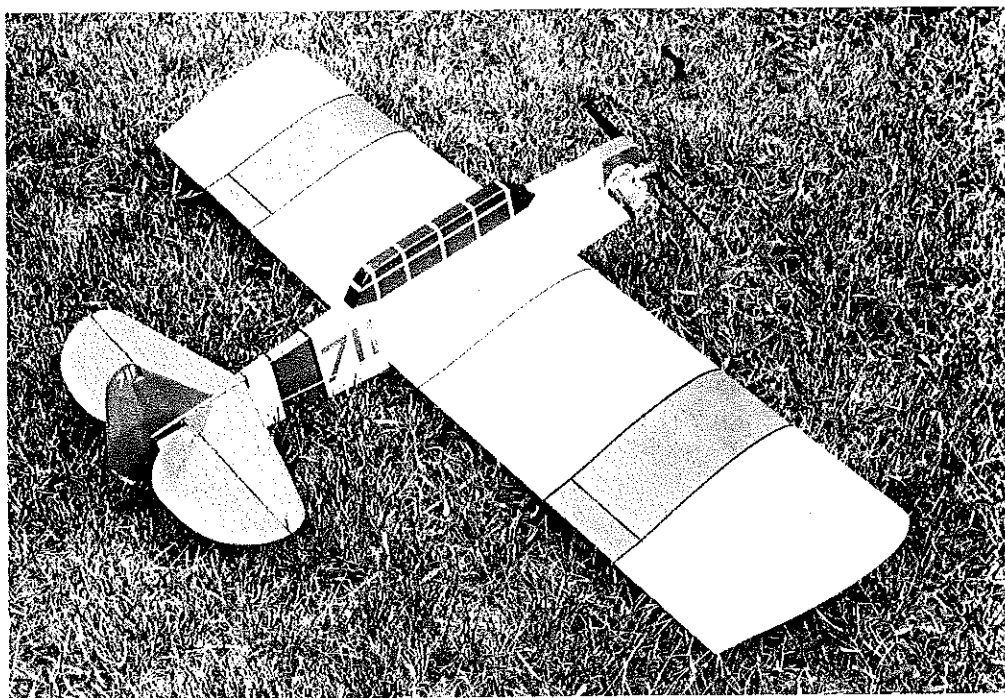
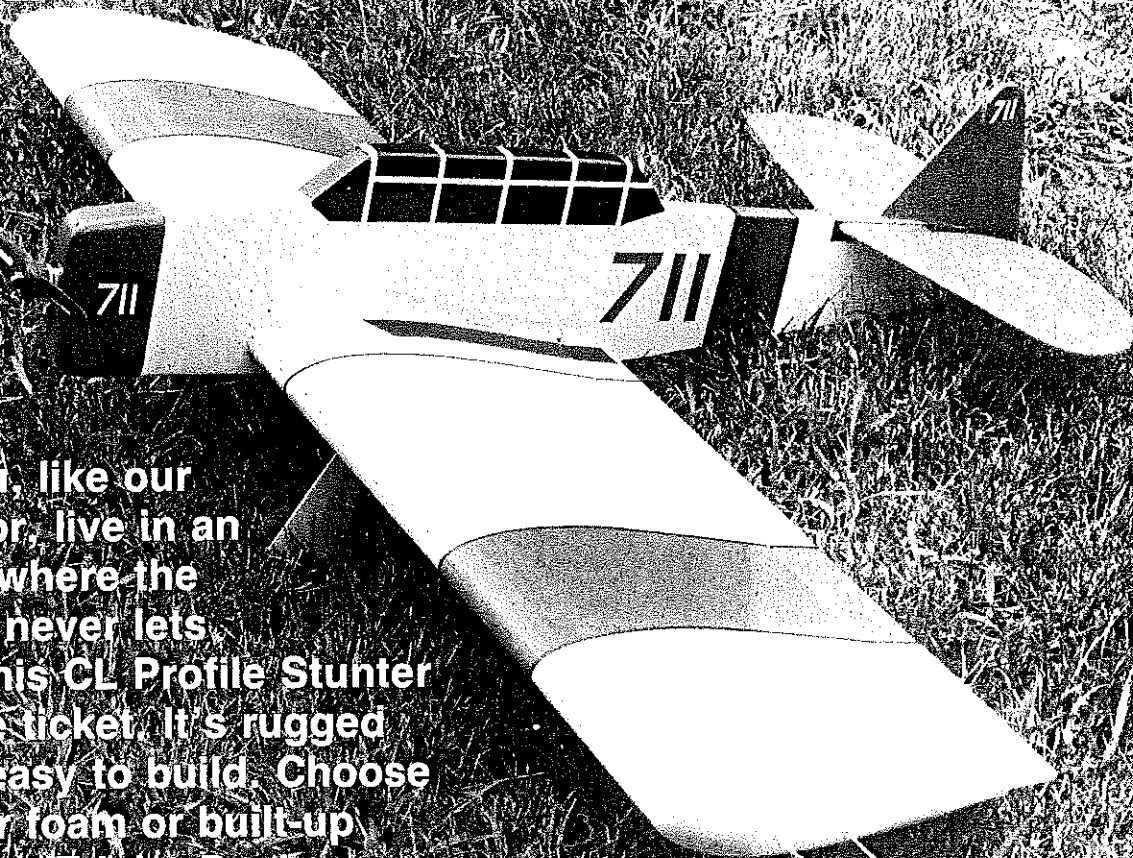


