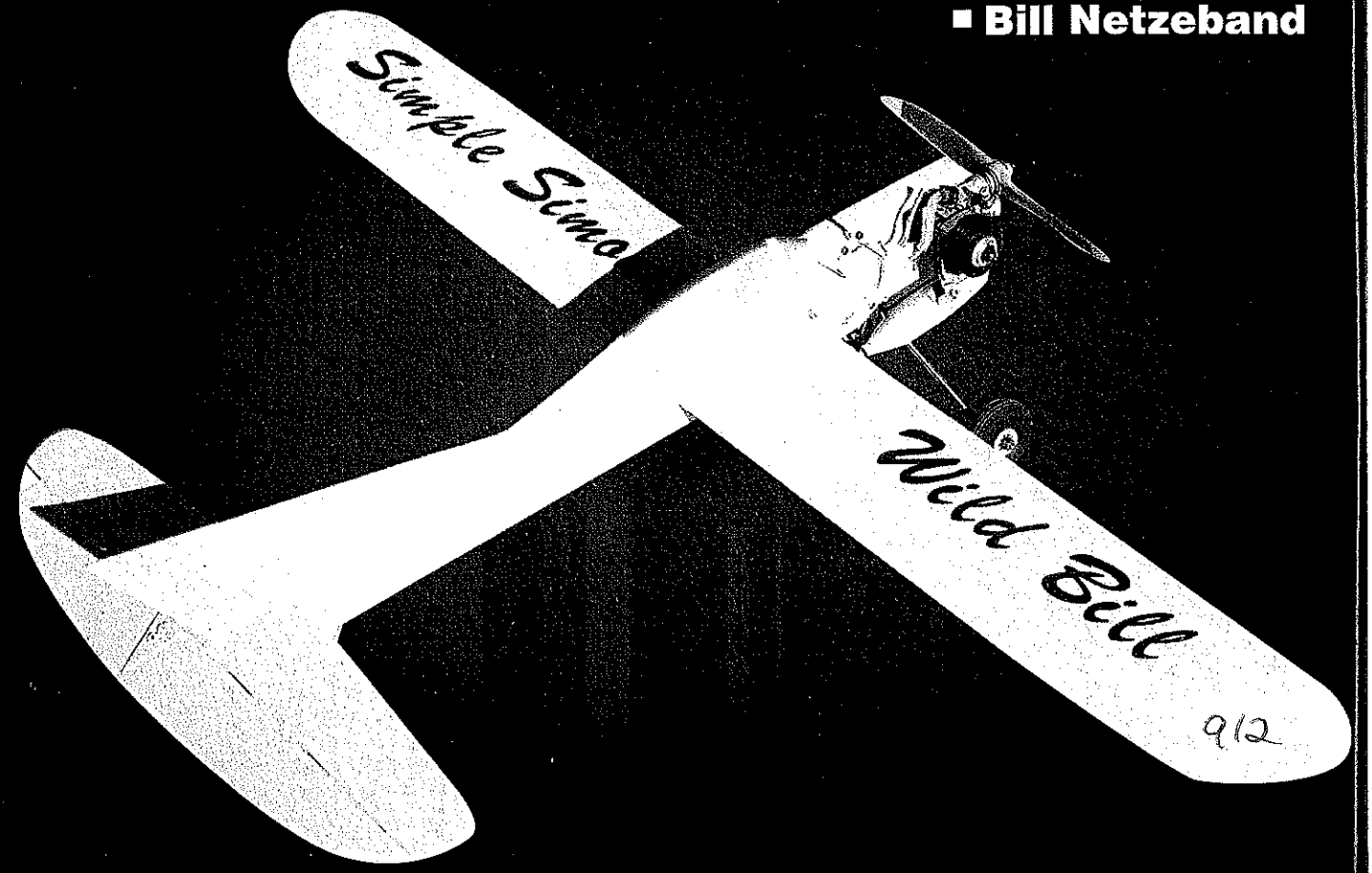
■ **Bill Netzeband**



The easy way to CL success

CONTROL LINE (CL) model aviation has been in operation for more than 60 years. However, it is clear that we need to introduce each new generation to it, to replace the growing number of mature fliers who drift away.

