



● The Joy Stick is the first of an entirely new breed of Half-A airplanes. Many months have been spent on the part of a number of individuals testing the basic design, modifications to the basic configuration, as well as improving its building and flying characteristics. A great many prototypes have been built and virtually hundreds of flights logged on each before submitting the design for publication in R/C Modeler Magazine. In addition, RCM's Editor, Don Dewey, Technical Art Editor, Dick Kidd, and racing columnist, Don Dombrowski, flew one of the prototypes shown in the photographs as well as building another from scratch in order to check the ease of construction, building time, and parts fit. The Half-A Joy Stick, as I have christened it, also fits all AMA Sport Pylon Rules and comes complete with a good tricycle gear set-up which makes it ground handle and land very easily even for the novice.

However, the prototypes shown in the photographs utilize a Cox Tee Dee .049 and

.051 with the control surfaces set for a tremendous amount of throw. With this particular set-up, the Joy Stick is definitely **not** recommended for the novice flyer. Here in Albuquerque, at an altitude of approximately 6,000 feet the .049 powered Joy Stick can easily keep up with a .60 powered Senior Falcon in speed and, at the 1,000 foot level at RCM's flying field, the aircraft flies at approximately 65 mph and can leave many higher powered models in its exhaust trail. Yet, its size is somewhat deceptive with a 38½" wing span, fully symmetrical airfoil, and all-up wing area of 266 square inches. You might be tempted to power it with a .09 or .10 engine — **don't!** The added weight of the engine decreases from the flight capabilities of the Joy Stick and the .049 or .051 engine gives the Joy Stick power to spare. In fact, with a good T.D. .051 it can rank with the best Half-A pylon racers.