Profile AT-6

667

If you, like our author, live in an area where the wind never lets up, this CL Profile Stunter is the ticket. It's rugged and easy to build. Choose either foam or built-up wings. ■ John Paul



Top picture: Thousands of AT-6s were built during the last war, and hundreds are still flying. The model's profile is scale, while the wings and stabilizer have been modified for Stunt flying. The scale lines remain true from the pilot's standpoint as he flies her through the pattern. Above: The thick fuselage provides a rugged model as well as giving it a more-than-profile look. It's made up from foam core with hardwood inserts for the engine area sandwiched between two sheets of 1/8-in. balsa, resulting in a lightweight, strong, and vibration-free model.

DON'T YOU just hate it when the wind blows and blows? I had no idea when I moved to the Midwest just how much those skies can bluster. After two years I'm convinced that calm is the anomaly and wind is normal. So what's a guy to do? Build models that fly in the wind, natch.

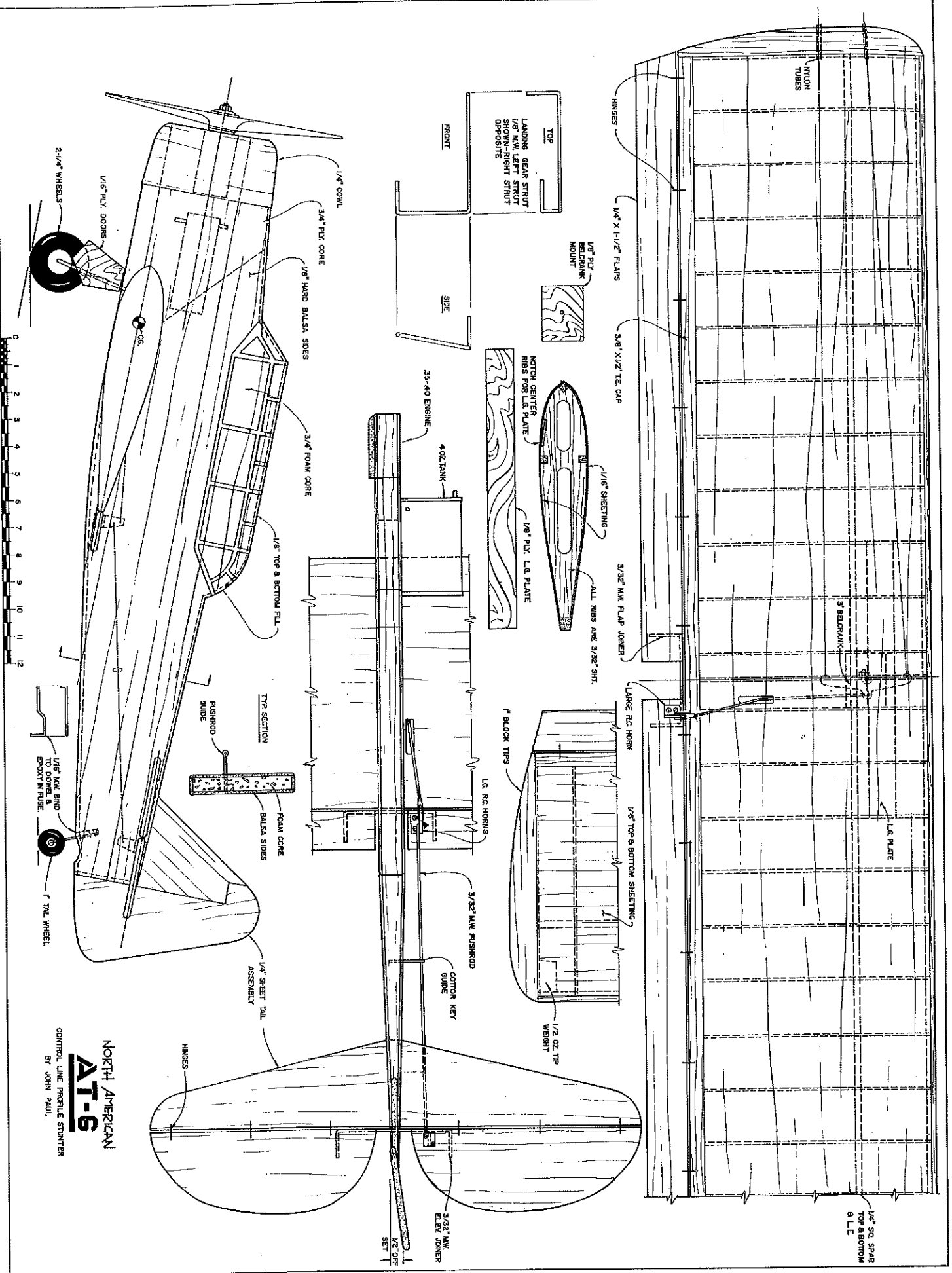
The AT-6 was designed to do just that. It's clean, rugged, nimble, and able to penetrate a typical midwestern Saturday wind.

