CONSTRUCTION . . .

Wing ..

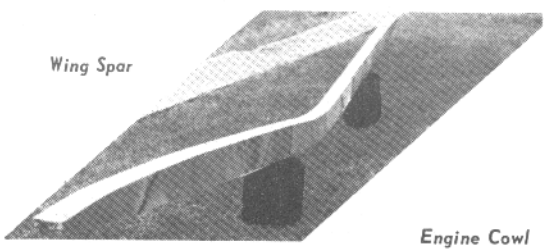
The standard wing is a single assembly with a conventional box spar running from tip to tip. The spar is not really very difficult to build although it is quite long. The top flange, for instance, consists of a full span 1/4" x 3 1/4" board. This may be in 2 or 3 sections spliced to reach from tip to tip. The center part of the wing flange is built up of several laminations in order to give the progressive strength towards the center. The plans set shows the wing spar construction in considerable detail. A full set of 12 construction photos is included showing step by step assembly of the spar. Spar flanges are spaced apart with small diaphragms. A single two-by-four jig is also detailed. It is covered front and back with plywood. Final assembly of the spar can also be done on this same jig.

The airfoil profile is the NACA 23012. All ribs are the same airfoil size out to the beginning of the aileron and elliptic section of the wing planform. Ribs are the standard built-up truss type.

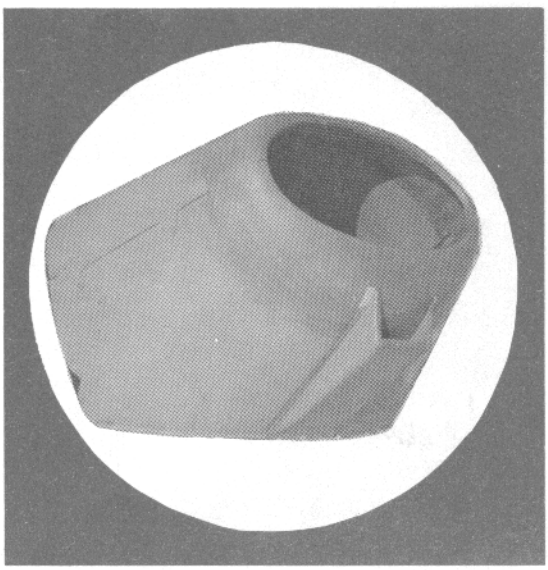
A short rear spar extends through the center section between points approximately behind the undercarriage legs. Slotted ailerons and flaps are mounted from a full span false spar. The leading edges extending to behind the spar, wing walk, trailing edge at false spar; and wing tips are all plywood covered. Reinforcement blocks are mounted on the spar to carry control fittings and undercarraige legs. The plywood covering in the center section after the spar serves as the seats.

The wing is mounted to the fuselage with two large bolts extending through the spar and through bulkhead No. 1 in the fuselage. Brackets at the center section spar secure the rear part of the wing to the fuselage. Thus, the whole wing assembly carries almost the entire control system including the control column assembly, undercarriage , ailerons, and flaps and their control system. Removal and installation of the wing is very simple.

The optional three piece wing is almost identical in structure as the original except for the shorter sections of wing spar and additional two wing ribs. Another change is the running of the false spar through this entire center section. This 3 piece wing is not actually intended to be foldable although this could be achieved if the flaps were removed prior to folding. The version without flaps would not present any problem and folding would be easy.



Wing Spar



Engine Cowl

CONSTRUCTION . . .

Ailerons and Flaps ..

The flaps are simple slotted type with a single spar and plywood covered leading edge. The ailerons are similar except for the laminated curved trailing edge to maintain the eliptical planform of the wing. Ailerons are provided with a balance weight.

Engine Section . ..

The engine mount is a simple tubular structure attached to the firewall backed by reinforcement blocks. For weight and balance reasons the mount for the Continental A-65 for the CP 30 is somewhat longer than the mount for other C-85, C-90 and 0-200 engines with electrical accessories. The nose ring of the cowling is usually fiberglass and the single curvature section behind is aluminum alloy.

