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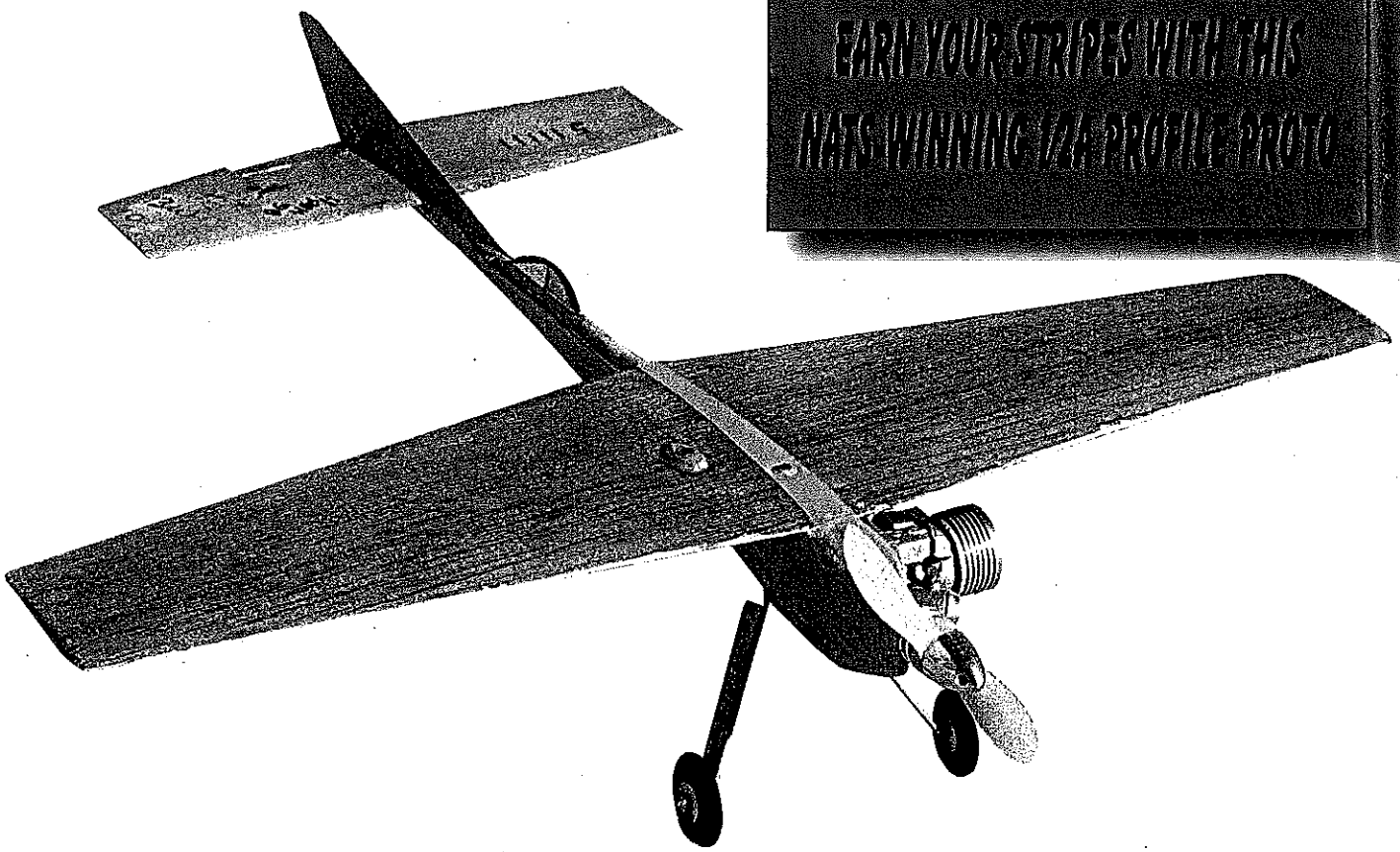
EARN YOUR STRIPES WITH THIS NATS-WINNING F2A PROFILE PROTO



LITTLE TIGER

Dave Hull

THIS IS A SIMPLE, multipurpose low-cost Profile Proto Speed model that is easy to construct and offers plenty of fun for kids and adults.

Profile Proto is an excellent entry level event for anyone who is interested in Control Line Speed flying. It's an exciting pastime that's bound to get your adrenaline flowing.