Certainly one of the most popular and frequently seen propeller-driven aircraft around, the AT-6 seemed a good choice as packaging for my Stunt practice ship. The full-size plane still flies at air shows, air races, fly-ins, and, of course, in the movies. My aircraft file includes examples of AT-6s in everything from Japanese to German colors.

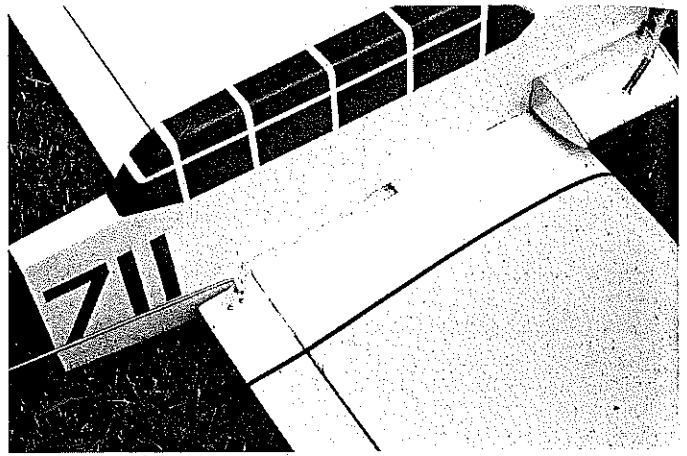
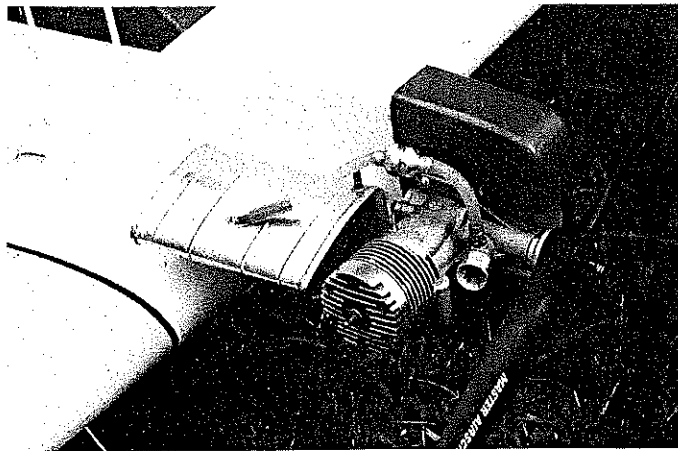
Profiles are a super way to meet the need for the practice that Stunt flying requires. They build fast and inexpensively, and with a little effort can be made to look great, too. I refuse to fly a model that doesn't look authentic, and so the lines of the full-size AT-6 were retained in the profile view. Usually that's all the pilot sees, anyway.

To make the tall fuselage less vulnerable to vibration and flight loads, I built up the profile on the original, making it all of one inch thick. This gives the AT-6 a full-fuse-

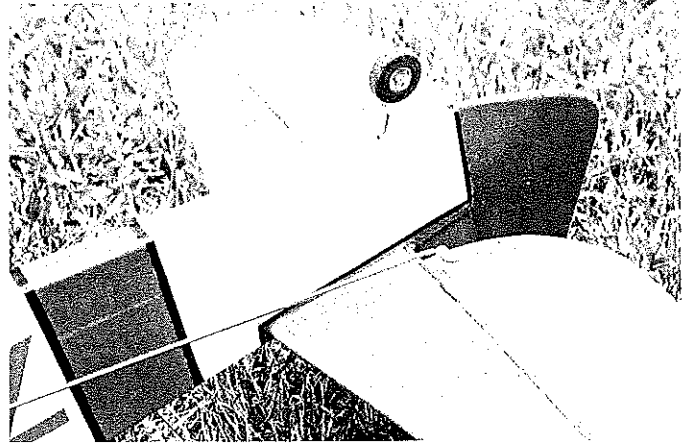
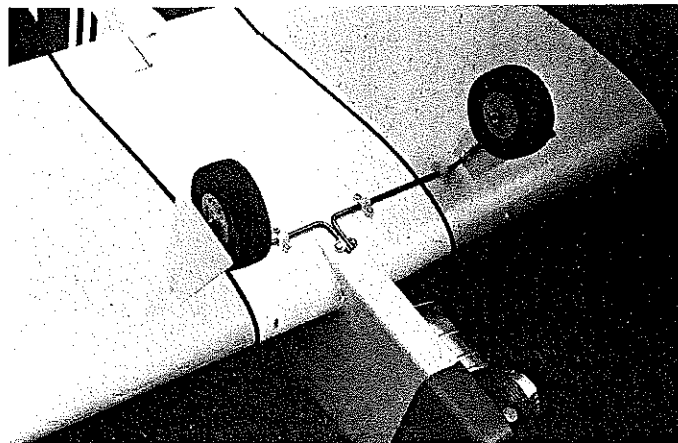
X 667