Most of the designs published recently are high-performance equipment that require experienced piloting.

Now there are multipurpose clubs, with members from all model-airplane interests. They are proving that we must exist together, rather than separately, in order to increase member numbers on a local basis to acquire and hold flying sites.

These clubs also maintain active training programs to assist beginners through the initial phase, in which the instructor can let the beginner handle the controls and prevent crashing until the novice gets a "feel."

Once the beginner solos, the airplanes must be capable of challenging him or her to become more proficient. The clubs need a good-looking CL training model.

How does one approach a CL design created to be capable of shrugging off the exaggerated control movements made by a beginner who doesn't yet

Photos by the author Graphic Design by Carla Kunz

have the feel for the controls and the peculiar operating environment of being in the center of the airplane's flight envelope while maintaining a modest five-second-plus lap time (dizziness factor), and has the ability to plow through blustery 15 mph winds without blowing out of the flight path?

Very carefully!

The airplane is scalelike, and has pretty shapes and a canopy, with fairly nice paint.

The geometry utilizes a high (9:1) aspect-ratio wing, with a flat-bottom, cambered section, a generous stabilizer, idealized stabilizer-elevator ratio, and a generous tail-moment arm to help all the parts go in the same direction at the same time.

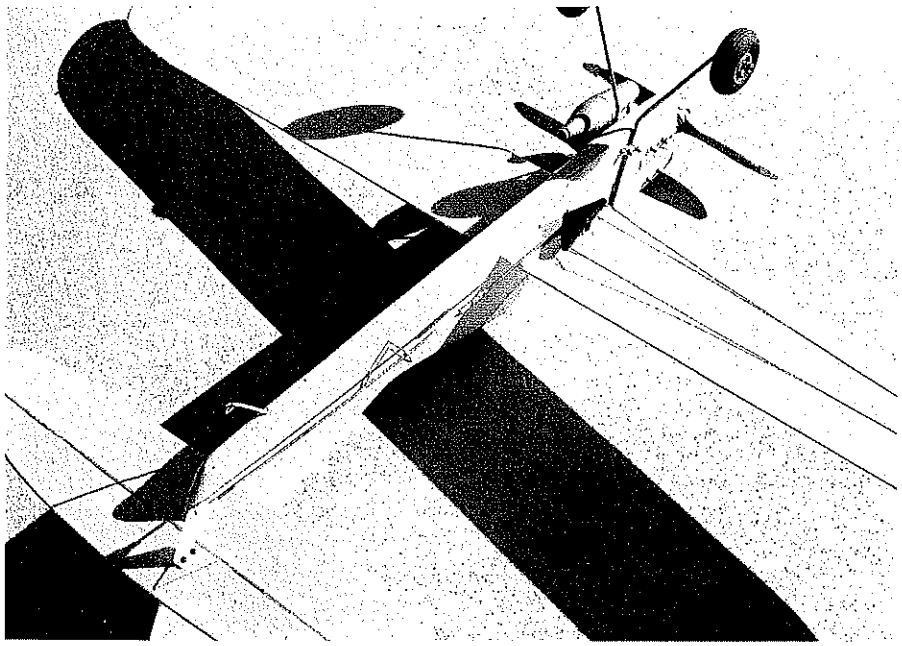
I originally designed and built Simple Simone in 1956. It provided my St. Louis MO club with a counterclockwise trainer, with the ability to increase performance.

The original was powered by a Fox .19, and had the J. Roberts throttle system added later. A second airplane was built around the new Fox .15. Both models put in a lot of air time and slow flying for Carrier practice.

A third machine was beefed up to use .36 engines, and did a very nice job of imitating the early Rat Racers. Simple Simone was published in the *1959 Air Trails Annual.*

In order to fly CL near Murrieta CA, we joined a Radio Control (RC) club—the Palomar RC Flyers—because they let us build a CL circle on their field. The main nuisance is a 98 decibels-at-nine-feet noise limit, but we have adapted.

The club works with several youth groups, and we decided to get the CL subgroup ready for youth too. Therefore, Simple Simone was built again.