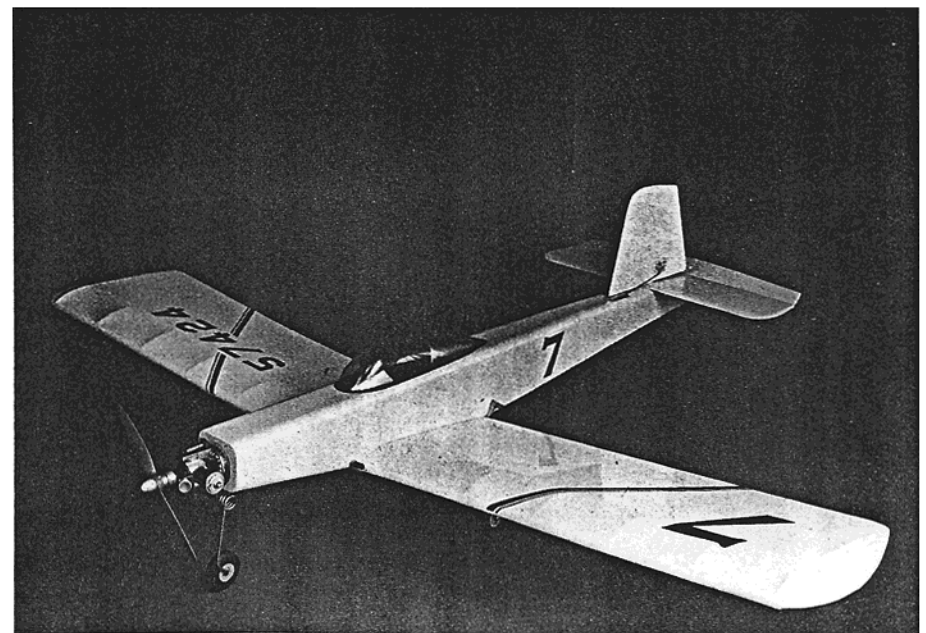
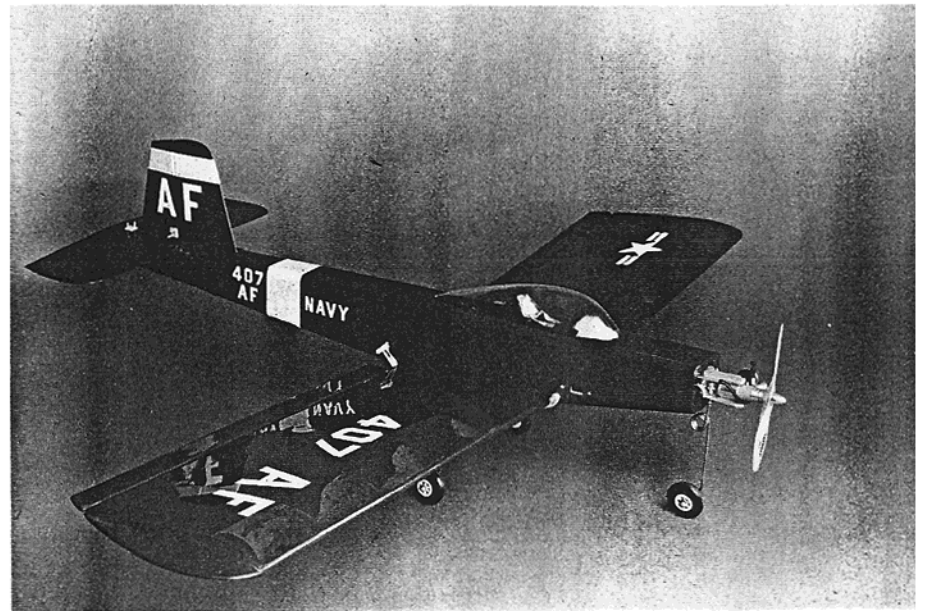
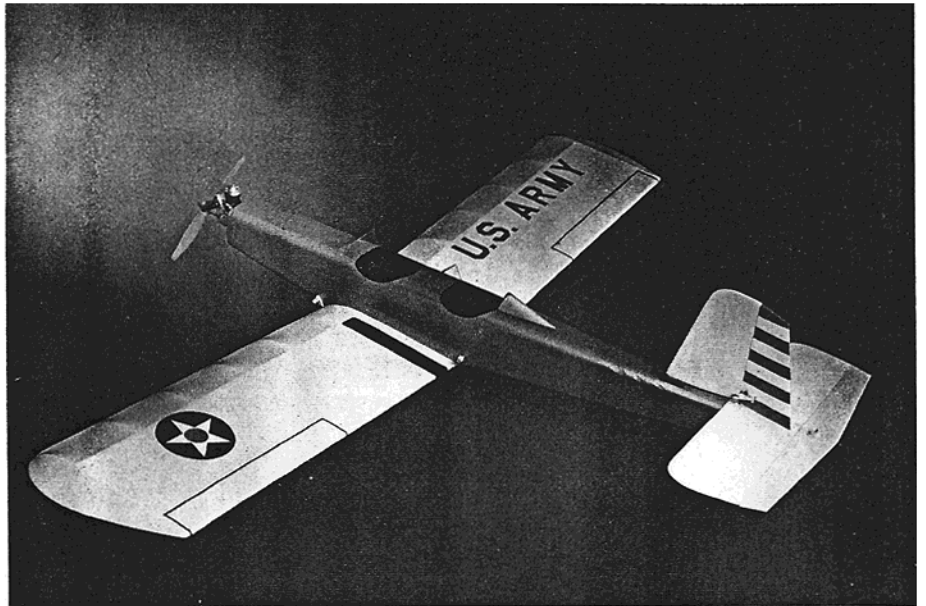
With a more docile engine, such as a Cox QZ and minimum throws on the rudder and elevator, the Joy Stick can be handled by the

novice. The aircraft has been designed, however, to withstand any G-forces that you can put upon it. As an example, at a flight speed of approximately 60 to 65 mph the plane can be dived under full power from an altitude of 1,000 feet or more and then pulled straight up into vertical snap rolls without any undue stress on the airframe. With a one or two ounce tank installed, giving a Tee Dee engine a flight time of 8 to 13 minutes, you will find that this model will perform consecutive vertical eights, or outside loops as long as you are inclined to do them; do consecutive loops from inverted flight; roll; and fly inverted as long as you care to keep it that way. The take-off run is extremely short while the power off glide is slow and flat and the landings are as easy as you'd care to have them. While several prototypes were built with ailerons and with dihedral ranging from half of that shown on the plans to no dihedral at all, the difference was not that great as from the rudder and elevator only configuration. The roll mode was definitely

When you fly this Half-A machine designed by Noel Rozelle, you'll know why we used the type face below. Photos by Taylor Collins.