NORTH AMERICAN
AT-6
 CONTROL LINE PROFILE STUTTER
 BY JOHN PAUL



Left: The business end of the AT-6 featuring an O.S. Max .35 engine, which effortlessly pulls the model through the entire Stunt pattern in winds up to 15 knots. The fuel tank is held in place with silicone glue. Be sure to scrape the bonding area down to bare wood. Note the fuel filter in the line. Right: The flaps and elevator are interconnected; adjustment is made through the Z-bend in the bellcrank rod. The elevator pushrod is secured with a steel wheel collar. The wire is notched to accept the setscrew, so even if it loosens up the pushrod can't slip out.



Left: The landing gear is designed to withstand the rigors of flying off grass fields and for quick and easy maintenance. The torsion bars are anchored to the hardwood fuselage core with screws and washers, while nylon clips secure them to the wings to allow pivoting. Note the lightweight wheels and gear doors. Use silicone glue to adhere the gear doors and they'll stay in place even with the abuse of rough grass landings. Right: This bottom view of the tail reveals the clean elevator control hookup. The throw is adjusted by removing the horn and reinserting the rod in the desired hole. This may be a little effort, but it's far more secure than clevis ends, which can pull loose under extreme loads.

lage look and the ground crew something to hold on to. I made the wings out of foam, hollowed and planked with $\frac{1}{20}$ sheet balsa for maximum strength.

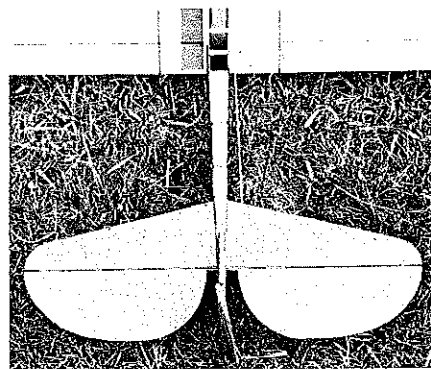
The combination of built-up fuselage and planked foam wings adds up to a quick-building model that's fun to fly and can handle a good deal of wind and abuse.

Yes, I did say "abuse." On its first flight the AT-6 was inverted at 15 ft. of altitude, when the down line snapped and the model began a series of extremely tight loops—which stopped rather abruptly as it dived for terra firma! The damage? Only a broken-off rudder and fin. With a little help from CyA (cyanoacrylate glue), the plane was back in the air within minutes. That's rugged!

If you don't want to fuss with a foam wing, simply follow the plans and build a fully sheeted wing. Your model will still be as tough and rugged as you could wish.

It's too windy to fly? Then let's get building!

Wing. If you decide to make the foam wing, you'll be using the rib pattern for your template. Cut two templates out of $\frac{1}{8}$ -in. plywood without cutting in the spar notches or the leading edge groove. Cut the wing halves



The large elevators guarantee that the model will go where you point it. The $\frac{1}{2}$ -in. rudder offset keeps the lines tight even in strong winds—without producing too much drag.

from foam, then notch the templates for the spars. The spars keep the foam wing from flexing in flight.

If you choose the built-up balsa wing, begin by cutting out all the ribs, which, except for the seven that anchor the landing gear plate, are identical. Lay all the strip wood over the plans, and mark the pieces with the rib locations. Pin down the bottom spar, and position the ribs. Before gluing, add the top spar and lift the "egg-crated" wing off the plan.

Pin on the leading and trailing edges, and set the assembly back down over the plan. Use scrap wood to block the wing level and square, then apply thinned white glue to each joint. A small watercolor paintbrush speeds this job considerably. I use white glue because it dries slowly and produces a filleted joint that's remarkably strong.

While the glue is setting, rough cut the wing tip blocks, then add the lead-out guide tubes and the wing tip weight to the proper tips.

The flaps can be cut from a single sheet of medium-firm and straight $\frac{1}{4}$ -in. balsa. Cut the bellcrank and landing gear mounting plates from good-quality five-ply wood. Attach the lead-out cables to the bellcrank and pushrod. Bolt the bellcrank to the mount, and install it in the wing. Make sure it can move its full sweep freely and without interfering with the pushrod.

String the lead-outs through the inboard wing. Epoxy the landing gear plate in position, and sand the wing prior to planking it.

Plank the wing with $\frac{1}{16}$ sheeting. The 12-in.-wide sheets now on the market make this job a cinch! Again, use white glue, so you'll have plenty of time to get it right.

