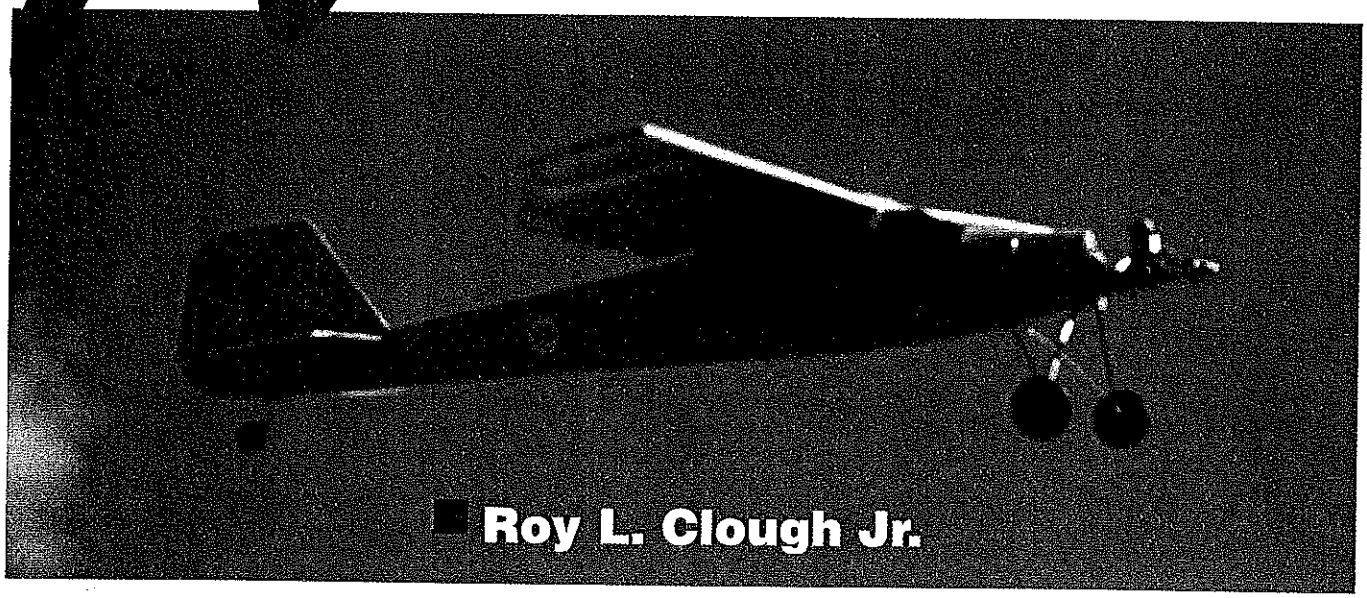
A TRAIN



■ Roy L. Clough Jr.

Learning to use ailerons? Bank on this model to keep you on track

If you are a rudder-and-elevator hotshot who is looking for new places to go, take the A Train!

A is for ailerons; *Train* is for trainer. You get elevators, ailerons and throttle. Coupling the ailerons to a steerable tail wheel gives you control on the ground. The throttle makes you the boss over takeoffs, power in the air, and landing where you want to.

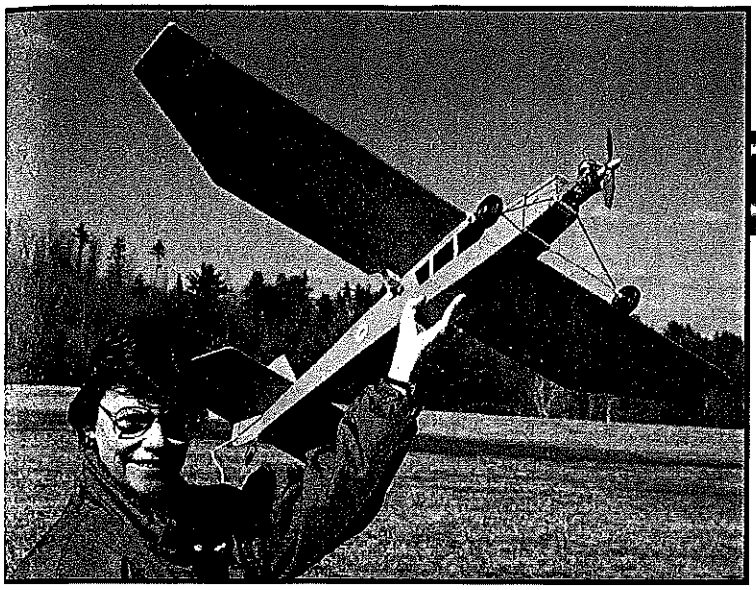
A Train assumes a healthy modicum of rudder-elevator experience and familiarity with orientation; that is, knowing how a model looks in the air, coming and going. It is not intended to be a raw beginner's model; its design aim is to introduce aileron control. Ailerons *must* be used—there isn't a rudder.