You can easily see Simple Simone's easy-to-install and easy-to-adjust external controls. Keep everything neat and slop-free for the best results.

I made some structural changes, to include modern techniques and engines, and ran the aerodynamic characteristics data. The data proved that all of the original geometry features were okay.

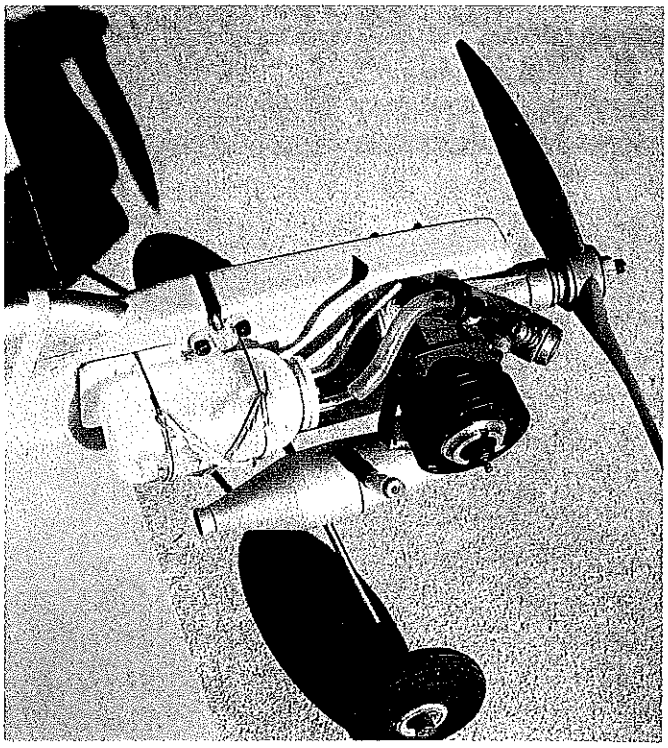
The plans show an O.S. .15 FP and muffler, because it is a good choice, and I have the drawings in my CAD (computer-aided design) system. This airplane is powered by an early Norvel .15, and it is a good match. This is an ideal home for some of those hot .15s that have been outperformed by something hotter.

CONSTRUCTION

Simple Simone wasn't intended to be a beginner's construction project. It requires some woodworking skills, and is happiest when assembled with good glue and alignment skills.

It is a neat idea to have the beginner present during construction, and gently get him or her on the right track with good building techniques.

I'll be brief about the details of construction, and offer a few helpful hints I have learned during these many



Notice the clunk-tank mounting and venting.