JOY STICK

The photos show three versions of the versatile Joy Stick. The prototype at the bottom, with a hot T.D. .051 and maximum throws were flown by RCM's resident Polish racing expert, Don Dombrowski, whose only comment was "Sunnava - - - !" Don Dewey yelled "I ain't got it," fourteen times during one flight; Dick Kidd claimed the sun got in his eyes after doing four snap rolls while trying to turn left; while Carl Maas of RS Systems just sat on the ground and sucked his thumb after his turn at the stick.



JOY STICK

Designed By: Noel L. Rozelle

TYPE AIRCRAFT

Hairy Machine

WINGSPAN

38½ Inches

WING CHORD

6¾ Inches

TOTAL WING AREA

266 Square Inches

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

2½ Inches

O.A. FUSELAGE LENGTH

28¼ Inches

RADIO COMPARTMENT AREA

(L) 9" X (W) 1¾" X (H) 2"

STABILIZER SPAN

12 Inches

STABILIZER CHORD (incl. elev.)

4¼ Inches (average)

STABILIZER AREA

49½ Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

4½ Inches

VERTICAL FIN WIDTH (incl. rudder)

4 Inches (average)

REC. ENGINE SIZE

.049-.051 Cubic Inch

FUEL TANK SIZE

2 Ounce

LANDING GEAR

Tricycle Gear

REC. NO. OF CHANNELS

2 (3 w/throttle)

CONTROL FUNCTIONS

Rudder, Elevator (Throttle Optional)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa and Ply

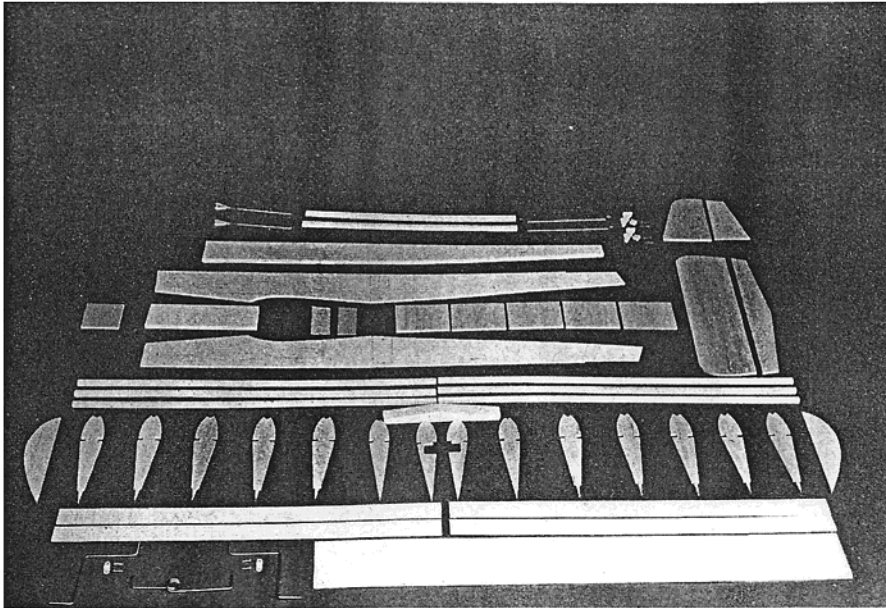
Wing Balsa and Hardwood

Empennage Balsa

Weight Ready-To-Fly 22 — 28 Ounces

Wing Loading 12.2 — 15.5 Oz./Sq. Ft.

