Fine photo, good looking aircraft, fine looking modeler. Combination is an almost unbeatable one at any contest, even more so as a Sunday flier.

BELLANCA SUPER VIKING 300

By JAMES YOUNG . . . dual purpose stunt, scale and fine stunt machine that has the possibilities of flying every maneuver better than most of the existing designs. Not exotic still has all of the looks necessary to impress the static as well as flying judges!

▶ Occasionally an airplane comes along that must be built. My first view of the Bellanca sent me directly to the drawing board. Much to my surprise, the Bellanca was a natural.

With the trend in stunt ships going toward jet type aircraft, the Bellanca stands out as unique without being weird or exotic. Its highly realistic design sacrifices nothing in terms of a good stunt ship.

For the moment, forget what the airplane looks like and consider it strictly as a stunt ship. The basic design is similar to many successful stunt ships; however, many refinements have been incorporated to make the Bellanca fly every maneuver better than most existing designs.

The fuselage is reasonably deep, allowing for the use of a low wing, high stabilizer and high engine thrust line. The deep fuselage contributes to greater horizontal stability. The low wing and high thrust line make an extremely short, attractive landing gear possible. This not only improves ground handling, but improves inside maneuvers by concentrating the weight of the gear closer to the pivot point of the aircraft. The high stabilizer is out of the turbulence of the wing, a very important point as the Bellanca has an extremely thick wing.

The wing used on the Bellanca has been under development for at least ten years. Like most modern stunt ships the wing is similar to that of a Nobler.

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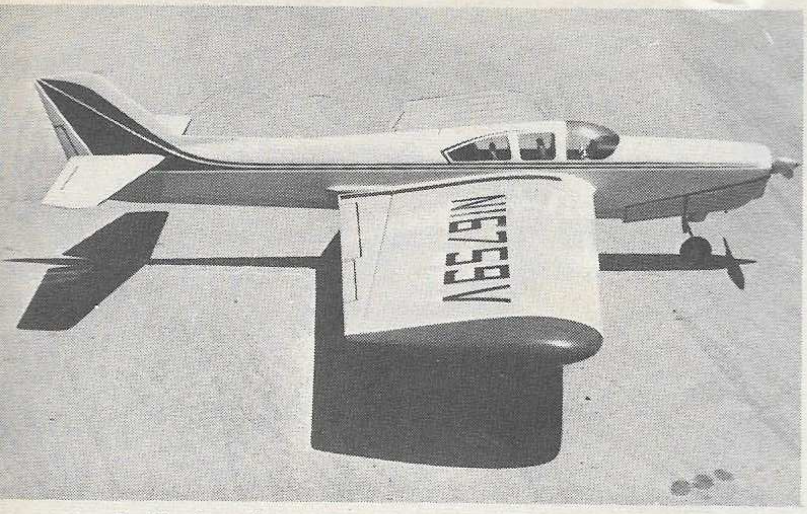
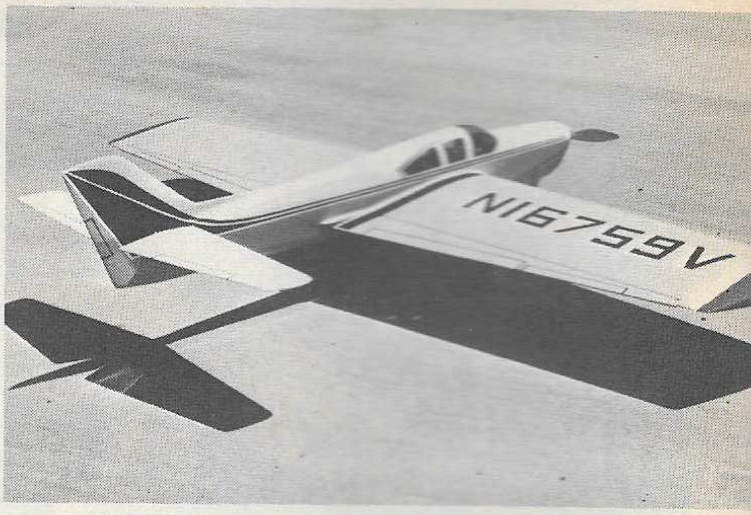
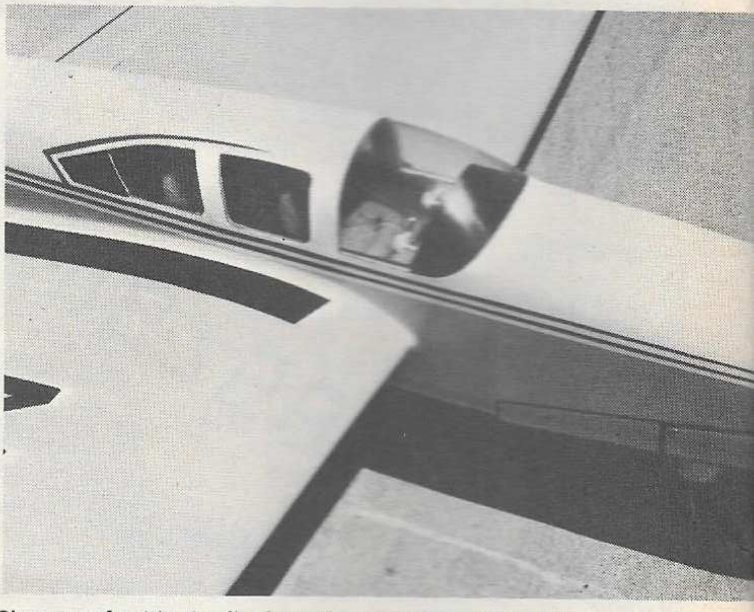