Little Tiger has had a good record at AMA Nationals, placing first in Junior in 1995 (and second in 1996); in Open class it placed third in 1995-6-7 and first in 1998.

With slight modifications, the model has served a couple of different purposes. It began as a trainer for my stepson, Jeff Macapinlac, in early 1995. Since then it has been primarily a contest model.

CONSTRUCTION

It is very important to make Proto Speed models as light as possible, for good acceleration at takeoff. My model weighs approximately seven ounces.

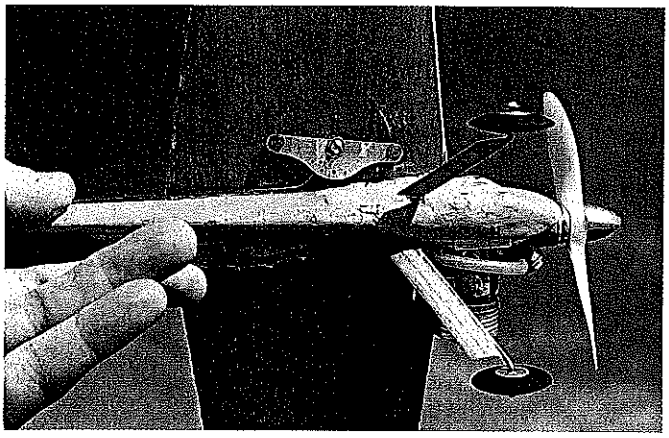
Empennage: Cut the stabilizer portion of the tail surfaces from firm ⅛ balsa sheet. Sand to a symmetrical airfoil, with rounded leading edges and sharp trailing edges. Connect the elevator to the stabilizer with Perfect brand cloth hinges and cyanoacrylate (CyA) glue, applied only to the nonmoving part of the hinges.

The rudder and wingtip control line guide can be cut from 1/32 birch plywood.

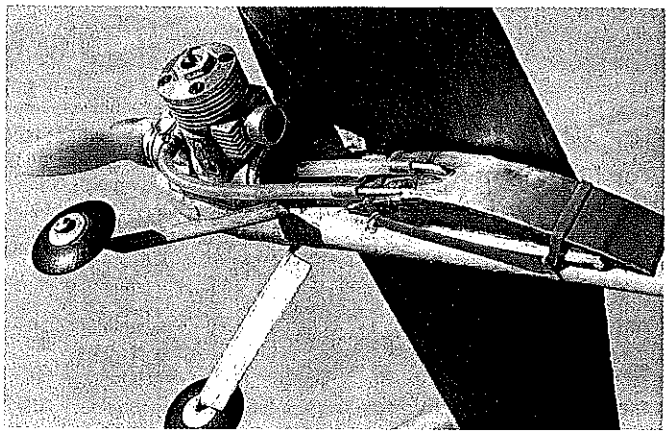
Fuselage: Use the hardest piece of ¼ x 2 x 12 balsa that you can find. The nose section of the beam-mount fuselage should have ¼ x 5/16 maple engine mounts sandwiched between two ⅛ birch plywood doublers, bonded with epoxy. The canopy is carved and shaped from a sheet of Plexiglas®.

The landing gear is formed from 1/16 steel wire and is securely attached to the fuselage with safety wire and epoxy. One-inch-diameter streamline wheels (from K&B or Glenn Lee) are held in place on the landing gear with small washers soldered in place.

Wing: The wing is made from a stiff and firm medium-hard piece of ¼ x 4 x 16 balsa that is carved and sanded to a



"Simple, exposed controls are required for Profile Proto," says the author. No binding or sloppiness allowed.



Pressure line goes to top of tank; fuel feed line comes from bottom. Keep nose up after filling to prevent flooding.

symmetrical airfoil (NACA 63-009). A slot is cut in the center of the wing for a ¼ square spruce spar four inches long that is used for the bellcrank anchor (bellcranks can be obtained from Ned Morris or Kustom Kraftsmanship).

The pushrod is made from .035 music wire. I made the control horn for the elevator from .015 tin.

Engine: Our airplane was fitted with a Cox Black Widow .049 engine for its training flights; a Cox Tee Dee was used for the first Proto Speed flights. When we got to the Nationals, a CS .049 engine was installed and was used for our winning Proto flights.

The fuselage plan shows mounting holes for a CS; other engines may use adapter plates for mounting. The plates are secured to the fuselage with 3-48 screws and blind nuts, using the CS holes. The Tee Dee and Black Widow engines are lighter than the CS, and must be mounted farther forward for proper center of gravity placement (within ⅛ inch of the wingtip leading edge).