When the planking is dry, give the wing a

Continued on page 168

GET \$ \$ \$ \$ \$ \$
\$50 CASH

Home Video Buffs

If your video is used –
 you will receive \$50.

All tape content used becomes
 property of RC Funnies.

All formats accepted.

Send original tape only - (no copies).
 We will return your tape if you enclose
 \$5 – for postage and handling.

Set tape to proper segment
 with brief written explanation.
 Send video of anything funny,
 new, or interesting to:

RC Funnies

3493 Scottwood Dr., Green Bay, WI 54311

RC Funnies

Premieres Oct. 1990

RC Entertainment at its best!

Sit back & relax.

Smile – Laugh – Enjoy
 The funny side of modeling.

A series of 30-45 min. videos that will tickle your
 funny bone! A collection of fun-filled and funny
 moments from around the country. Great for club
 meetings or home entertainment. A new & exciting
 tape every other month. \$25 per tape, VHS only.

SPECIAL INTRODUCTORY OFFER!

\$\$\$ SAVE OVER \$50 -

1 YEAR SUBSCRIPTION (6 TAPES) - \$150. \$99.95

\$\$\$ SAVE \$110 -

2 YEAR SUBSCRIPTION (12 TAPES) - \$300. \$190

For year round entertainment –

Credit card orders may be placed by calling
 1-800-236-9696 (Visa & MasterCard)
 or - send name, address, phone (please print
 or type) and subscription amount

RC FUNNIES

3493 Scottwood Dr., Green Bay, WI 54311

GLIDER RETRACTS

Servo actuated glider retract. Over center up/down
 lock. Aluminum parts made on computer-controlled
 milling machine from 6061-T6. These beautifully
 crafted retractors are made from the finest materials
 available, and are the best offered anywhere. Made in
 the USA.

1/5 SCALE 3 oz. without wheel. 1-9/16"W x 4"L x
 2"H. 2 3/4" wheel max.

1/4 SCALE TWO TO CHOOSE FROM.
STD - FOR GLIDERS UP TO 10 LBS. 5.2 oz without
 wheel. 2"W x 3-7/16"L x 2 3/4" H. 3.5" wheel max.
HD - FOR GLIDERS OVER 10 LBS. 6.5 OZ. 2"W x
 6"L x 2 3/4" H. 3.5" wheel max.

1/3 SCALE 8.8 OZ. without wheel. 2 3/4"W x 6"L x
 2 3/4"H. 5" wheel max.

FIVE-FOOT PUSHRODS-1/16" Music Wire with
 casing.

Send stamped self-addressed envelope for pricing and
 more info to:

SCALE GLIDER COMPONENTS
 7034 FERN PLACE, CARLSBAD, CA 92009
 (619) 931-1438

ceived that I got the idea that some similar discus-
 sion here would again be an appropriate basics
 topic.

This topical area has been covered in a piece-
 meal fashion throughout past years of this col-
 umn. However, it's time for a review/update
 with some old and some new ideas and examples.
 Of necessity, this will require more than one col-
 umn. This month we'll look at some generalities
 and begin detailed discussion with the next (De-
 cember) column.

The intent of all this is to help you transition
 from store-bought to custom wiring/installa-
 tions—even if you now feel that such is beyond
 your ability.

I normally think of the Electric "stuff" in a
 model as comprised of three things: the motor,
 the battery, and everything else.

In the simplest view, the "everything else" is
 basically what connects the first two together and
 makes everything work. However, "everything
 else" can include quite a variety of components
 and wiring options. For example, control choices
 include speed controls, electronic On/Off
 switches, servo-driven switches, and no control
 at all (not recommended!). And these choices are
 further expanded with the existence of products
 from several competing manufacturers.

Then there's the problem of connector variety,
 so that it's a frequent occurrence that competing
 products don't readily interconnect.

There are so many questions: Does the fuse go
 before the speed control or after? Where should
 the arming switch go—or do I need one now?
 Which wire do I cut? Red, or black? And much
 more. If all goes well, all these questions and
 more will be answered.

Before the detail begins—some preaching!
**Each and every one of my Electric installations
 is fused!** I will not fly without a fuse! Period. I
 strongly recommend that, if your system does not
 include a fuse, you get one in. (We'll see how.)

Personally, I'd like to see the AMA require a
 properly installed system fuse as part of the con-
 ditions of insurance. There is *no excuse* for not
 having a fuse. It is a distinct safety consideration.
 And please don't anyone tell me, "It works better
 without one"! Power loss associated with a prop-
 erly installed fuse is peanuts, and I don't care if
 you're in competition or not!

The next chapter and verse concerns arming
 switches. In my view, this is not only another sys-
 tem safety item, but also a downright practical re-
 quirement as well. The *arming switch* is the *mas-
 ter control* of an Electric power system. It's not
 unlike the main circuit breaker in the wiring sys-
 tem of your home.