Type: CL basic trainer

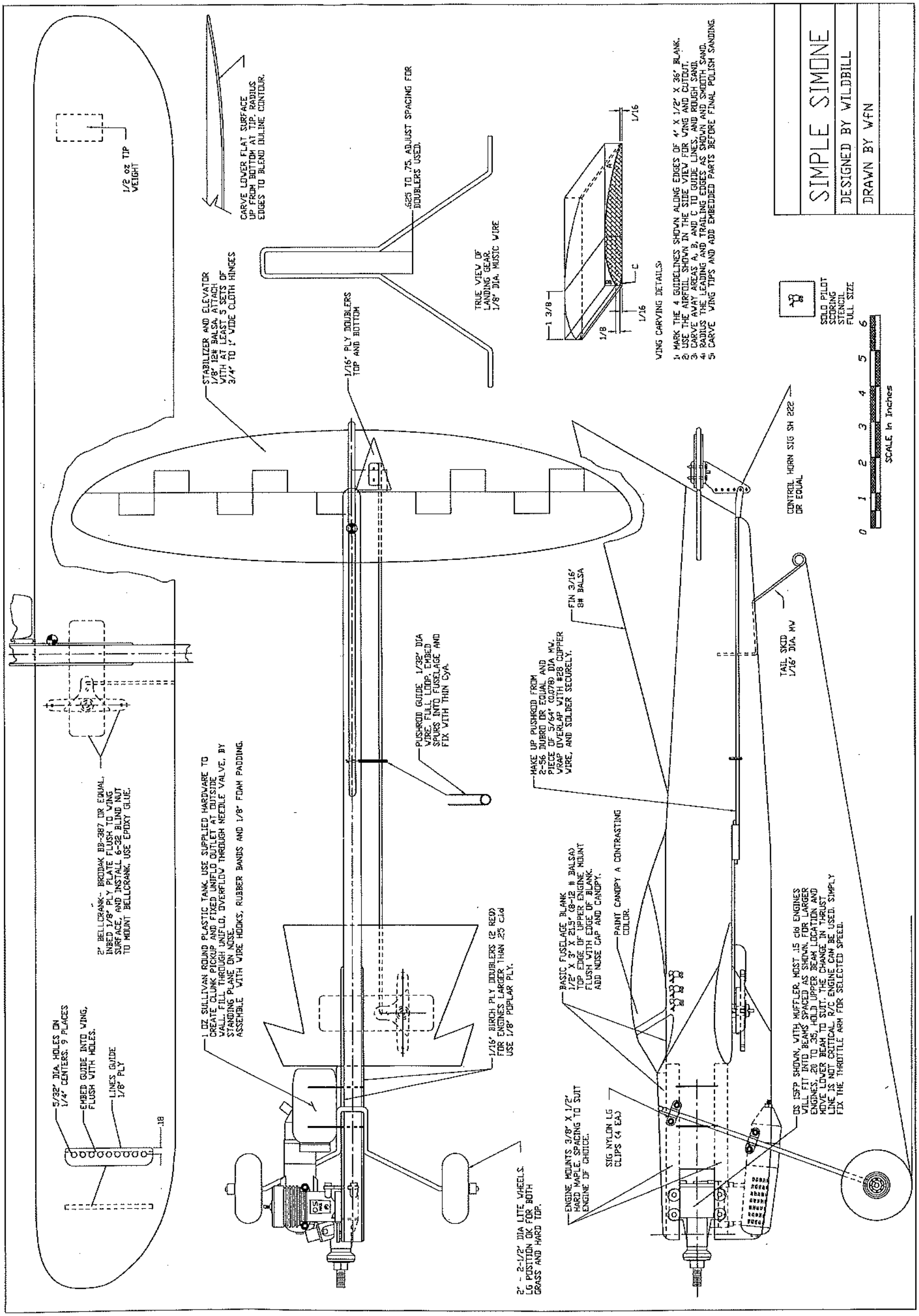
Wingspan: 36 inches

Power: Any good glow .15

Flying weight: 22 ounces

Construction: Sheet balsa

Covering/finish: Brodak dope


5/32" DIA. HOLES ON 1/4" CENTERS. 9 PLACES
EMBED GUIDE INTO WING, FLUSH WITH HOLES.
LINES GUIDE 1/8" PLY
.18
2" BELLCRANK- BRODAK BB-387 OR EQUAL. INBED 1/8" PLY PLATE FLUSH TO WING SURFACE, AND INSTALL 6-32 BLIND NUT TO MOUNT BELLCRANK. USE EPOXY GLUE.
1/2 oz TIP WEIGHT
1 OZ SULLIVAN ROUND PLASTIC TANK. USE SUPPLIED HARDWARE TO CREATE CLUNK PICKUP AND FIXED UNIFLO OUTLET AT OUTSIDE WALL. FILL THROUGH UNIFLO, OVERFLOW THROUGH NEEDLE VALVE, BY STANDING PLANE ON NOSE.
ASSEMBLE WITH WIRE HOOKS, RUBBER BANDS AND 1/8" FOAM PADDING.
STABILIZER AND ELEVATOR 1/8" 12# BALSA. ATTACH WITH AT LEAST 5 SETS OF 3/4" TO 1" WIDE CLOTH HINGES
CARVE LOWER FLAT SURFACE UP FROM BOTTOM AT TIP. RADIUS EDGES TO BLEND OULINE CONTOUR.
1/16" PLY DOUBLERS TOP AND BOTTOM
.625 TO .75. ADJUST SPACING FOR DOUBLERS USED.
PUSHROD GUIDE 1/32" DIA WIRE. FULL LOOP. EMBED SPURS INTO FUSELAGE AND FIX WITH THIN CyA.
TRUE VIEW OF LANDING GEAR. 1/8" DIA. MUSIC WIRE
1/16" BIRCH PLY DOUBLERS (2 REQ) FOR ENGINES LARGER THAN .25 c.i.d USE 1/8" POPLAR PLY.
2" - 2-1/2" DIA LITE WHEELS. LG POSITION OK FOR BOTH GRASS AND HARD TOP.
MAKE UP PUSHROD FROM 2-56 DUBRO OR EQUAL AND PIECE OF 5/64" (0.078) DIA MW. WRAP OVERLAP WITH #28 COPPER WIRE, AND SOLDER SECURELY.
FIN 3/16" 8# BALSA
1 3/8
1/8
1/16
C
1/16
WING CARVING DETAILS:
1: MARK THE 4 GUIDELINES SHOWN ALONG EDGES OF 4" X 1/2" X 36" BLANK.
2: USE THE AIRFOIL SHOWN IN THE SIDE VIEW FOR WING AND CUTOUT.
3: CARVE AWAY AREAS A, B, AND C TO GUIDE LINES, AND ROUGH SAND.
4: RADIUS THE LEADING AND TRAILING EDGES AS SHOWN AND SMOOTH SAND.
5: CARVE WING TIPS AND ADD EMBEDDED PARTS BEFORE FINAL POLISH SANDING.
ENGINE MOUNTS 3/8" X 1/2" HARD MAPLE. SPACING TO SUIT ENGINE OF CHOICE.
BASIC FUSELAGE BLANK 1/2" X 3" X 21.5" (8-12 # BALSA) TOP EDGE OF UPPER ENGINE MOUNT FLUSH WITH EDGE OF BLANK. ADD NOSE CAP AND CANOPY.
SIG NYLON LG CLIPS (4 EA.)
PAINT CANOPY A CONTRASTING COLOR.