The engine installation, whether it be Lycoming or Continental, is conventional. The engine mount incorporates side thrust to minimize the effect of slipstream and torque.

The propeller may be either wood or metal to suit the engine installed. The metal prop provides about 5% more performance than the wood. A metal or fiberglass spinner can be installed.

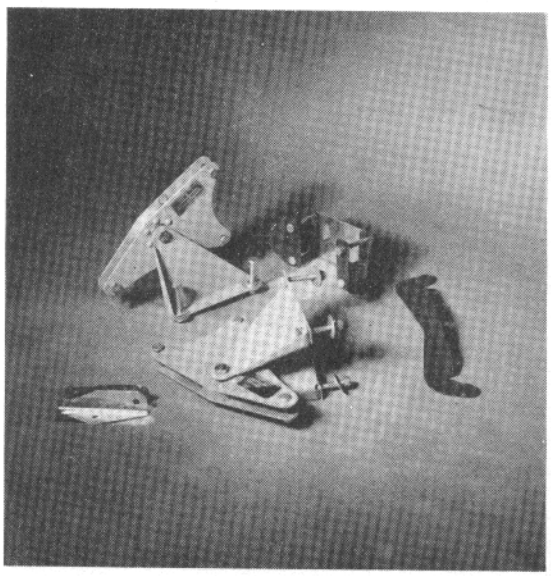
Undercarriage ..

The undercarriage legs consist of steel tube upper fixed section and smaller steel tube lower section. Shock is taken up by large coil springs available from Falconar Aircraft Ltd. A smaller rebound spring is also incorporated. Scissor forks are used for alignment. Undercarriage strut fairings and wheel fairings may be built up from sheet metal or fiberglass. Either 5.00 x 5 or 6.00 x 6 or similar wheels and tires may be used. Plans show the complete construction of the Adam hydraulic brake assembly. However, standard Goodyear or Cleveland brakes can be used if desired. Heel pedals are shown in the standard plans. However, a supplemental plan is available for toe brakes if preferred.

A standard tailwheel may be installed on the tailwheel leaf spring assembly. Plans show the detail construction of a steerable tailwheel.

Control System ..

The Emeraude uses individual dual control sticks mounted on the spar in the cockpit. Aileron cables run past pulleys through the spar out to aluminum alloy bellcrank assemblies and thence by push-rods to the ailerons. From the control column torque tube a push tube actuates the elevator bellcrank behind the seat. Cables run from this bellcrank to the elevator horn. All control cable is 1/8". All end fittings are standard.



Piel Emeraude control system parts made by Falconar Aircraft

CONSTRUCTION . . .

Control System..

Tubular type dual rudder pedals are installed. A very ingenious and simple rudder pedal bearing mounting has been devised by Piel. It uses waxed felt as a bushing. This inovation is extremely effective and permits self alignment and seating of the rudder pedals with very little friction. Anyone who has built homebuilt airplanes before and has encountered a problem of aligning rudder pedal bearings without slack can well appreciate this simple solution. The 1/8" rudder cables run along the inside of the fuselage to the rudder horn.

The flap control system uses a large lever centrally mounted with a grip operated lock that engages a quadrant mounted on the center rib between the seats. Two short cables go to the flap operating torque tube mounted in bearings of the same waxed-felt type as the rudder pedals. At the end of the torque tube are horns actuating the flap links attached to the inboard end of the flaps. These utilize standard ball bearings.

All bearings for flaps and ailerons are standard ball bearing type. Although those for the rudder and elevator are originally specified as the ball bearing type, a much lower cost type hinge assembly has been shown on the plans as an alternate. These use standard eyebolt and pin for each hinge.

There are actually very few other fittings in the aircraft except for those associated with the door and windshield arch.

Fuel System..

The CP 30 and CP 300 series use a single 18 gallon fuel tank ahead of the instrument panel. It is built up of aluminum alloy in two pieces with two baffles inside and a small sump at the drain. The fuel contents gauge may be the float and wire type or the electric type when an electrical system is installed.