Our CS engine is basically stock, with only a couple of modifications:

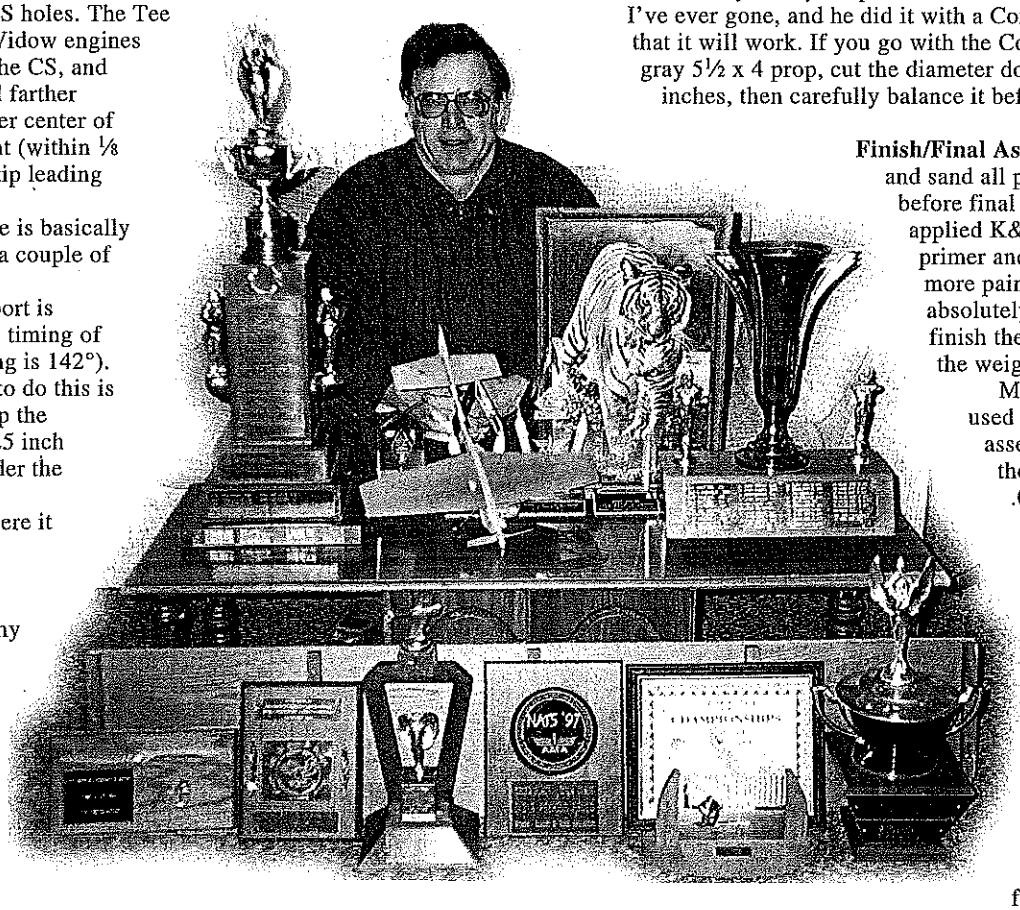
The exhaust port is raised to an open timing of 157° (stock timing is 142°). The easiest way to do this is to simply shim up the cylinder liner .025 inch with a gasket under the top flange of the cylinder liner where it seats into the crankcase.

The other modification to my engine was to install a hemi head (made by Jerry Rocha) that accepts Nelson glow plugs. The head is similar in design to ones made by Doug Galbreath and Walt Gifford (as specified in the November/December 1996 issue of *Speed Times*, publication of the North American Speed Society).

In my experience the stock CS head works well, but needs to be set up higher than the hemi. You may have to play with cylinder head gaskets to raise or lower the head, depending on weather conditions, in order to get optimum performance.

I use a crankcase pressure fuel system with an .010 pressure fitting that is tapped into the center of the engine backplate. For all-out racing, the fuel formula I use is 10% castor oil, 10% Klotz synthetic lubricant, 10% propylene oxide, and 70% nitromethane.

The propeller I used was a fiberglass 4⅜ x 4⅛ prop made by Mike Hazel. Other fliers, such as Al Stegens and Warren Kurth, have had good results with the gray Cox prop found in any hobby shop. In 1997 Kurth went as fast as I've ever gone, and he did it with a Cox prop, proving that it will work. If you go with the Cox prop, get the gray 5½ x 4 prop, cut the diameter down to 4⅜ inches, then carefully balance it before you run it.