OS 15FP SHOWN, WITH MUFFLER. MOST .15 cid ENGINES WILL FIT INTO BEAMS SPACED AS SHOWN. FOR LARGER ENGINES, .20 TO .35, HOLD UPPER BEAM LOCATION AND MOVE LOWER BEAM TO SUIT. THE CHANGE IN THRUST LINE IS NOT CRITICAL. R/C ENGINE CAN BE USED. SIMPLY FIX THE THROTTLE ARM FOR SELECTED SPEED.
TAIL SKID 1/16" DIA. MW
CONTROL HORN SIG SH 222 OR EQUAL
SOLO PILOT SCORING STENCIL FULL SIZE
0 1 2 3 4 5 6
SCALE In Inches
SIMPLE SIMONE
DESIGNED BY WILDBILL
DRAWN BY WfN

happy years of gluing things to other things.

I highly recommend using sanding blocks!

Materials: The wing and fuselage are made from 1/2-inch-thick, eight- to 12-pound-density lumber—3 x 36 for the fuselage and 4 x 36 for the wing.

The stabilizer and elevator use a piece of 1/8 x 2 x 36—preferably C grain. The fin is 3/16-inch thick, to allow it to survive being used as a handle.

The fuselage nose doublers are 1/16 birch plywood for engines as big as .25 cubic-inch displacement (cid) and 1/8 for engines larger than .25 cid.

The rest of the hardware is routine, except maybe for the use of a one-ounce Sullivan round, plastic clunk tank. I built this with a hard uniflow, filler and vent tube, with the supplied flexible clunk fuel pickup.

That allows you to stand the model on its nose and fill through the single vent to any volume you want, with venting through the needle valve. Quarter- and half-tank run times are more compatible with dual flights.

There are several aluminum-sheet profile landing gear on the market, and you are welcome to go this route. (Bending 1/8 music wire generates sour notes sometimes.)

The rest of the hardware is spelled out on the plans; you *have* looked at the plans, haven't you?

So far, any of the generous crop of 8 x 4 propellers have given good service, and they allow the use of mild fuels in the 10%-15% nitromethane range.

I highly recommend that you investigate the three-line throttle bellcrank system, currently manufactured by Brodak. Bob Smurthwaite invented the system in 1954, and it became the backbone of the CL Navy Carrier event.