Newcomers to aileron-and-elevator models sometimes get into trouble at low speed when the drag and disturbed airflow over a deflected aileron results in wingtip stalling. This can cause a snap-roll on takeoff or wallowing into a spin from a slow landing approach.

A Train pretty much gets around this problem. The ailerons have been moved inboard, leaving the low-drag wingtips free of stall-inducing clutter. Despite this somewhat-unusual aileron position, control is positive. Several of my fellow Winnipesaukee Radio Controllers who have wrung out the A Train agree that its turns seem very well coordinated, without appreciable yaw despite lack of rudder input.

Design objectives have been pretty well met. Lean and rangy lines, with the engine out on the end of a long nose, spread inertial moments and smooth out control response. With no dihedral, this results in largely neutral stability—the airplane tends to stay where

Photos by Carol Chamberlin-Clough Graphic Design by Carla Kunz



ı inboard aileron position is unusual, but is intended to leave A Train's gtips free to operate in "clean" air.

ı put it. That's exactly what you want from a trainer—if you want ɔ do something, you have to *make* it do something.

The model was purposely designed with a dash of nostalgia for old-time cabin gas model look (they used to put the wheels right front, to protect hand-carved props and expensive engines).

A Train gets you into tail-dragger technique, in case you haven't ɛady been there. Learn two-wheeling early on and you'll be able ıandle anything on the ground. There is no rudder but there is a ıund-adjustable rudder tab. All model airplanes tend to ımulate minor surface deflections that affect tracking to some ɣree. If alternate slow and fast overhead passes reveal a bit of bbing, like a hound dog running down the road, tweak the tab to ke the model beeline it.

CONSTRUCTION

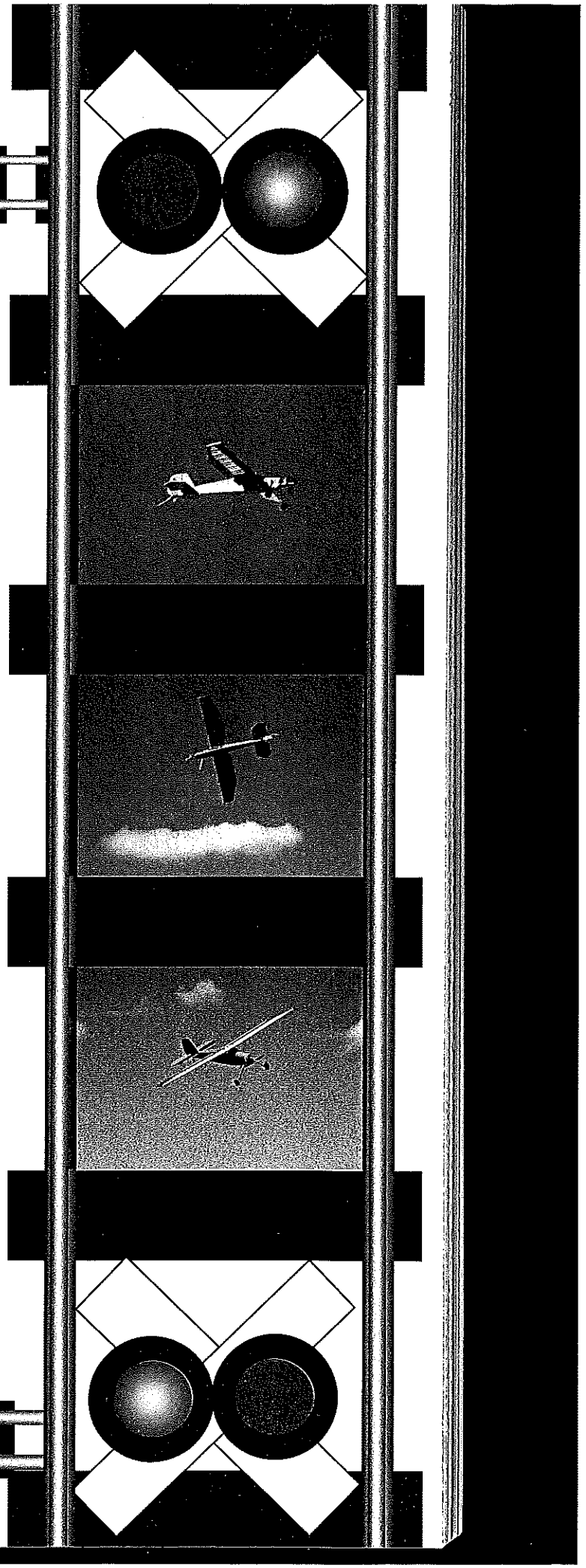
A Train uses a great little engine that seems to have been largely ɛrlooked by other designers. The Medallion .09 is easy starting, ıtweight, and powerful. Its cylinder-sleeve exhaust restrictor ·vides reliable throttle control with quick recovery to full power ɛr long periods of idling. I suspect that this is because back ssure keeps the glow element hot. (Larry Renger tells me that ; is a reasonable notion.)