Author and hardware. Little Tiger's 1998 Nats win occurred after photo was taken.

Finish/Final Assembly: Prime and sand all parts smooth before final assembly. I applied K&B Super Poxy primer and paint. Use no more paint than absolutely necessary to finish the job, and keep the weight down.

Medium CyA is used for final assembly. Make the fuel tank from .008 tinplate or brass shim stock and solder together. The tank is simply held in place by rubber bands attached to a couple of .035 wire hooks looped through the fuselage.

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Little Tiger/Hull

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Flying: Always keep safety in mind when preparing to fly. Give the airplane a thorough preflight check to ensure that all fuel lines, glue joints, screws, nuts and bolts, etc. are secure. You want kink-free flying lines, properly attached to free-and-easy working controls, with no binds in them.

To fill the fuel tank you disconnect the pressure line from the tank to vent it, and fill through the fuel line after disconnecting it from the needle valve assembly. After filling the tank, I like to keep the nose of the airplane pointed up until it's time to start the engine. This prevents fuel from leaking into the engine and flooding it. Stay clear of the prop, which is hard to see when the engine is running.

I prefer to fly this model clockwise around the circle, so engine torque will help keep the lines tight for takeoff. If you are flying counterclockwise, be prepared to step backward if necessary to maintain line tension and good control at the launch.

Your Little Tiger will accelerate quickly from the launch, and will be a fast, stable, exciting airplane to fly as it zings around the circle in the thrilling manner that only a high-performance Proto Speed model can give you. So have fun and enjoy it!

Editor's note: After the text was submitted, Dave Hull won the 1998 Nats with this model. His comments on the Nats win follow:

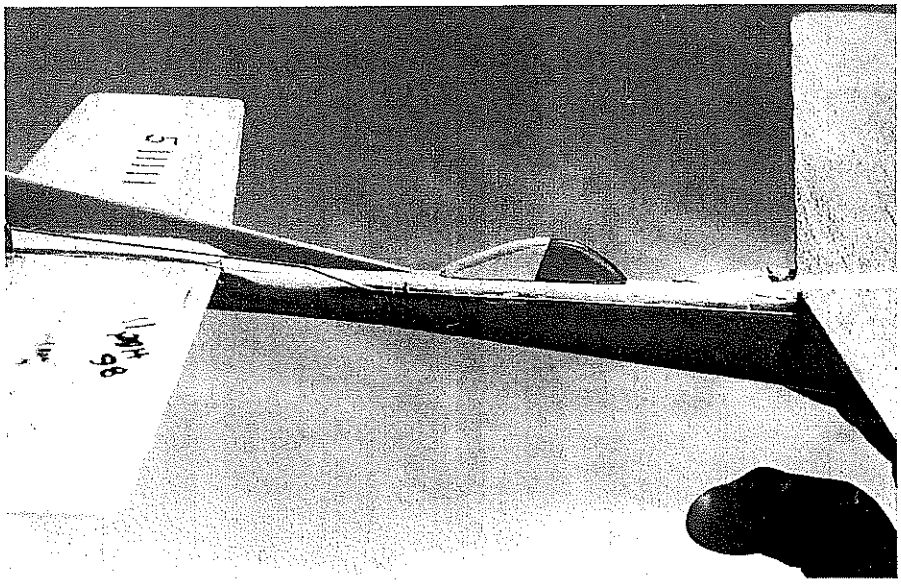
"The new best official speed is 109.98 mph for a standing-start Proto flight.

"Earlier, Al Stegens clocked the airplane at 120 mph flat for the top end, and 114.68 mph standing-start Proto time. It would have been a record had I not failed to get into the pylon in time. The rules require that you get into the pylon in 1½ laps, and the airplane surprised me by accelerating so fast from launch that it took me two laps to catch up with it before I could get in the pylon, so the flight was disallowed.

