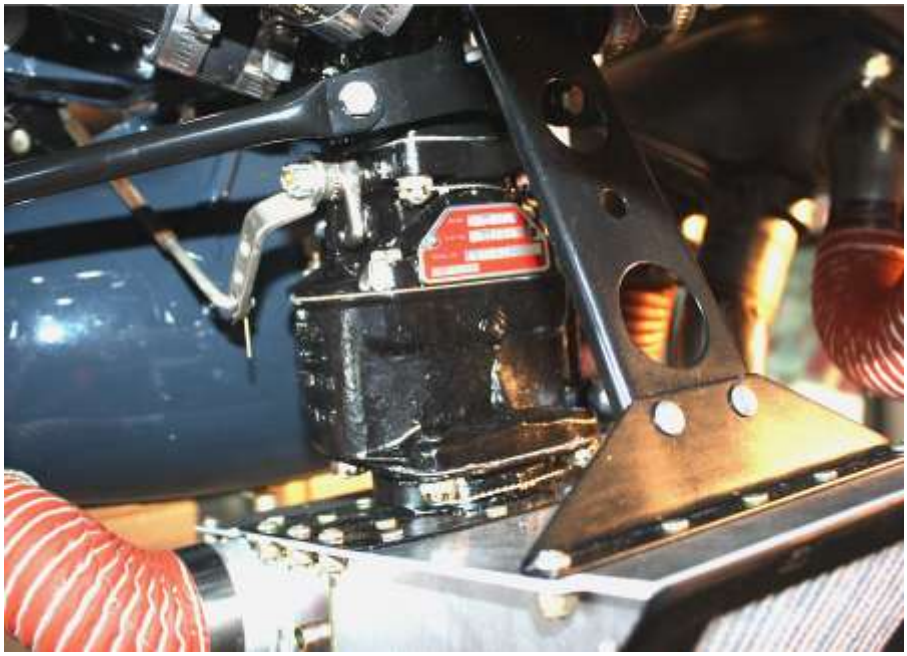
New Skytronics Aero-Lite wiring harnesses with new magneto plates.

Oil Filter adapter added to the engine to permit the use of aircraft oil filters and to eliminate the internal oil screen. The addition of the filter permits the longer intervals between oil change.

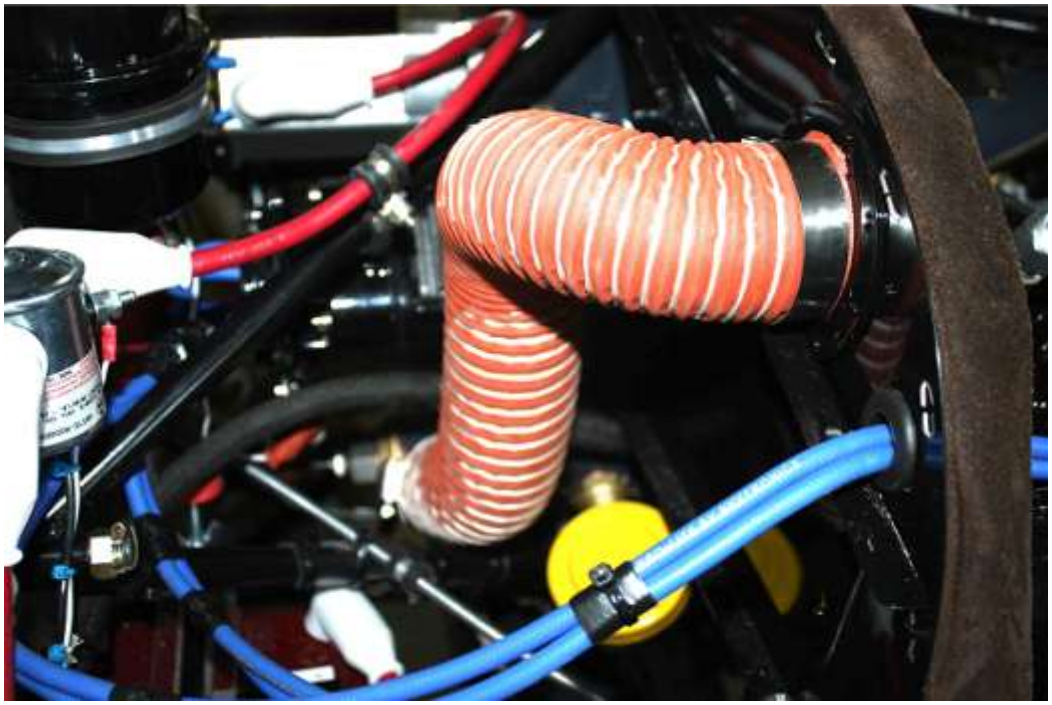


New light weight Sky-Tec starter replaces the old pull starter. Installation of the new starter required the removal of the starter pinion shaft within the engine. A master switch and push to start button on the instrument panel controls the starter.