This switch is *never* driven by a servo (servos
 have been known to glitch or stall!) and is *always*
 mounted on the surface of the model for ready ac-
 cessibility. It makes everything work—or can
 shut everything down easily! It overrides every-
 thing else in the power system, including any con-
 trol the radio may have over system operation.
 It's the last thing I turn on before takeoff, and the
 first thing I turn off right after landing. If you
 don't have one in your plane, you should. (We'll
 see how.)

With that, another column concludes. Remem-
 ber, the next (November) issue is the annual cov-
 erage of the AMA Nats, so there won't be any
 regular columns (except for Preston's Safety col-
 umn) until the December issue.

Please send all mail to the author at the address
 shown in the header. I respond to all correspon-
 dence accompanied by a self-addressed, stamped
 envelope (SASE).

In the meantime and as always,

Happy Electric Landings, Everyone!

RC Scale/Troy

Continued from page 57

event can be at your own pace, too. Naturally,
 you must first read the rules for the event in the
 AMA 1990-91 Competition Regulations hand-
 book in order to understand what will be ex-
 pected of you at a contest. But after spending
 those few minutes with the rules, you'll see that
 the detailed documentation package you've been
 fearing for so long isn't even required in Fun
 Scale. If you like, it can be replaced with some-
 thing as simple as the picture of the model from
 the box top of the kit you've built.

Many of the top Scale meets have begun to offer
 Fun Scale as an added attraction. Attend them.
 Once you've made the commitment to enter a few
 such contests, you can usually count on being
 able to rub elbows with the best of the best—the
 big-name Scale fliers—without the intimidation
 of having to do battle with them. Instead, you can
 simply enjoy meeting them, watching them
 work, and learning from them.

Display your best manners on the contest
 scene, but don't be overly shy. Just like you,
 Scale modelers love to talk about their airplanes,
 and your first few Scale meets will be your best
 opportunity to make friends and mentors of the
 more experienced fliers. Approach them, and
 you'll soon find that they are no different from
 you or me, or other RC modelers anywhere else.

Ask them to let you see their documentation
 packages, and talk with them about their static
 presentations. Ask them how they handled this or
 that neat little trick on their models. Watch the
 way they present their flights to the judges and
 the way they instruct their callers to assist them in
 their flight presentations. Pay particular attention
 to the highly professional, admirable manner in
 which the true sportsmen handle themselves
 when a judge is forced take a nibble out of their
 egos with a downgrade.

The more you watch and learn, the sooner you
 will come to grips with the contest trail. Before
 too long, your models will show marked improve-
 ment in construction and your flying style will de-
 velop purpose. You will come to know that your
 documentation package can be as important as
 your airplane and you will have learned the more
 effective ways of preparing one.

It will only be a matter of time before you
 move on to take your rightful place in the Sports-
 man or Expert Scale or Giant Scale classes of
 competition and perhaps yourself become mentor
 to another aspiring flier. As an added benefit,
 while you're working toward perfecting your
 models and your flying skills, you'll also be de-
 veloping two other valuable assets—good sports-
 manship and character!

After getting involved in AMA Fun Scale and
 using it as an opportunity to gradually become
 one with the Scale contest environment, perhaps
 you will understand that having fun isn't limited
 to fun flies and noncompetitive events. Scale com-
 petition fliers have fun, too. Most of these com-
 petitors are very warm people, enjoying what
 they do and trying to do it as best they can. After
 all, it really is fun!

AT-6/Paul

Continued from page 60

good sanding. Glue on the tips, then final
 carve and sand them. The flaps can be fit-
 ted, joined, and hinged. The multiple hinges
 shown on the plan serve a good purpose.

Wind and weight create tremendous loads on the hinges—and if you've ever lost one in flight, you know how exciting that can be. Hinges are a lot cheaper than models!

The fuselage is built a bit differently. Follow along with all the fancy footsteps. After the rehearsal's over, you can go back to your old dance—or try the new one.

I began with a sheet of 3/4-in. insulation foam cut to the shape of the AT-6 fuselage. Next I cut out an engine mount from 3/4-in. plywood, drilled the mounting holes, added the blind nuts, and tapered the rear of the fuselage. Both sides were sheeted with 1/8-in. hard balsa, and the exposed edges were capped with 1/8-in. sheet. A 1/4-in.-sheet cowl finished off the fuselage.

The resulting structure has proven as rugged and durable as it is stiff. If you're not convinced it's worth the effort, though, it's time to get out your old dance program. Cut the fuselage out of 1/2-in. sheet balsa, and proceed on your own.

The tail assembly follows traditional methods. Use flat, firm balsa, and round all the edges before assembling them. Offset the rudder only one-half inch. Too much rudder offset will make the airplane mush when it slows down.

Cut the openings in the fuselage for the wing and stabilizer. Fit in the parts, square them up, and epoxy them together. The wing-to-fuselage fit is crucial. When you're certain you have it right, epoxy a lightweight fiberglass cloth strip into the joint to help prevent separation.