It doesn't take long to cut out all of the parts needed for the Joy Stick. The fuselage is simplicity, itself. The sides are glued to the top block, two doublers and the firewall added, then the lower front block and rear sheeting. The wing is equally simple - - it's a light weight symmetrical section that can take all the air loads you want to put to it.



improved with ailerons but all other flying characteristics remained virtually the same. When you finish your Joy Stick and get it properly trimmed out, pull the stick down in the right hand corner and try to do only one snap roll! You can easily do 10 or 20, but you will find it's almost impossible to do just one! With maximum elevator throw, you will find that you can do **square** inside or outside loops very much like a stunt Ukie. And if all of this isn't enough, you will find that the Joy Stick is also capable of a few maneuvers that haven't even been included in the book as yet. With the speed the Tee Dee provides, it eats up sky as rapidly as a pattern ship, so be prepared!

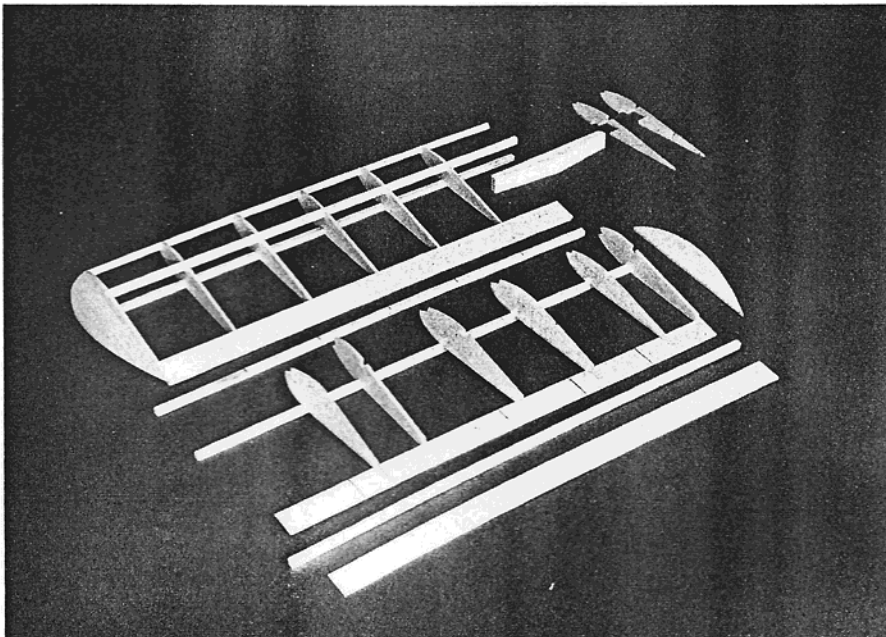
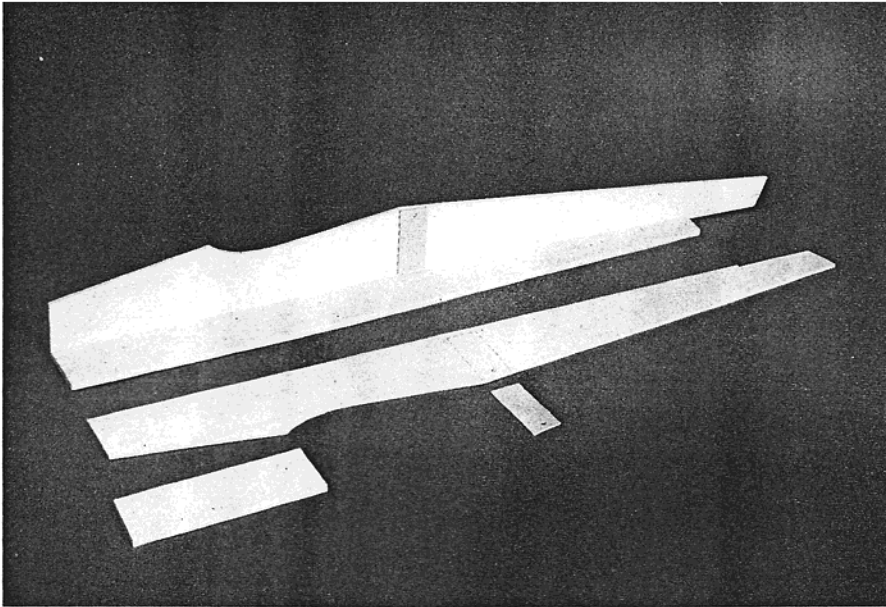
So, if you are interested in a small, lightweight aircraft that is economical on fuel, performs like the hottest fun-fly type ship, and will have the majority of hot shot fliers on the field waiting in line for a turn at the stick, this aircraft is for you. You'll find that the building time is approximately two leisurely evenings and will be one of the easiest aircraft you've ever built and yet one of the most durable due to the construction techniques and materials used.