One of two remanufactured Bendix magnetos is visible in this photo.

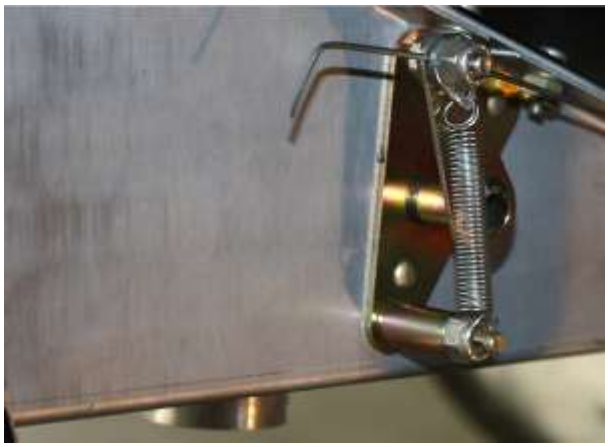


Rebuilt carburetor and new air box installed on engine.



An additional ventilation tube is installed from the right upper baffle to the oil screen housing. This provides additional oil cooling. The oil screen housing serves as an air to oil heat exchanger

Mixture return spring – a safety feature to return mixture to full rich position in the event of a breakage of the mixture control cable



Carb Heat position spring – a safety feature to hold the carb heat flapper in one position and to prevent it from oscillating back and forth in the event of a breakage of the carb heat control cable

The crew gathered for the inspection of the assembled but uncovered aircraft.
Joe Henry, John Propst, and Bill Pancake at Hales Landing August 2009.

Bill departing Hales Landing in NC 1890E after one of his visits.

Aircraft and engine history extracted from log books and FAA CD

Date	Tach	TTAF	SMOH	source	***prior to 9/7/1995 engine was not on N103RJ*** item
12/9/1946				reg cd	Aeronca Bill of Sale to Vereostra Aviation Sales, So Bend IN
12/20/1946				reg cd	Yorktown Flying Service buys plane form Aviation Sales
2/24/1947				reg cd	Moose Flying Club purchases plane, Marion IN
5/4/1948				reg cd	Betty Bogue & Virgil Bogus purchase plane, Marion IN
7/3/1950				reg cd	Betty Rose North purchases plane, Marion, IN
9/12/1951				reg cd	Waters aviation company purchases plane, Peru, In
3/20/1952				reg cd	Robert Bunn purchases plane, Rochester In
4/30/1952				reg cd	Lewis Markley purchases plane, Rochester In
4/10/1954				reg cd	Cruthers Sutton and Walther Shadley purchase plane
12/30/1954				reg cd	Gold and Black Flite Club purchase plane
9/30/1955				337	remove wood prop and install McCauley 1A90 metal prop
9/30/1955				air cd	337change prop and recalc W&B
5/1/1956				reg cd	Purdue Pilots Inc purchase plane West Lafayette, In
8/8/1956				air cd	7AC Airworthiness Certificate issued by FAA
11/25/1956				337	weld tubing on right side of instrument panel
11/26/1956				air cd	337 weld repair tubing below dash on right
3/21/1957					periodic inspection
7/31/1957		1121.55		ac log	periodic inspection
8/8/1957				reg cd	Edwin Malinquist of Monticello In purchases plane
12/23/1957				reg cd	Arets Flying service of Lafayette, Indiana purchase plane
6/30/1958		1134.15		ac log	periodic inspection
10/22/1958				reg cd	Earl Wohler, Jr of Parn, In purchases plane
5/24/1959					periodic inspection, recording tach installed
5/28/1959	11.1	1246		ac log	periodic inspection
6/3/1959				ac log	replace exhaust stacks, fixed tail wheel, install CM7445 prop.
6/13/1959				ac log	Eng s/ 5631368 removed for overhaul . Installed engine 3720568R
1/31/1960	97	1333.7		ac log	periodic inspection
6/17/1961	218	1454			periodic inspection
9/16/1961				air cd	337 weld repair tubing above dash on right
10/14/1961				337	weld repair tubing above right side of instrument panel
6/21/1962				ac log	patch wings per 337
6/21/1962				air cd	337 patch wing
6/23/1962				337	applied dope patches to left and right wings
6/23/1962	320	1557		ac log	periodic inspection
3/28/1963	420	1657		ac log	adjust rudder
7/1/1963	423	1660		ac log	repair door latch. Weld repair carb air box, patch left elevator, replace compass, patch engine cowl, replaced left case fame and oleo with used serviceable unit, installed pioneer 2" venturi type 7413-900, schwin suction regulator #2500 and Bendix turn and bank indicator
11/1/1963				reg cd	Howard Denham or Harry Denham of Puru In purchase plane
4/18/1974				reg cd	John Ruzicka sells 3129E to EC Poole
7/7/1974				reg cd	ECPoole registers 3129E Syracuse Indiana
3/10/1976				reg cd	McDaniel and Jackson Register 3219E
3/10/1976				reg cd	E.C. Poole sells 3129E to McDaniel & Jackson
4/15/1976				ac log	recover. New empty wt 805, useful load 414, empty cg 14.70

