

# \*\*\* CESSNA 310 \*\*\*

By D. G. PRENTICE . . . Nothing can match the sound of a twin in flight. This one offers scale appearance with high performance and no handling problems with one engine out. Economical, too . . . uses two .19's.

• The sound of a twin-engined model on the flight line usually brings all other activity to a standstill. Too few modelers make the effort to build a twin. This is understandable when one considers the extra effort involved, the extra cost, the size of the model, and the additional hazards of flight.

It is not possible to eliminate the extra problems involved in a twin, but with forethought and a little ingenuity, they can be reduced. The design presented in this article attempts to reduce the problems and still have a presentable model, i.e., a real miniature aircraft.

To reduce the number of problems, several design factors are to be noted. The model weighs just under 5 lbs., which is very light for a scale model with two engines and retracts. The fuselage top and bottom is planked with light weight balsa (this is almost a lost art). The wing is sheeted with 1/16 balsa, and wherever possible, the lightest balsa is used. All blocks are hollowed out to the minimum practical thickness. The fuselage is coated with 1/2 oz. fiberglass cloth and resin. Excess resin is removed by rolling a roll of toilet paper over the finish before the resin hardens. This soaks up the excess resin, and the outer layers of the roll are removed as they become soaked with the resin.

The fuselage width was reduced considerably to get the engines closer to the center line. The nacelles are placed as close to the fuselage as an adequate sized prop will allow.

The rudder has maximum throw to take care of any engine-out problems. The most dependable engines I could find were used. The engines were Webra .20's, but any good .19's could be used.

As a result of the above precautions in design and construction, the model flies as well as any single-engined scale model. On two occasions, landings were made with an engine out. No problems were encountered until we started to taxi. The model will not taxi in the grass on one engine, but chases its tail. The Violet retracts using a fifth servo have presented no problems, and their ease of throw adjustment made their installation simple. The wingspan of 52 inches makes the model easy to pack, and the small engines keep the fuel bill to a reasonable level.

As this is not a beginner's model, only the highlights of the construction will be discussed. Most experienced modelers have their own pet construction preferences and usually choose to go their own way on the smaller details.

## WING

The wing is normally the most disliked part of a model to construct, so

let's do them first. The wing is built on two half building boards propped up to the required dihedral. The ribs and spars are assembled in egg crate fashion, so assemble the spars first. This will allow the clamping of the spar doublers to the spars to ensure a strong wing joint. Lay the lower leading edge sheet balsa on the boards and place the front spar on them. Before fastening the spar to the board, glue it to the back edge of the front lower sheet. Pin this spar down securely. By placing it on the top of the lower leading edge sheeting at this stage, the lower front of the wing can be covered before removing the whole assembly from the board. Install the center rib temporarily and the two outer ribs so as to locate the rear spar. Raise the rear spar off the board with small blocks. Fit the other ribs in place temporarily and pin the rear spar in place. Now install the lower rear 3-inch sheeting in place. Prop up to get a straight trailing edge, and glue the whole assembly in place. Install the aileron end ribs and the hinge blocks. The idea is to cover the top and bottom of the leading and trailing edges before the wing is removed from the board. The ply nacelle sides should be installed before the wing is removed from the board, in addition to the firewalls. The metal motor mounts and the engine can be installed before the wing gets off the board.

The ailerons are cut out after the wing is removed from the board. The front of the aileron ribs is cut away at an angle and the balsa aileron leading edge is installed.

At this point, it is a good idea to install the servos, retracts, throttle connections, etc., and ensure that all is working with no binding. With everything working correctly, finish the covering of the wings and nacelles.

The hatches for the fuel tanks are located under the nacelles and are held in place with small screws. The inside of the nacelles is fiberglassed to ensure that the firewalls will not come off. The cowlings are built up of balsa, or may be made using the fiberglass routine. The engines are on their side to keep the carburetors level with the fuel tanks. This also gets the mufflers under the model.

## FUSELAGE

The fuselage sides and bulkheads lock together by means of the 1/8 x 1/4 strips of balsa attached to the bulkheads and the slots in the fuselage sides. The top and bottom of the fuselage is planked.

The inside is given a coat of resin to keep the planking from sagging between the bulkheads. As the nose gear is installed

at an angle, it must be installed before the upper and lower covering is added.

The tail assembly is installed before the lower covering is added, as the pushrods are inside the model. Make them right, as you will not see them again . . . one hopes. The windows are painted on to avoid reducing the strength of the fuselage.

## RADIO

The radio must be installed as far forward as possible. A compartment for the batteries can be made above the retracted nose wheel. Should additional weight be required to get the C.G. correct, add it in the area in front of the nose wheel. The original had to have 4 oz. added. To do this, a square opening was cut under the nose, weight and foam added, and the cut out portion was glued back in place. A cover is made to go over the servos in the wing. This ensures that the leads, etc. from the servos in the fuselage do not jam the wing servos.

## FLYING

The engines must be run until they are thoroughly reliable. To sync the engines, set up one at peak rpm, then back off a little on the needle valve. Start the second engine and adjust it until sync is reached. You will know it, as it is one sweet sound. Don't worry about sync at idle or low rpm. You may also note that your installation has a sympathetic vibration point or excessive vibration at one particular rpm. If so, stay off this speed and pass through it quickly. No problems have been encountered in flying this model. The tip tanks and small amount of washout provide the confidence necessary to make long low approaches during landings. Happy Landings.



The author and his sweet-sounding bird. Colorful model is a real eye catcher.