On the other hand, anybody who has his heart set on the Tee Dee ɔ .09 (which comes with a "big engine" muffler and adjustable- ed carburetor) can use it. After several of the guys in the club put question to me, I swapped engines in a matter of ten minutes. ɛ Tee Dee is a little heavier and more powerful, but balance is ily maintained with a nudge of the Velcro-mounted battery.

I chose the Cox Cobra 3 radio system. Servo reversing makes ' kind of installation simple. The transmitter has an "ergonomic" e that is not only attractive but comfortable to hold. It has a novel mb-lever throttle control in just the right place to feel natural, but re isn't a trim for the throttle. This makes the difference between ' *idle* and *off* a bit chancy.

Larry Renger passed along a clever trick that makes low-end ɔttle control easy: Glue a chunk of foam to contact the throttle ɛr at idle. This gives a tactile cue to the idle position. To stop the ɡine, simply squeeze the lever to compress the foam for shutoff.

The fuel tank is a transparent 35mm film container. I've used se containers in various small models and have never had a



ker, despite the friction-fit covers. Polaroid color negative film is ckaged in the container that I prefer.

The film containers make great tanks, but there is no room for linary clunks and fittings. No problem; fittings aren't needed. icone fuel line squeezed through undersized drilled holes won't k. Cut a long taper on the end of the tubing to poke through the e, then pull it into place. Use the same method to pull the fuel feed e through the one-inch length of thick-wall brass tubing that serves the clunk.

I wanted A Train to have ground steering, despite the absence of a lder control (to which the tailwheel is usually connected). There s no problem in getting the aileron servo to work the tail wheel; trick was to devise a quick disconnect so the wing could be ber-banded for crash protection and easily removed for transport.

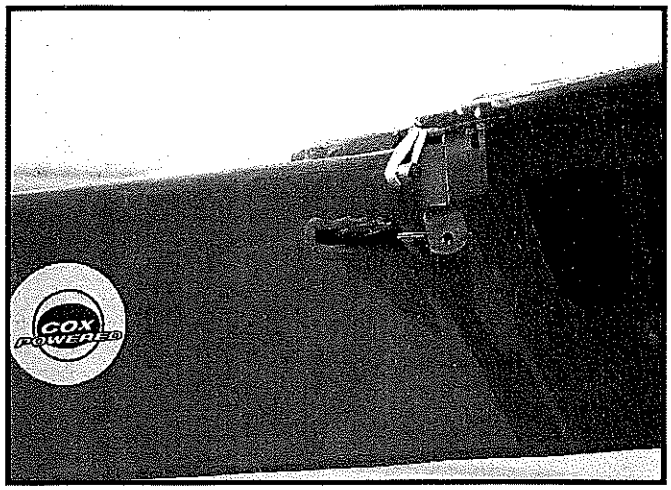
ng: To my knowledge, the wing construction is a new way of ng about it. I've used it on several airplanes lately, with good ults. One of the best things is that it gets you out of fussily carving curved-and-notched wing ribs.