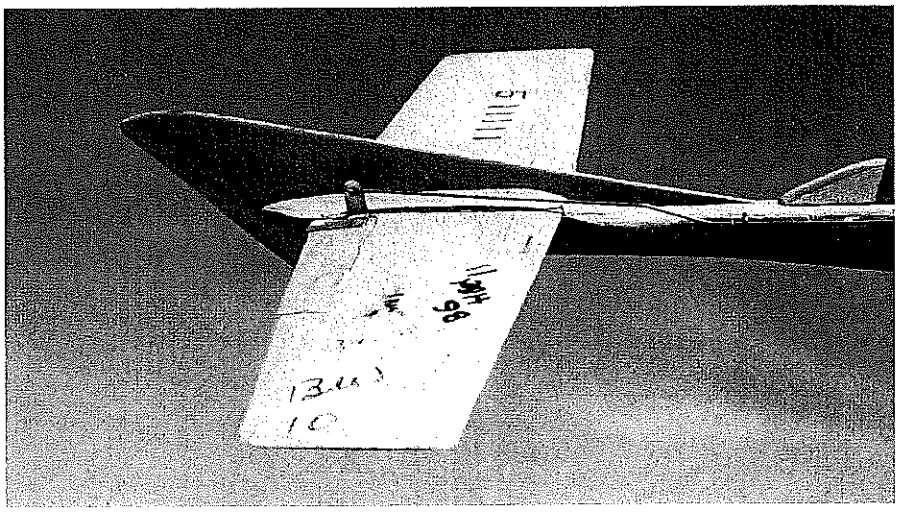
"The head clearance was set at .008 on the winning flight and on the unofficial 114 mph flight.

"I dropped the oil content in the fuel from 20% to 14% for these two fast flights. Afterward I noticed the engine had lost some compression, so this was inadequate lubrication, and I wouldn't recommend that anyone else try it, unless they want to wear out their engine in three or four runs.

"In the future, I intend to stick with at least 18% total oil, with four percent being castor oil and the balance Klotz synthetic oil." ✈



"My cool control system," says Dave Hull. "It stays real cool out in the open breeze, while moving through the air at 105 mph." Canopy is Plexiglas®.



Elevator control horn is made from .015 tin. Marks on stabilizer are from Nats processing.

