NATIONAL NEWSLETTER

Academy of Model Aeronautics January 2004

5161 East Memorial Drive Muncie IN 47302
Tel.: (765) 287-1256 Fax: (765) 289-4248
www.modelaircraft.org

In this issue

About the *National Newsletter*

The *National Newsletter* is edited and published bimonthly at AMA Headquarters

Editor
Sarah Greiner

Technical Editor
Ed McCollough

Circulation:
AMA Chartered Club Newsletter Editors
The Model Press
Past Presidents
AMA Executive Council
Associate Vice Presidents
Special Interest Groups
Industry Associates

PROPELLER BALANCE

What you should be looking for

By LLOYD SULLIVAN

Let's talk about balancing propellers. There is more to it than just throwing the propeller up on any one of the many different balancers and sanding the heavy blade until it is level. This, of course, is better than not doing anything and assuming it is balanced from the factory, but in my 27 years in this hobby, I can only remember three instances where I did not have to do anything before using the propellers. As a matter of fact, just the other day I picked up a 28x10 Bolly propeller that was perfectly balanced, and I did not have to adjust it. This is very unusual. Typically the propellers and/or the hubs are out of balance.

There is more to balancing propellers than just throwing it up on a balancer and sanding the heavy blade until it is level.

What to check for

The following list (in order) shows what I check on every propeller I buy.

- ✔ Hole is in the center (most are)
- ✔ Hub faces are square (most are)
- ✔ Tip shapes are identical (usually not a problem)
- ✔ Lateral side-to-side balanced (usually needs attention)
- ✔ Propeller hub balanced (usually needs attention)

I know this sounds like a lot to check, but the destructive power of vibration on our airframes, radio equipment, and even engine fuel mix via fuel foaming are relentless.

How do I check all of this?

Checking all of this is not as involved as it may seem. If the hole is not in the center or the hub faces are not square, I usually just take or send the propeller back and get a replacement. If the hole is not in the center laterally, it's usually not a problem to sand the long tip until it is the same length as the shorter one. If the hole is not centered in the hub on the vertical axis (with the blades horizontal), get a replacement. The bad news is checking that the hole is in the center and the hub faces are square are the hardest on the list to determine. The good news is they are the ones that are most likely to be right.

There are two things that are essential to accurately balance a propeller: the knowledge to properly check a propeller and a balancer that is accurate enough to allow you to achieve perfect balance.

I hope this article gives you the knowledge you need. The balancer is another issue. It needs to support the propeller hub perfectly centered on the balancing shaft, and the propeller needs to be able to swing through its entire arc friction free. If you cannot position the propeller blades vertically while on the balancer, you never will be able to finish this procedure.

Balancing a propeller laterally is only one small step toward achieving proper balance. I use a High Point Balancer, which is no longer made under that name. I think DuBro markets it now with a plastic base. It supports the propeller on a shaft with

Please see **PROPELLER BALANCE** on page 2

sliding cones and the shaft rests in the "V" formed by overlapping wheels about 2 inches in diameter. This is a friction-free and accurate balancer. There are others made by Master Airscrew and some which use magnets. The key here is friction-free. The less friction there is, the more accurate the results.

Procedure

1. Hole is in the center: This is rarely a problem and I usually don't check it unless I am doing a lot of work to bring a propeller into proper balance. To check the hole on the propeller blade axis, I find a bolt that fits the center hole snugly. Then I measure from this bolt to the propeller tip on each side. It is important that these measurements are equal. If one blade is a little longer, I sand it to match the shorter side. To check the hole from the other directions, I use a digital caliper. The measuring device doesn't have to be digital but it needs to measure in thousandths of an inch.

I usually draw three lines across the hub face. One line is straight across the hub and 90° to the blades. The other two are 45° to this line so the hub looks like it has a straight line and an "X." It is important that each of these three lines go through the center of the hole. Measure the distance from the edge of the hole to the end of each of these line segments. All four measurements on the 45° lines should match if the hole is in the center. Both measurements of the straight line should be the same, but they may not be the same as the measurements of the 45° lines.

2. Hub faces are square: This check only requires a flat surface a little longer than the propeller and a good ruler. I prefer a metric ruler because it has greater resolution, yielding a more accurate measurement. Place the propeller hub face on the flat surface and measure the distance each tip is from the surface. If the hub is square, the tips should be the same distance from the surface.

Check both hub surfaces for square. Another way to check for square is to look at the tips while the engine is idling. If the hub faces are not square, the tips will be out of track. Checking this at idle is important because propeller flex under load will affect the observation. Don't stand in line with the propeller arc above an idle for safety reasons.

3. Tip shapes are identical: Tip shapes should be identical as well. I just put the propeller on a piece of paper and trace the tip shape with a sharp pencil. Place the other tip on this tracing to check that both tips are the same. If they are not, shape the larger tip to match the smaller one. Although the two are usually very close and rarely need attention, it is something that should be checked.

4. Propeller hub and lateral balance: This problem is often overlooked. Hub balance is just as important as lateral balance. In fact, you cannot achieve proper lateral balance until the hub is balanced.

To check hub balance, position the propeller on the balancer so that the blades are vertical. If the propeller swings to one side, most likely the hub is heavy on that side. I usually test this two or three times to be sure the results are consistent.

To correct a heavy hub condition, you can sand the hub flat on the heavy side or take a $^{3}/_{16}$ drill bit and drill shallow holes on the heavy side until you get as close as possible. If the propeller does not move when either tip is in the vertical top position, the hub is close enough. I also check the propeller in the 45° positions. Heavy hub and/or lateral balance will affect propeller movement here.