Before you start, look over the wing plan to fix the procedure in ır mind. Note that the standard 36-inch wood eliminates trimming ırs and sheeting to length.

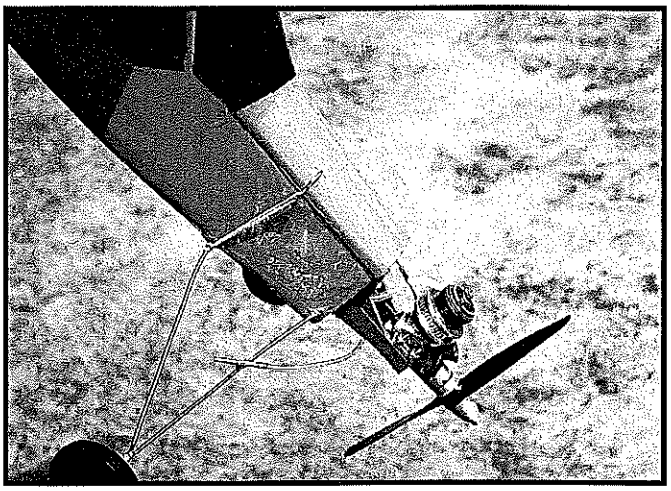
Start by cutting compression struts from hard 3/16 square balsa. t V notches in one end to mate with the diagonally positioned 3/16 ding edge. On a flat work surface glue to standard 3/16 x 1 trailing ge and 3/16 square leading edge. Add the wingtip outlines on each e. Note how the size and placement of the wing spars controls the vature of the sheet balsa upper leading edge sheeting. Allow the ırs to dry in place, and gently sand off the corners to profile the et balsa curvature.

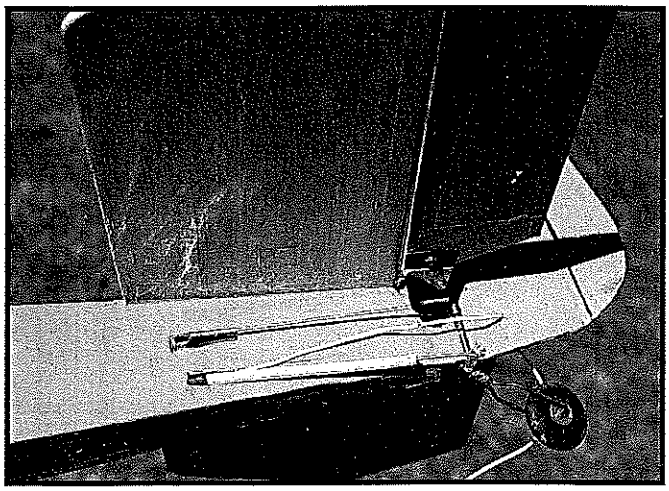
The 1/16 soft sheet balsa sheeting is put on the easy way. Bend it in ce over the spars, mark the width, and trim. When you know it l fit, dampen one side to promote a bit of curl and stick it to the ırs with cyanoacrylate (CyA) glue. Do not use water-based glue to k down the dampened sheet balsa—the wood might warp.

Now do the wingtips with spliced-on leading edges, trailing ges, and tapered spars. Sheet with more 1/16 balsa. When



Aileron quick-disconnect allows the wing to be rubber-banded in place for crash protection and transportation convenience.


Landing gear is designed to separate from the fuselage in the event of a hard landing. Engine is a Cox Medallion .09.


Steerable tail wheel is linked to the aileron servo. Cox Cobra three-channel radio was used on the original A Train.