Make sure the rudder, stabilizer, fuselage, and wing are well aligned. Measure the distance from the flap hinge line to the elevator hinge line on each side, adjusting them before the epoxy sets if they aren't identical. I suggest using a one-hour epoxy (or slower) to allow sufficient time for making adjustments.

While the model is curing, bend the left- and right-hand landing gear wires from 1/8-in. music wire. Fashion the plywood gear doors, gluing them to the wires with silicone caulking. Bend the tail wheel strut, and glue it to a dowel for later assembly.

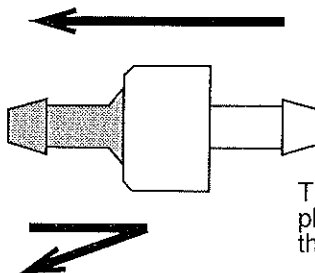
NEW!

Auto Plug / One Way Valve

Flow In

One

Direction Only



The Fourmost Auto Plug / One Way Valve can be used in a variety of circumstances that require the maintenance of air or fuel pressure.

The Auto Plug can be used in place of a plug in fuel systems that utilize muffler pressure.

The Auto Plug / Valve may also be used in conjunction with bladders to eliminate continual pinching of the line during the fueling process.

The Plug/ Valve is also ideal for the pressure line between the muffler and fuel tank to prevent pressure and fuel from escaping back into the muffler.

This product may only be used with glow fuel.

Auto Plug Product No. 138 Size 1/16 inch I.D. Price: \$4.95

FOURMOST PRODUCTS

(503) 357-2732

Covering and finishing. Glue the fuel tank in place before you begin doping the model. Silicone caulking works great for this task as well, though you do have to make sure the tank is aligned with the engine. I like to give the model three coats of clear dope, with a good sanding between coats.

Cover the flat areas and the wing with silkspan, doping it right to the wood. This helps seal off the pores and create a resilient surface. Follow with five coats of clear dope, sanding between coats. Finish with a light coat or two of color. Which color is up to you. With millions of documented AT-6 color schemes from which to choose, settling on just one can be the hard part.

Final assembly. Install the control horns and pushrods. Use the clamp-on style horns with a plate on top that secures the mounting screws. I used Z-bends at the control horn ends and stainless steel set collars at the wire end. Notch the wire end to receive the setscrew on the set collar so that it can't

slip off.

Don't forget the pushrod guide, the way I did! This keeps the pushrod from flexing during compression loads. The guide can be bent from 1/16 music wire or made from a cotter key. Epoxy it midway between the flap horn and the elevator horn.

Add the tail wheel. Drill a hole to fit the dowel, and epoxy in the strut.

Mount the landing gear struts to the wing using nylon clips and small sheet metal screws. Make certain the screws are long enough to seat well into the plywood plate. The front ends of the wires are secured by washers and screws mounted into the plywood fuselage core.

Install the wheels, engine, and propeller. Finish off the lead-out ends. Balance the model before its first test flight.

A calm day is preferable, though not mandatory, for your test flight. A few washers of outthrust will help keep the AT-6 on the end of her lines. Fire up the engine, and get

**MACS
PRODUCTS**

FOR THE DISCERNING MODELER

Complete Line Of Exhaust Systems

- * Tuned Pipes * Muffled Tuned Pipes
- * Headers * Venturi Mufflers
- * Expansion Mufflers * Helicopter Ball Mufflers * Specialized Exhaust Systems.

Unsurpassed Workmanship & Performance
Check with your Dealer

MACS Products

7935A Carlton Rd, Sacramento, CA 95826
(916) 456-6932

HELICOPTER ENTHUSIASTS

WE DO IT ALL

**BUILD YOUR HELI
TEST YOUR HELI
REPAIR YOUR HELI**

COMPLETE CONSTRUCTION WITH
NEW OR YOUR RADIO
SET UP AND PAINTED

AND
NOW

CUSTOM BUILT & BALANCED
ROTORSPORT MAIN BLADES

\$45⁰⁰

BUILT AND PAINTED CANOPIES
YOUR CHOICE OF ANY 3 COLORS

\$69⁰⁰

CALL FOR OUR LOWEST
PRICES ON HELI KITS

WRITE OR CALL FOR INFORMATION

BOLAR HELI RESEARCH

215
377-4941

322 NORTH 7TH ST.
LEHIGHTON, PA 18235

717
645-2623

NEW!
Hobby Lobby's
CATALOG 16
FREE!

If you are a beginner
our Catalog tells you
everything you need to know
about Radio Control.
If you are already in the hobby
CATALOG 16 is full of brand
new things that no one
has seen until now . . .