Fuselage Construction:

To build the fuselage, cut both sides from 1/8" x 3" x 36" balsa sheet. Cut 1/8" from the front of the right fuselage side to provide the necessary engine offset and then mark the position of the plywood dowel doublers. Next, cut the top deck from a sheet of 1/4" x 2" x 36" balsa — there will be enough left over to make the 1/4" x 2" x 6" bottom nose sheet. Sand the offset angle on the top deck and bottom nose sheet simultaneously so that the angles will be the same. Glue and pin the top deck and bottom nose sheet **in between** the fuselage sides. This will assure an absolutely perfectly aligned fuselage. Now place this assembly aside and allow to dry.

Cut the rear dowel doublers from 1/16" plywood and the 2 1/4" x 2" firewall from 1/8" plywood. The only fuselage pieces left to cut out are the cross grain planks for the bottom of the fuselage. These can be cut from the 1/8" balsa left from cutting out the fuselage sides. Cut these approximately 2 1/2" wide since the excess will be trimmed after gluing in place.

Locate what you have built of the fuselage so far and glue the 1/16" plywood doublers in place. Next glue the cross grain



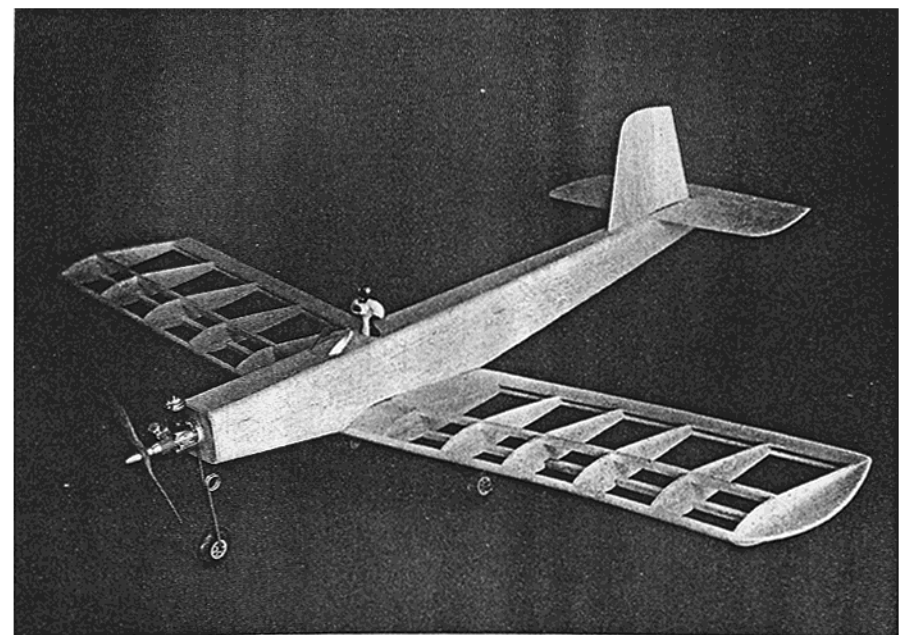
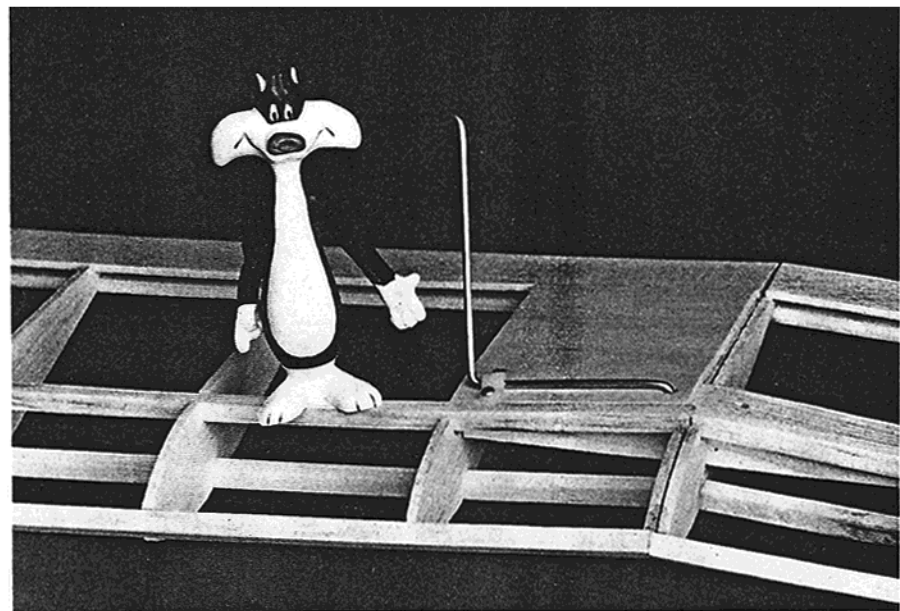