A TRAIN

Type: RC Sport/Trainer

Wingspan: 47¾ inches

Engine: Cox Medallion .09

Functions: Throttle, elevator, ailerons

Construction: Built-up

Covering/finish: Iron-on film

·ything is solid, glue the triangular ribs
ussets to the main spar and compression
ts and cover the center section, top and
om, with 1/16 sheet back to the trailing
e.

The ailerons are hinged with ordinary
zer tape. Leave a 1/8 gap doing the first
so that when you tape the second side
can squeeze the sticky faces together in
crack of the hinge. Tough and simple. If
doubt that these hinges will stay put,
ember the last time you tried to remove
king tape after it had been left in place
a week or two.

The wing is covered with any lightweight
-on material, up to but not over the
ge gap. Use separate pieces to cover the
rons.

elage and Tail Surfaces: These are
rly conventional and require little
lanation except to note the swing-open
deck. This provides easy access to
ron hookup (you won't need an aileron
nsion wire) and you get the satisfaction
illing the fuel tank by sight; less messy
waiting for it to signal "full" by spilling
out of the vent. A simple paper clip wire
k and a thin rubber band to the rear
ling gear leg holds the hatch down in
ht. Also note that the top fuselage has a
g stop and notches to make certain
ing can shift and lock up the ailerons in
ht. (Guess how I learned *that* one!)

The landing gear attachment is rather
—and practical. Crossbars are glued
CyA in slots in the firewall and the
ling gear fuselage support crossbar.
er with Tyvek before applying iron-on
. It's rugged, but it will tear off without
ing the fuselage.

The tail wheel is mounted in a simple
vel bearing of brass tubing soldered to a
h of tin-can metal. If you'd rather use a
mercial assembly, do so.

vos: Locating the servos as shown on the
makes them accessible with the wing
and is good for balance. Hold the servos
lace with "Goop." Get to know Goop—
a better servo mount than any amount of
dware, transmits little vibration, and
ps off fairly easily.

The wing-mounted aileron servo is set

into a cutout in the lower surface sheeting and held in place with a couple of gobs of Goop adhesive on its sides. Don't bother with the normal mounting lugs here.

The use of Cox servos is assumed. The radius of servo arm holes to the radius of elevator and aileron horn shown on the plan produces approximately the right amount of deflection for smooth and positive handling.

Aileron hookup should be quite clear from the plan sheet. After the wing is complete, add the tail wheel steering arm. I used 1/32 sheet brass and left it unpainted to show up better in the picture.

The elevator push-pull rod can be just about anything (I used a 3/16 dowel with lashed-on paper clip wire ends), the tail wheel control should be a sheathed plastic pushrod because both ends of the sheath must be glued in place for the semiflexible pushrod to operate properly. A simple bend in the screw-in wire end engages a hole in the aileron bracket when the wing is put on.

Flying: Be sure that the model balances 1¾-2 inches back from the leading edge when the airplane is supported on fingertips under the wing. This slight nose-heaviness is intentional and much easier to start with than a tail-heavy model. The balance point is easily altered by moving the battery back and forth along its Velcro hold-down strip. After you get some experience handling the A Train, move the battery pack back a little to liven up the maneuvers.

Universal advice to a flier with a "move-up" airplane is to have it test-hopped by an old salt. When he gets through fooling with the trims, you'll get at least get a level start.

Takeoffs are made with the engine wide open. Just remember that with the tail wheel connected to aileron control, you should hold the stick back a little to keep the tailwheel on the runway. Just let the airplane take off in three-point attitude.

The A Train has quite a wide speed range—from faster-than-you-might-expect to slower-than-you'd-think-it-would-stay-up. Use the throttle to get comfortable while you practice turning in both directions until you have a feel for the reaction produced by stick motions. When you start more advanced maneuvers, remember that altitude is the only friend you have. Begin with loops, then learn to roll out on top to make an Immelman turn. Note that with a high-wing airplane you will also have to use elevator correction as the model goes over.

Learn the difference of inverted flight "feel" with a flat-bottomed airfoil—a valuable insight if you build and fly high-wing Scale models.

A Train is not intended to be an advanced aerobatic model, but it will perform most common maneuvers with power to spare. The main thing is, it will teach you to *think ahead of your airplane.* ✈

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Full-Size Plans Available—see page 200