ALL NEW ... fiberglass biplane,
ready built helicopter,
electric powered (EP) aerobatic plane,
EP jet engines, EP racer,
EP U-2, new motors,
new sailplanes, boat drives,
fast boat hulls, new adhesive,
new airbrush, new hardware,
new retractable EP drive ...

more new items than ever
can be found in Catalog 16



Call us at (615) 373-1444
or send the order form.
FREE IN THE USA
Outside USA send \$2.00

Call for **FIRST CLASS** mail
\$2.00 — bill to your credit card.

ma
Name _____
Street Address _____
City _____
State _____ Zip _____

Hobby Lobby
INTERNATIONAL, INC.®

5614 Franklin Pike Circle
Brentwood, TN 37027
(615) 373-1444

flying.

The short-coupled moments and ample control surfaces make the AT-6 a highly responsive airplane. I fly mine with a wide-spaced handle and have found the need to tune down the control movements.

Once that test flight is over, let the winds blow! True to her lineage, the AT-6 is a good trainer and fun to fly.

CL Racing/Ballard

Continued from page 61

1990 at Tucson, AZ. Events of interest to us Racers were Class II Mouse Race, Limited Sport Racing, and Texas Quickie Rat. I'm including photos of some of the winners of their respective events.

Annual Rebel Rally: I recently attended the 30th annual Rebel Rally Control Line contest held in Jacksonville, FL. This contest is held over a weekend. Most CL events were flown, including Florida Slow Rat, Mouse Race I, Texas Quickie, and L'il Wizard and Slow Rat for the kids. The contest had numerous entries, with some of the participants as young as six years. One of these fine Junior pilots was Russell Whitney, and I am enclosing a photo of him flying his Florida Slow Rat.

Another photo shows the Lickety Split Slow Rat flown by Charles Barnes Sr. (Ft. Lauderdale, FL). It uses a K&B 5.8cc engine. Look closely at the photo and you'll see that the engine is mounted on a large aluminum plate. This minimizes engine vibration and steadies the fuel flow to the engine. Charles uses a swing-weight carburetor which chokes the engine on the ground, then opens up full bore while in the air.

Dick Lambert and I were practicing with our Scale Racers and found that the hot, humid air was quite similar to what we expect to find at the forthcoming AMA Nats in Illinois. We found that the Scale Race engines must turn more than 27,000 rpm on the ground. A propeller diameter of 6 1/2 to 6 3/4 in. seemed just right. A smaller diameter prop will, of course, allow your engine to turn this rpm, but it does not pull the airplane properly.

We also tried the new Nelson heavy-duty one-piece glow plug and found that distortion and/or frosting of the element were virtually nonexistent. We ran one of the plugs for almost 300 laps with only .005 in. of head clearance without any

problems. The element appears to hold up much better than the wire ones used in the first two production runs of this particular plug. We were testing because of an earlier report that the heavy-duty plug did not develop enough heat, and this may be the case on an extremely cool day; however, if the temperature is in the high eighties with 65% relative humidity, the plug works very satisfactorily.

Superfast! One of the photos shows Gabe Manfredi's Class I Mouse Racer that turns times of five minutes flat (or less). This 1/2 A Mouse I racer features some unique characteristics. The profile body is laminated from a piece of 1/8-in. plywood (drilled with lightning holes) and surfaced with two sheets of very light balsa. The finish is extremely sleek. The wing uses very soft balsa with a lightweight basswood spar and 1/4 basswood veneer on the bottom of the wing for added strength. The resulting flat-bottomed wing is extremely light. The tail is a piece of hard 1/8 balsa.

Note that the engine mounts onto a thick metal plate. This reduces engine vibration and gives an extra margin of speed. The engine uses a left-handed crankshaft (so that the propeller rotates in the direction opposite to what you normally see) to minimize the adverse effects of engine torque trying to roll the model toward the pilot during takeoff. The plane gets off very quickly and has excellent flying characteristics even under windy conditions.

As always, I solicit your ideas, comments, and photos. I use them whenever possible, and I really appreciate the effort you make in sending them.

CL Aerobatics/McMillan

Continued from page 62

coarse sandpaper (for better adhesion), and spread a thin coat of Vaseline on the hinge barrels so that the epoxy won't get into them.

Tech tip: Lubricating the control system is a point you cannot overlook. The requirement is somewhat hidden unless you think about it a little.

Lubricating is only part of the picture. You're asking the lubricant to penetrate your bellcrank's bearing points, form a coating, and basically stay put and perform its function for the life of the plane (which we'll hope is several years!). Now, that's a tall order!
Continued on page 174

Stock No	Description	Price	Qty.	Amount

AMERICAN EXPRESS **HANDLING CHARGE:** Sub Total _____
 MasterCard Check with order, or 7 1/4% Tax TN Only _____
 VISA Credit Card order— \$4.90 Handling _____
 COD Order — \$7.90 **TOTAL** _____

Name _____
 Street Address _____
 City _____ State _____ Zip _____
 MasterCard Visa Amer.Exp. Exp. Date _____
 Card No. _____
 Ship COD My Check enclosed \$ _____
MA

**To order
from
HOBBY LOBBY
INTERNATIONAL, INC.[®]**

**use the
order
blank**

or call:
(615)
373-1444