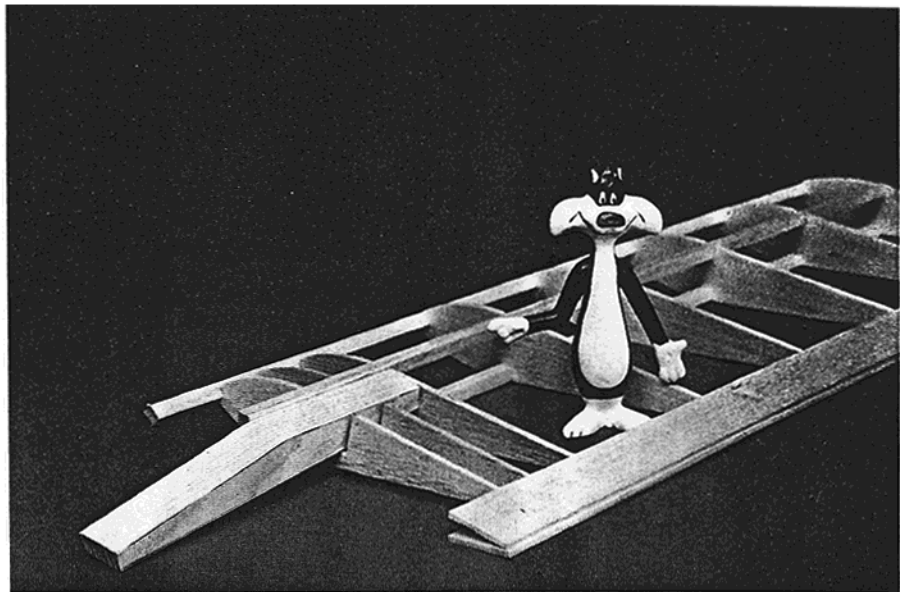
bottom planking on to the fuselage. All that is left now is to figure out which motor mount you are going to use, center it on the firewall, mark and drill the holes, place blind nuts on the back side and epoxy the firewall to the fuselage. After all is dry, sand the fuselage and round the corners to suit. Do not put the wing hold-down dowels in place as yet, as it makes covering more difficult.

Wing Construction:

Build the wing in two halves. Cut the spars and leading edge from 1/4" square balsa. Six of these will be needed, all 18" in length. Now cut the trailing edge pieces from 3/32" x 1" balsa sheet. Four will be needed, again all 18" in length. Mark all spars and trailing edges at 3" intervals for accurate rib spacing. Pin down a spar and a length of trailing edge to your building board, using a rib to check the spacing and alignment. Now glue and pin the ribs in place, all except the two center ribs, one from each wing panel. Glue and pin the top spar, leading edge and trailing edge in place, and allow to dry. Build the second wing half in the same manner and allow both halves to dry before taking the pins out and gluing the wing tips and gussets in place. When these are dry, sand the wing halves to the desired smoothness.