Profile view of the Viking 300 shows the fine lines so important and necessary for a competitive control stunt plane—clean and businesslike.



Another view shows the care and attention paid by author to finish details. All control surfaces simulated, plus fine paint details.

Authors very pretty wife takes time out to pose with the "300". He does have a pair of winners here. Note the almost full span flaps.



Close-up of cabin details show the attention paid to this area. Control columns, upholstered seats, plus carpeting on the deck, instruments.

BELLANCA SUPER VIKING 300 . . . CONTINUED

There are, however, several very important differences. The airfoil design incorporates a very blunt leading edge, with the thickest point approximately 20% behind the leading edge. This airfoil design is very efficient and exhibits an extremely high lift-to-drag ratio.

In order to obtain a slower more constant speed from the airfoil, the wing was increased in thickness. This also gave the added advantage of more lift. The wing cord is also very wide. This puts area closer to the center of the aircraft and helps eliminate wing wobbles due to overly long wings. 3/32" balsa was used for planking and cap strips, allowing for a better sanding job, smoother joints, and smoother airfoil section. No appreciable addition of weight was noted.

The fuselage is unusually long due to a long nose, long tail moment arms and wide wing cord. The purpose of the long nose is for stability, both in level flight and through maneuvers. Most long nosed stunt ships, however, lose the ability to turn tight corners. In the Bellanca this tendency was overcome by two methods:

1. All unnecessary weight was taken out of the nose. This was done by lightening the motor mounts and omitting all unnecessary hard wood parts (see plans). The engine used (Fox 35) is an extremely light power plant. I have tried many other engines but have found none more suited to the job of powering a stunt ship. Also a Veco extension shaft was used to lengthen the nose with practically no addition of weight. All parts in the nose were fiberglassed to provide extra strength and fuel-proofing without adding much weight.

2. The long tail moment makes the airplane turn quicker by providing a longer lever for the elevator to act upon. This means that the elevator is more effective in causing the ship to turn about its pivot point. The result is an airplane that is extremely stable in level flight and smooth through maneuvers, coupled with the ability to leap through the square corners so important in the FAI scoring system.

It is important to note at this point that no matter how sharp the corner, its affect will be lost if the model mushes or bobbles after the square corner has been completed. The long fuselage combats bobbles as it tends to fly straight when the elevator is neutral. The high lift wing also helps to reduce mushing and stalling through tight corners.

The width of the fuselage (3 inches at the widest point) will probably be a point of much concern to the serious stunt builder. No degradation in flying characteristics was noted as compared to similar type designs incorporating much narrower fuselages. I am sure that

(Continued on page 49)

BELLANCA 300

(Continued from page 12)

there is a natural limit to how wide the fuselage can be, however, the Bellanca must be well under this limit. Horizontal stability and turning ability are excellent through all maneuvers.

CONSTRUCTION

Little space will be devoted to construction as the experienced builder should be able to extract all necessary information from the plans; however, extra precautions should be taken in several areas.

1. Weight

Use all soft, light balsa. Except for the fixed portion of the horizontal stabilizer, little strength is derived from the hardness of the wood. Be especially careful about weight which is located away from the center of the aircraft as it can cause poor turning, wing wobbles, and poor horizontal stability. Remove weight from the model (no matter how small) which is not essential to the aircraft's ability to fly well and stay together. It has always been my experience that a light airplane will out-fly a heavy one under any conditions. Finished weight of the Bellanca should be about 42 ounces.

2. Cockpit

The cockpit was coated with fiberglass,

BELLANCA 300

(Continued from page 49)

resin, and cloth for strength. An easier approach to the problem would be to mold the cabin structure from fiberglass. The seats were carved from balsa and the controls were formed from brass tubing, painted white. Natural wood grain panels were made by wrapping wood grain contact paper around balsa panels. The windshield and side windows are cut from a large RC canopy. A light green tint was added by dipping the canopy into a hot "RIT" dye solution. The tint is permanent and penetrates through the canopy material.