5/1/1976				337	complete recover of aircraft Sherwin Williams Porcelain white and Grabber blue. Install mufflers, wheel pants, prop spinner
5/1/1976				air cd	337 recover aircraft grade A
7/17/1976				reg cd	Clyde JcDaniel and Roy Jackson Change tail # from 3129E to 103RJ
7/28/1976				reg cd	Roy Jackson of Columbus Oh registers 103RJ
7/28/1976				reg cd	Clyde Daniel & Roy Jackson sell plane to Joy Jackson
3/11/1977	125.3	1887.3		ac log	replace tach
3/30/1978	422.2	2184.3		ac log	annual airframe inspection
11/24/1978				air cd	337 recover airframe and feathers ceconite
11/24/1979	597.7	2309.8		ac log	annual airframe inspection
11/24/1979				337	Airframe, R&L elevators, R&L horizontal stabilizers recovered with Ceconite 101 in accordance with Cooper engr bulletin and STC SA4-836 & 43-13-1
10/5/1980	676.8	2388.9		ac log	annual airframe inspection
~~11/1/1980~~	~~-~~	~~-~~	~~91~~	~~eng log~~	~~annual~~
~~10/30/1981~~	~~124.5~~	~~-~~	~~124.6~~	~~eng log~~	~~annual~~
4/3/1982	777.7			ac log	annual airframe inspection
~~10/21/1982~~	~~141.2~~	~~-~~	~~124.6~~	~~eng log~~	~~annual~~
10/24/1982	809.6	2611.7		ac log	annual airframe inspection
6/8/1983				reg cd	Roy Jackson sells 103RJ to Max Marion
11/5/1983				reg cd	John Ruzicka registers 3129E
1/19/1984				reg cd	Max Marion of Ashville OH registers 103RJ
~~7/1/1984~~	~~161.2~~	~~-~~	~~144.6~~	~~eng log~~	~~annual~~
3/15/1989				337	remove wings to replace fabric. Wing spars were refinished and wing repairs completed where necessary. Recovered wings with Stits-poly fiber style D104.
4/18/1989				air cd	337 recover wings with stits poly fiber
2/19/1990				reg cd	William Frush registers 103RJ to self
2/19/1990				reg cd	Max Marion sells 103RJ to William Frush
3/22/1994				chart	W&B calculated by W Frush and J Baldwin
9/7/1995				337	convert 7ac to 7bcm
9/7/1995	3.5		164.7	eng log	annual
9/7/1995	3.5	2615.2		ac log	annual airframe inspection
9/7/1995	0			ac log	replace tach
9/7/1995				337	conversion from 7AC to 7BCM, gasolator bowl, mufflers installed, modified fuel tank installed, cowling modified, surface travel adjusted, nameplate restamped, McCauley model CF7146 prop installed, placards added
9/7/1995				air cd	7AC/BCM Airworthiness Certificate issued by FAA
9/7/1995				air cd	Form 8130 application for airworthiness certificate for conversion from 7ac to 7BCM with C-85-f submitted and approved by FAA inspector Jay Wilkins
9/7/1995				air cd	337 issued for conversion. 337 lists 85-12 engine
9/4/1996	7.5		168.5	eng log	annual
9/4/1996	7.5	2625.7		ac log	annual airframe inspection
12/16/1997	9.7	2627.7		ac log	annual airframe inspection
12/17/1997	9.7		170.7	eng log	annual
11/18/1998	12			eng log	annual
11/18/1998	12			ac log	annual airframe inspection
3/13/1999	16			eng log	annual
3/23/1999	16			ac log	annual airframe inspection
9/2/1999				reg cd	William Frush Sells 103RJ to Charles Armbrust
9/10/1999	16			eng log	change oil
9/14/1999				reg cd	Charles Armbrust registers N103RJ