After you purchase the bellcrank and handle, it should be easy to add a transfer crank through the nose fuselage to reverse and reduce the throttle-arm travel for stock RC engine systems. Three .012 lines can be as long as 60 feet with a good .25 RC engine.

While I'm on this page, electric/electronic/infrared remote-actuator systems are emerging in the modeling publications and are available for CL operation.

The throttle adds a huge dimension to the training program. I'd have drawn the pictures for you, but I am currently practicing publication miniaturization techniques. (Okay, I'm *lazy*.)

Fuselage: Engine-beam spacing is drawn for the O.S. .15 FP. Other .15s are generally wider across the crankcase. Hold the upper beam position, and draw a new position for the lower beam to match your engine.

Lately I have been sliding the wood underneath the plans, and punching as many pinholes around the outlines as are needed. It saves the plans, and is quite accurate.

Please note that you can saw into the wing's slot through the lower engine-beam slot. Do the fuselage blank first.

Tack-glue the upper engine bearer and 1/2-inch nose cap in place. Attach the canopy piece. Use the refined nose shape to cut the doublers. I radiused the edges of the doublers, leaving the nose edges fairly square. You can round the rear fuselage or not.

Assemble the plywood doublers and beam mounts with medium-curing epoxy, and press them tightly between flat surfaces during the cure. Solvent-release glues allow the nose surfaces to warp into unacceptable shapes.

Wing: The plans show a procedure to shape the airfoil accurately. After you complete the five steps, you can massage the mounting slot in the fuselage for a good fit with the real wing.

The bellcrank platform is embedded in the wing and uses blind nuts, just to keep things faired in. You can install the inset-lines guide and the embedded tip weight, and get the wing all smoothed up for assembly and painting.

The wing is an ideal candidate for plastic-covering practice. The fuselage and tail are easier to paint.

Stabilizer/Elevator: This is basically a slam dunk. I have had excellent results using Duco cement to attach the cloth hinges. It rubs through the tape readily, freezes quickly, sands well, and is

compatible with most of the dope and polyurethane finishes I have used.

However, it doesn't *taste* any better than the old cellulose cements, so you'll have to clean it off of your fingers.

I used a special pair of "glue jeans" to wipe my fingers on as a kid, and was blessed with a very patient mother. After continued use, the jeans would break across the thigh and were recycled as shorts. Oh, the construction ...

The edges of the stabilizer and elevator are shaped to a simple radius, all around, before hinging, and sand them smooth afterward.

Fin: There's nothing unusual here. Carve, sand, and glue it onto the fuselage, as straight as your pride will allow. The grain runs parallel to the outside edge of the fin.

Hardware: The landing gear-mounting holes, wire tank-mounting bracket holes, and engine-mounting holes are laid out before painting. I leave the main landing gear on the bench until after the airplane has been painted. The same procedure applies to the control hardware.

Preassemble all of the parts and make their mounting holes, then disassemble and paint the model. The pushrod length assembly and pushrod guide are basically the last items for permanent assembly.

Flight Trimming: There is no recommended center-of-gravity (CG) location. The effect of most built-in CGs is adjusted for with the controls and the lines guide. The prototype model's CG was located 1/2-inch aft of the leading edge.

The pushrod was plugged into the holes shown on the plans, and after a few flights the leadouts settled through the #3 and #5 holes in the guide.

The final adjustment was a three-inch lines spacing at the handle, and we had a beginner's tune wired in.

All of these items are determined by the interaction of the actual weight, the actual CG, the flight velocity, the actual lines' characteristics, and the actual handle-to-elevator travel ratio.

Simple Simone will do a respectable loop with more elevator action. Please resist the temptation to fly inverted; if you *can't* resist, give yourself the full height of the circle to recover.

Further performance enhancements come from more power.

You probably already have a training routine. My only caveat: keep the new pilot on dual control until he or she shows signs of correcting the flight path at the *right times*. See how many solo pilots you can paint on the side of your club's Simple Simone.

Have fun! MA

Bill Netzeband
23978 Via Pamilla
Murrieta CA 92562