Sources

Note: K&B Manufacturing and Kustom Kraftsmanship are MA *advertisers.*

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LITTLE TIGER

Type: CL Profile Proto Speed

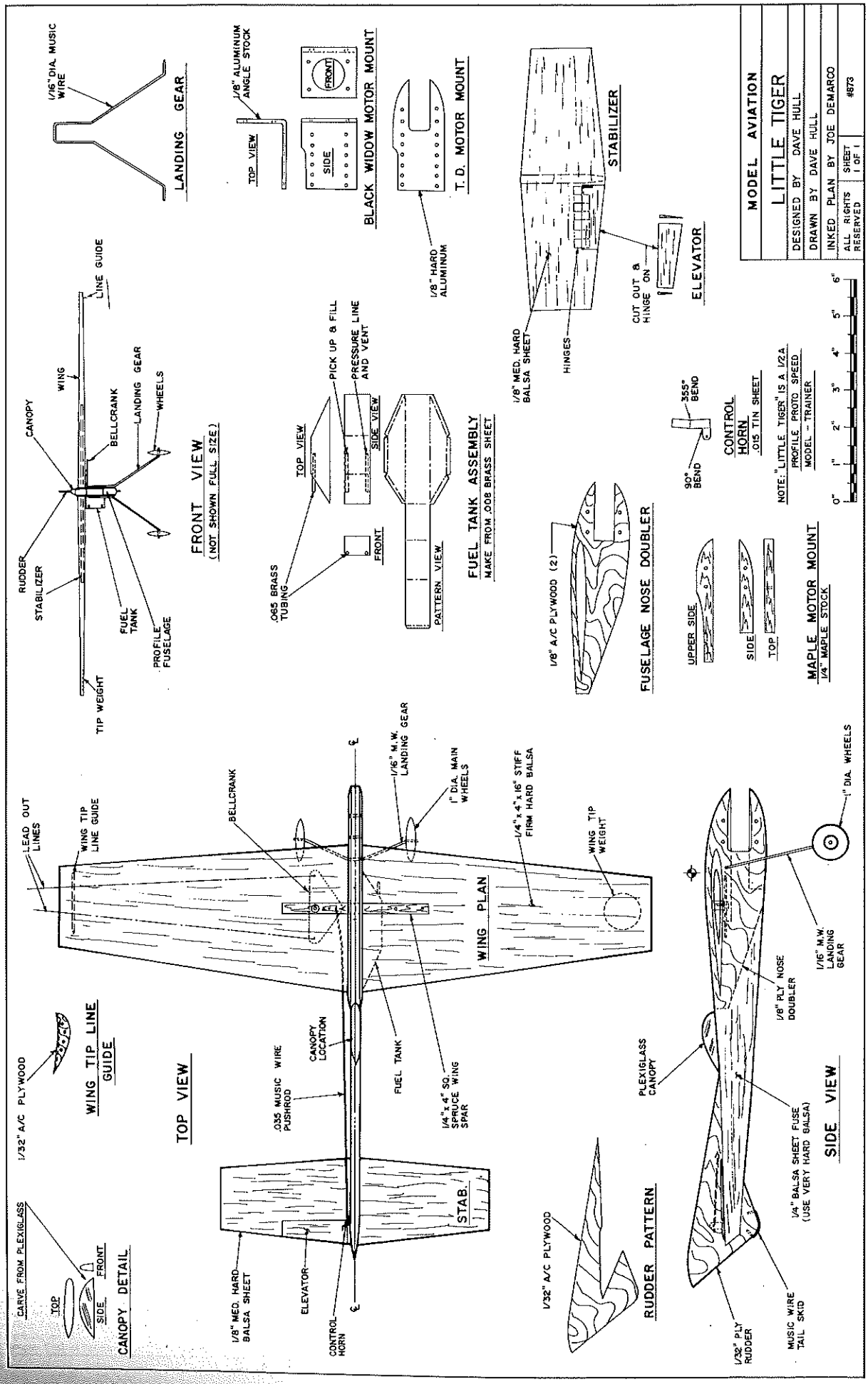
Wingspan: 15½ inches

Engine: C.S. .049

Flying weight: 6-7 ounces

Construction: Balsa and plywood

Finish: Epoxy


MODEL AVIATION
LITTLE TIGER
DESIGNED BY DAVE HULL
DRAWN BY DAVE HULL
INKED PLAN BY JOE DEMARCO
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SHEET 1 OF 1
#873
LANDING GEAR
1/16" DIA. MUSIC WIRE
BLACK WIDOW MOTOR MOUNT
1/8" ALUMINUM ANGLE STOCK
TOP VIEW
SIDE
FRONT
T. D. MOTOR MOUNT
1/8" HARD ALUMINUM
FRONT VIEW
(NOT SHOWN FULL SIZE)
CANOPY
WING
LINE GUIDE
BELLCRANK
LANDING GEAR
WHEELS
RUDDER
STABILIZER
FUEL TANK
PROFILE FUSELAGE
TIP WEIGHT
FUEL TANK ASSEMBLY
MAKE FROM .008 BRASS SHEET
TOP VIEW
PICK UP & FILL
PRESSURE LINE AND VENT
SIDE VIEW
.065 BRASS TUBING
FRONT
PATTERN VIEW
STABILIZER
1/8" MED. HARD BALSA SHEET
HINGES
CUT OUT & HINGE ON
ELEVATOR
1/8" A/C PLYWOOD (2)
FUSELAGE NOSE DOUBLER
UPPER SIDE
SIDE
TOP
.355" BEND
90° BEND
CONTROL HORN
.015 TIN SHEET
NOTE: "LITTLE TIGER" IS A 1/2A PROFILE PROTO SPEED MODEL -- TRAINER
0" 1" 2" 3" 4" 5" 6"
MAPLE MOTOR MOUNT
1/4" MAPLE STOCK
WING PLAN
LEAD OUT LINES
WING TIP LINE GUIDE
BELLCRANK
1/16" M.W. LANDING GEAR
1" DIA. MAIN WHEELS
1/4"x 4"x 16" STIFF FIRM HARD BALSA
WING TIP WEIGHT
TOP VIEW
.035 MUSIC WIRE PUSHROD
CANOPY LOCATION
FUEL TANK
1/4"x 4" SQ. SPRUCE WING SPAR
STAB.
1/8" MED. HARD BALSA SHEET
ELEVATOR
CONTROL HORN
1/32" A/C PLYWOOD
WING TIP LINE GUIDE
CARVE FROM PLEXIGLASS
TOP
SIDE
FRONT
CANOPY DETAIL
RUDDER PATTERN
PLEXIGLASS CANOPY
1/8" PLY NOSE DOUBLER
1/16" M.W. LANDING GEAR
1" DIA. WHEELS
1/4" BALSA SHEET FUSE (USE VERY HARD BALSA)
1/32" PLY RUDDER
MUSIC WIRE TAIL SKID
SIDE VIEW