10/4/2000	41		211	eng log	annual
10/4/2000	41	2488		ac log	annual airframe inspection
9/1/2001	52			eng log	change oil
2/12/2004	76.47			eng log	change oil
10/19/2004	80.5		250.5	eng log	redo #3 cylinder, annual by Gary Moore
10/19/2004	80.5	2698.7		ac log	annual airframe inspection
10/25/2004	80.5			ac log	replace elt battery, expires oc 06
4/30/2006	95.3			eng log	change oil
8/1/2007	112			eng log	change oil
8/7/2008	113.7				Propst purchases plane from Charles Armbrust (23rd owner)

About the owner

John Propst was born and raised in Nebraska. His father was a carpenter and during his younger years John learned many skills related to the construction and restoration of homes.
John attended the University of Nebraska and received the BSEE degree in Electrical Engineering in 1970.
Following graduation, John began work as an electrical engineer at the Shell Oil Wood River Refinery located just outside of St. Louis. John held several training positions in electrical, mechanical, instrumentation, heat transfer, and project engineering. John was then transferred to Shell's corporate major project group as an electrical project engineer. He worked on a number of major projects across the United States. John was then transferred back to the Wood River Refinery where he held positions of Manager Utilities Technical Support, Manager Electrical Engineering, and Maintenance Manager. He was then reassigned to the Shell Deer Park Texas Refinery as Manager Electrical Power and Generation. From there John was reassigned to Shell's Westhollow Technology Center in Houston where he provided electrical technical support to all Shell refining and chemical manufacturing facilities in the United States and Saudi Arabia. In this position John served on a number of codes and standards groups including IEEE, API, CMA, NFPA, and UL, John served on Code Panel 7 of the National Electrical Code for several code cycles and participated on a number of industry standards related to electrical area classification in explosive environments. John was involved with the analysis of reliability of industrial power systems and developed the spreadsheet reliability modeling technique. In 2002 John was recognized as an IEEE Fellow for contributions to the modeling of risk and reliability in industrial electrical systems. John has published a number of prize winning papers for the Petroleum and Chemical Industry Committee and the Industry Application Society of IEEE related to electrical area classification and electrical system reliability and risk analysis. John continues to serve as an active member of the IEEE Petroleum and Chemical Industry Committee.
After retirement John and his wife Joyce retired to the small rural area of Elizabeth, West Virginia to be close to Joyce's family. John and Joyce have a daughter who lives in Collinsville Ill where she is a journeyman electrician. Their two granddaughters and one great grandson also live in the Collinsville area. John first obtained his private pilot's license in 1971 flying out of the Lambert St Louis airport. However, with work and life priorities John did not fly after obtaining his license until after retirement. Shortly after moving to West Virginia, John and Joyce attended an air show at the Parkersburg airport. It was there that John got the bug to get back into flying.
After a chance visit to the small private Hale's Landing airport near Elizabeth WV. John and Joyce purchased an airport lot and built a hangar. At the same time they purchased a 1980 Piper Dakota. John renewed his private pilot's license and then went on and obtained his instrument rating. Over the next two years John purchased a Baby Ace and an Aeronca Chief and tried to master the skills of a tail dragger pilot. On a visit to Stewart Airfield outside of Cincinnati, John had a lesson in an Aeronca Champ. From the first time he flew a Champ he knew that was the plane he wanted. He began his search for a Champ with an 85-12 electric start that was still rated for light sport. Through the grapevine John learned of N 103RJ. While the plane was not in the best of shape, it had the basic configuration he was looking for, and appeared to be restorable. At the 2008 Middletown Aeronca convention John first met and became friends with Bill Pancake. Bill offered to provide guidance and mentoring to John on the rebuild. Without Bill's guidance, expertise, and insistence on doing things right, this restoration probably would never have gotten off the ground. Equally lucky, Joe Henry retired and moved to Hales Landing and obtained his IA. Joe's intimate knowledge of vintage aircraft has been an equally valued source of knowledge and guidance. My thanks to Joe and Bill for all their help.