Next, cut the landing gear brace from 3/4" thick x 6" long pine or basswood and drill two 3/32" holes for your landing gear. The landing gear brace also forms the proper dihedral angle. When the wing is joined, some trimming of the top spars will be necessary for a proper fit. Also, the two center ribs will need to be cut to fit around the center brace.

Join the wing halves by gluing the center brace to either wing half on the lower spar, allowing 3/32" spacing for planking. Slide both center ribs onto the half of the wing with the brace attached and glue the lower spar of the second wing section to the center brace in the same manner. Next, slide the two center ribs into the center of the wing and glue the ribs, spars, trailing and leading edge, securely in place. Plank the center section with 3/32" balsa sheet and locate the holes for the landing gear. Sand the center section to desired smoothness prior to covering. Our prototypes used 3/16" washout in each wing tip, accomplished



The trunion block is also the dihedral brace and can be installed ahead of the main spar for the taildragger version, or as shown, for the trike gear. The completed framework of the Joy Stick shows how simple it is to build. Construction time, after cutting out the parts, is two hours, ready for covering.

when wing is Solarfilmed.

Empennage:

The entire tail section is cut from 1/8" balsa sheet. Sand all parts and bevel as shown on the plans if you are planning to use MonoKote or Solarfilm hinges. If you have never tried these hinges, they are very easy to make and add no weight or expense to your Joy Stick.

Finishing:

Iron-on coverings, such as MonoKote, Flite-Kote, or Solarfilm are recommended for best results. These coverings are light and easily repaired, should damage occur during training flights. I have found that it is easier to cover the fuselage separately from the empennage and then glue the tail in place after stripping the covering material from the areas to be glued. Glue the tail on as straight and square as possible. Poor workmanship will affect the performance of any models you build.

Drill holes for the wing dowels and glue the latter in place. After the wing is covered, secure the landing gear in place with nylon clips and screws and mount the wheels of your choice. The nose gear is sandwiched in between the motor mount and the firewall with 3/32" plywood spacer shown or a Tatone landing gear spacer is made to go behind Tatone's #21 Half-A motor mount. Finally, screw the motor mount in place and install the motor.

Cut a pushrod exit hole in the rear of the top deck for the rudder pushrod. The elevator pushrod exits the open rear end of the fuselage. Position your radio gear in place and check for balance, then secure the servos with servo rails or servo tape. The prototype Joy Sticks have used various radios with a Futaba used in the prototypes shown in the photographs. The completed Joy Stick weighs approximately 22 to 30 ounces and flies with two, three, or even four channels if you can pack them in - - - even at our mile high altitude in Albuquerque. The recommended prop size is a Cox Gray 6/4 propeller.

Flying:

The Joy Stick makes an excellent, inexpensive trainer if set up with a docile .049 engine and minimum control throws. However, with a hot Tee Dee .049 or .051, as previously mentioned, it will do a lot of maneuvers you wouldn't expect from a Half-A airplane, such as consecutive loops from level inverted flight and as many spins or snap rolls as you care to do. If you should get carried away with the spins and stack it in, as I have, you'll be glad to know the Joy Stick was built from the ground up with this in mind. The wing is of control line combat design and that speaks for itself, because they have to take a lot of hard knocks. The fuselage is just as tough because I don't like to walk over to a model after a bad landing, or what should have been an easy crash, and find nothing left that is repairable. It's going to happen sooner or later, so when it does you'll be glad you built the Joy Stick.

So, if you want to be among the first to build one of these new breed of Half-A airplanes, order a set of plans from RCM's Plan Service, and start building. Currently, plans are being made to have the Joy Stick kitted by Mile High Models of Albuquerque, New Mexico. Either way, plan or kit, you're going to be surprised at the ease of construction, durability, and outstanding performance that you would never expect from a Half-A model. □

**By H.E
RCModeler
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