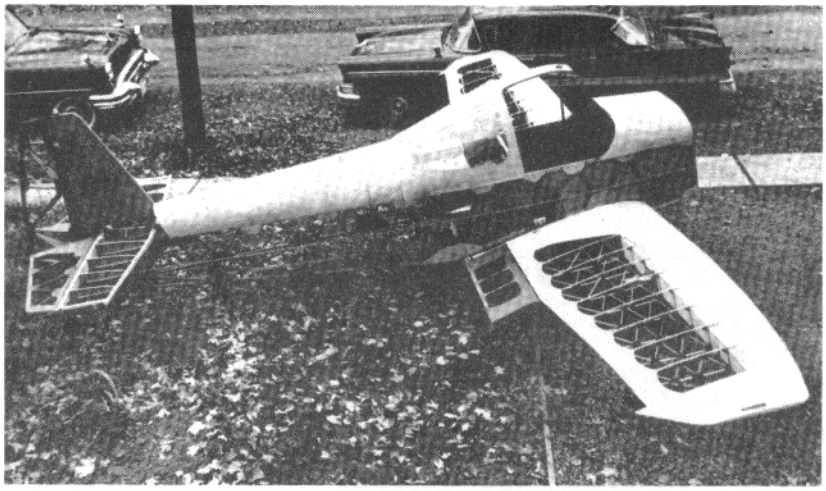
A ten gallon auxiliary fuel tank may be used on the CP 300A series aircraft. This is also built of aluminum alloy. It is located immediately aft of the seat in what is otherwise the front part of the baggage compartment. However, it is installed with plywood structure around it.

Cockpit..

One of the most outstanding features of the Emeraude is its large and comfortable cockpit. The roominess permits the installation of a full panel of blind flying instruments and radio. The smooth inside walls permit easy application of upholstery.

There is plenty of room to mount all the engine controls in a very neat pattern. Either a central push-pull knob type throttle may be used or individual lever type, one in the center and one on the left permitting easy operation by either pilot's left hand.

Cockpit



Ready for Covering

VERSIONS . . .

The basic CP 30 version is for the Continental A65 engine and other engines of similar weight and power. The power plant weight for this version should not exceed 185 lbs.

The CP 300 series is eligible for all engines from 75 hp. up to 105 hp. including the popular Continental and Lycoming engines. Maximum power plant weight for this version is 140 lbs. This will permit engines such as the Continental 0-200 and Lycoming 0-235 to be used with full electrical system. The starter, generator and voltage regulator for Continental engines usually weighs about 25 lbs. and for the Lycomings it is 30 to 35 lbs. The regular generator and voltage regulator are being replaced by the lighter alternator and its regulator in many newer installations. Alternators also have the advantage of being able to supply full power at relatively low rpm.

Plans show engine mounts for both Continental and Lycoming engines. It should be noted that the Lycoming 0-290 has not been approved by Piel for use at its full maximum horsepower of 125. However this engine should be satisfactory if throttle opening is limited to permit only 105 hp. to be utilized (2500 at rpm approximately). Normally this engine is too heavy to permit the use of an electrical system and starter. However some of these aircraft are being built with this engine installed and using the much stronger birch plywood in the construction in the same thicknesses as specified for the light okoumé mahogany ply.

If the builder prefers, he may build his Emeraude without flaps. There is no version designation to show the deletion of flaps. The elimination of the flap system and the flaps simplifies wing construction. It is merely necessary to build the wing ribs inboard of the aileron the full airfoil size to the trailing edge.

Recently introduced has been the three piece wing version of the Emeraude. This version is very popular with those builders who have limited workshop and storage space. The tip sections join the center section just outboard of the undercarriage. The principal fittings are at the main spar and consist of long plates bolted to the spar and permitting disconnection at the joints. Additional smaller fittings are provided one at the leading edge and the other at the flap false spar. The center section span is 8.6 ft., each outer panel is 8.8 ft. long. There are eight main spar fittings and eight false spar fittings. Four leading edge brackets are required. There are 2 extra ribs and the center section has some modified ribs and other small modifications. The extra weight of fittings and structure is about 20 lbs.