FINISH

Any well-built stunt model deserves a good (but light) finish. First, cover all seams with silk and clear dope until sealed. Apply two coats of Aero Gloss clear dope (24 hours apart) to entire structure. The model is then sanded with 400 (dry) sandpaper until all the burrs are gone. Next, the entire ship is painted with three coats of Aero Gloss balsa fillercoat. Wait 24 hours and sand entire structure with 320 (dry) sandpaper until practically back to the clear dope. Cover the open areas only with SIG light-weight silkspan. Do not cover planked areas as this only adds unnecessary weight. Paint covered areas with Aero Gloss clear until paper is filled (3 to 5 coats). Again, it is advisable to wait 24 hours between coats. When clear dope is dry, sand all covered areas with 400 (dry) sandpaper, until all burrs are smooth and then coat the entire model with balsa fillercoat (3 coats) (Extra fillercoat may be applied to areas which are not filled). Sand with 320 (dry) until surface is free from all signs of wood grain and seams. Using Hobby Poxy "Stuff", fill all dents, nicks, and scratches. Then, sand entire model with 400 (dry) sandpaper until practically back to the clear dope.

Color dope was applied with a "Binks" air brush. The spraying process is slow but it cuts down on rubbing time as the spray is very fine. The airbrush applied a thin even coat of paint making for a lighter, smoother finish. The colors used were yellow, white, black and brown (camouflage tan). I do not believe in the use of clear dope over the color dope as it is hard to rub, hard to patch, and turns yellow from exposure to the sun.

Aero Gloss was used throughout. All external glue joints were made with Aero Gloss glue to prevent bleeding and all fillets were formed from Epoxilite applied to the base wood and sanded with 320 (wet) sandpaper to shape. Whatever kind of paint is used, it is important to use the same brand and type throughout the entire finishing process.

TRIMMING

The CG location is very important, but it is only an approximate check. Trimming should be accomplished by flying the aircraft and noting its characteristics. Following is a list of ills that are usually found in any new ship:

1. Nose heavy

Extremely stable, slow to respond (often heavy line tension)

2. Tail heavy

Unstable in level flight, overly quick response (often light line tension)

3. Too much wing tip weight (or inside flap too long)

Outside wing drops in bottom of square maneuvers (inside and outside). Line tension is good at top of maneuvers (45° point).

4. Not enough tip weight (or inside flap too short)

Line tension is poor at top of maneuvers (45° point). The inside wing seldom drops in any maneuver as it has more area than the outside wing. Since flap area has been engineered for this airplane, the length of the inside flap should not require alteration.

5. Elevator up with respect to level flap

Aircraft will fly nose high in level flight and tail high in inverted position. Also ship will turn better inside maneuvers than outside maneuvers.

6. Elevator down with respect to level flap

Aircraft will fly tail high in level flight and nose high in inverted position. Also ship will turn better outside maneuvers than inside maneuvers. Elevators can be bent by holding flaps at control horn and twisting one elevator side at a time (at control horn) in desired direction.

7. Not enough offset in engine and rudder

Low line tension in all maneuvers. Engine offset is far more effective than rudder offset.

8. Too much offset in engine and rudder

Excessive line tension in level flight coupled with poor horizontal stability in square maneuvers.

9. Elevator twisted

Aircraft will have poor horizontal stability (tail wobble) in sharp corners.

10. Flaps twisted

Wing dips in bottom of inside square or triangle. Other wing dips (or no dip) in bottom of outside square maneuver. Also poor tension at 45° position of maneuver. (Note whether ship is upright or inverted when poor tension occurs.) If the outside wing drops in the bottom of inside squares and poor tension is noted with aircraft inverted (or receiving down elevator) at the 45° position, twist flaps (at control horn) so that inside flap is up with respect to outside flap. A little twist will produce large results, so go easy.

The problem of a warped wing has not been brought up here as there is no good solution to this problem as far as I am concerned. If the wing is warped, scrap it and start over again. It will save you a lot of work and misery in the long run. A good way to prevent warps is to build the wing on a jig.

FLYING

The Bellanca has been flown on 65 foot lines but should operate equally well on 60 foot to 70 foot lines. The new Rev Up 10-6 EW provides a nice slow constant speed with plenty of pull through maneuvers.

Playing the wind properly can make any stunt ship perform better. Following is a list of approximate positions for a uniform line tension and constant speed throughout maneuvers. (This pertains to counter-clockwise flyers only).

1. Inside loops, inside squares and triangles: 15° left of downwind.
2. Outside loops, outside squares: 15° right of downwind.
3. Horizontal round and square eights: inside loop 15° right of downwind; outside loop 15° left of downwind, and intersection downwind.
4. Vertical eights and hour glass: anywhere from straight downwind to 15° right of downwind (according to the airplane).
5. Cloverleaf: first and fourth loop 15° right of downwind, second and third loops 15° left of downwind and vertical intersection point downwind.
6. Wingover and overhead eight: start maneuver directly upwind and complete maneuver directly downwind.

The amount of deviation from downwind can vary with the intensity of the wind and the specific aircraft involved but 15° is a good place to start.

Although I am sure that the appearance and maneuverability of the Bellanca will not be displeasing to the judge's eye, the ship was designed to please the handling and appearance qualifications of that all important man: the pilot and owner. ■