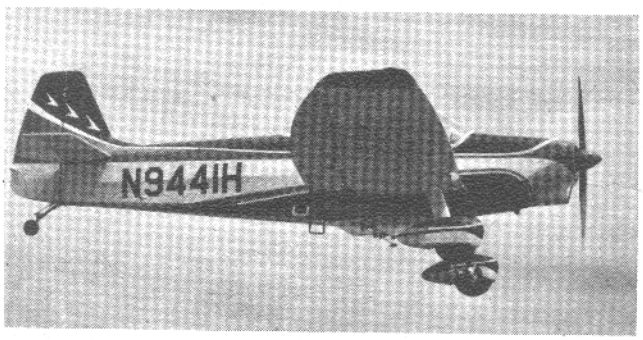
VERSIONS . . .

The basic CP 300 series, or CP 301 as designated in most of the plans for the Continental C-90 engine, is the version with standard equipment. If deluxe equipment is added such as sliding bubble canopy, auxiliary fuel tank, and other miscellaneous accessories then the version becomes the CP 301A when equipped with the Continental C-90 engine. When the deluxe version is equipped with any of the other engines, the letter "A" follows the designation number.

The CP 301C is a factory produced variation with slightly increased span, elliptical tips and other small refinements. Anyone wishing to buy the complete aircraft imported from France would get this version.

CP 30 series	CP 30	- Continental A-65
CP 300 series	CP 301	- Continental C 90-12F standard equipment
	CP 301A	- Continental C 90 deluxe version
	CP 301C	- Continental C-90-14F Type certificated factory built version
	CP 302	- 90 hp. Salmson radial (F-PJGE)
	CP 303	- 85 hp. Salmson radial
	CP 304	- Continental C-85
	CP 305	- Lycoming 0-235 100 - 115 hp.
	CP 306	- 75 hp. Lycoming. 0-145
	CP 311	- 100 hp. Continental 0-200
	CP 316	- 105 hp. Potez

The airplane can be luxuriosly finished inside. Plush upholstery costs little for the amount needed. It makes the airplane look expensive and envied.



Piel Emeraude

DATA

VERSION		CP 30 Series	CP 300 Series	CP 300A Series
EQUIPMENT		Standard	Standard	De Luxe
	UNITS			
Wingspan	ft. & in.	26' 4"	26' 4"	26' 4"
Length	ft. & in.	21'	20' 9"	20' 9"
Wing area	sq. ft.	117	117	117
Aspect ratio		5.9	5.9	5.9
Weights-empty	lbs.	620	695	750
-fuel & oil	lbs.	140	140	210
-load	lbs.	340	510	385
-gross (1)	lbs.	1100	1345	1345
Wing loading	lbs/sq.ft.	9.4	11.4	11.4
Power loading	lbs/hp	16.9	12.8	12.8
Ultimate safety factor (1)	g	6.8	6.8	6.8
Speeds -				
-stall, power & flaps	mph	37	42	42
-landing	mph	40	46	47
-cruise	mph	103	120	122
-maximum	mph	112	137	137
-flaps down, max.	mph	78	105	105
-dive, max.	mph	137	174	174
rate of climb	ft./min.	690	930	930
take-off run	ft.	260	600	600
landing run	ft.	390	525	525
service ceiling	ft.	13000	14700	14700
range	mi.	500	460	720
endurance	hrs.	4-3/4	4	6-1/4
fuel capacity (2)	US gal.	21.3	21.3	33
economy(miles per gal.)	Imp.gal.	18	18	27-1/2
	m.p.g. US	23.5	21.5	22
	m.p.g. Imp.	28	25.5	26.5

NOTES: (1) Subject to licensing authority approval, gross weight can be increased at the expense of ultimate safety factor.

(2) 1 Imp. gal. = 1.2 U.S. gal.