Position the propeller on the horizontal and check for a heavy blade. If the propeller balances horizontal, rotate it 180° and check it again. Heavy blades should be corrected by removing material from the front face of the propeller. Do not remove from the back side because the propeller will have a different pitch on one side. Be careful to preserve the airfoil shape while removing material. Go slowly. Sometimes a little goes a long way.

When the propeller balances horizontally, it is time to recheck the hub and fine tune if necessary. Place the propeller in both 45° positions. If it rotates consistently to a certain position, the hub needs attention at the low point. When the propeller is balanced, it will stay in any position you put it in on the balancer. Do not accept anything less. Do not try to correct an out-of-balance hub by removing material from a blade face.

Technical editor's note: If you remove any material from a wooden propeller, you must reseal the wood and you must add the same amount of sealer to all blades so that balance is retained.

from *Propwash*
Propnuts Radio Control Model Airplane Club
Paul Shaffer, editor
Highlands TX

BAD BEHAVIOR

As a man took his seat on an airplane, he was surprised to find a parrot strapped in next to him.

After taking off, the flight attendant came around to serve the passengers on the airplane. The man asked the flight attendant for a coffee and the parrot squawked, "And get ME a coke ... NOW!"

The flight attendant, flustered by the parrot's attitude, brought back a coke for the parrot; however, she forgot the man's coffee.

As the man pointed this out, the parrot drained his glass and screamed, "Get me another coke of I'll really create a scene!"

Quite upset, the attendant came back, shaking, with another coke but still no coffee.

Irritated at her forgetfulness, the man decided to try the parrot's approach. "I've asked you twice for a coffee. Go and get it right now, or I'll create a scene that will make his look like a Victorian tea party!"

The next moment, both the man and the parrot were grabbed and thrown out the emergency exit by two burly security guards.

Hurtling toward earth, the parrot turned to the man and said, "You're pretty cheeky for a guy who can't fly!"

from *Plane Talk*
Aerobatic Aces R/C Club
Bob Van Singel, editor
Three Rivers MI

DO-IT-YOURSELF

Make your own brushless motor from a CD-ROM

By TERRY SLATTERY

In electric flight, brushless motors are more desirable than brushed motors because they are more efficient and more powerful for their weight. Their undesirable characteristic is that they cost more than brushed motors—sometimes significantly more.

An inexpensive alternative for brushless motors for light airplanes and micro-helicopters is to use the brushless motors from a CD-ROM drive. It takes an evening to extract a motor and rewind it. This sounds daunting, but it is easy.

First, remove the motor from an old 8X to 56X CD-ROM drive. You may have to press the old spindle off the motor shaft (I use a cut-off nail in a drill press). You'll have to remove the motor from its mount. The ones I've used have been brass press-fit onto a metal bracket. File the edges of the brass until the motor can be extracted from its mounting bracket. Now you'll have a bare motor.

Remove the outer rotating shell (the part containing the magnets). Inside, you'll find the stator and windings. The stator will have nine poles. Remove the old wire from the stator. Before rewinding the motor, you must decide how much torque is needed versus the rpm and current draw. More turns per pole will provide more torque and less rpm per volt. Fewer turns provides less torque and higher rpm per volt, but at a higher current draw. Good values for CD-ROM motors are 14 to 19 turns of wire per pole. For my motors, I've done 16 and 19 turns. It isn't hard to change, so pick a value in the middle of the range and experiment.

Number the stator poles (1 through 9). Cut three 40-inch pieces of enamel-insulated, 28-gauge magnet wire. Wind the first wire clockwise (as viewed from the end of the pole) around the first pole. Carefully add turns tight against each other and in layers. When you're finished with the first pole, extend the wire around the stator body to pole 4 and wind it. When pole 4 is finished, extend the wire to pole 7 and wind it. You'll see that you've wound one wire around every third pole. Mark the ends of the wire with a small piece of masking tape. Continue the process with the other two wires, winding them around each of the other sets of three poles: 2, 5, and 8, and 3, 6, and 9.

Now you'll have a stator with six labeled wires. Solder the ends of the wires from poles 1, 2, and 3 together, leaving a short tail. You now have a "Y" configuration with the center of the Y at the end of the soldered wires. The other ends of the wires will go to a sensorless, brushless speed controller (the Castle Creations Phoenix 10 ESC is a good candidate).

Mount the stator to a piece of $^1/_{16}$-inch plywood that has been drilled so it is a snug fit for the mount that used to be in the metal plate. I epoxied the stator to the plywood, and it has performed well with that mount.

Reattach the rotor and its shaft, and you have an inexpensive brushless motor!

from *The Crabag*
Chesapeake Bay Radio Control
Carl Wick, editor
Crownsville MD

TECHNOLOGY

Helpful hints for two-stroke glow engines

Today's two-stroke glow engines are technological marvels; they're powerful, lightweight, easy to use, and with proper use and care, will last for many years.

Next to the radio system, the engine is one of the most expensive investments we make in Radio Control (RC) aircraft. Over the years, we've learned a lot about the care and feeding of engines, and we know there aren't any secrets to operating a model airplane engine correctly. From adjusting the fuel mixture and choosing the best glow plug to proper maintenance and using common sense to improve reliability, this article is full of helpful hints and information so you can have a happy relationship with your two-stroke glow engine.

Easy starting

Nothing is more frustrating than owning an engine that is difficult to start. Our frustration often leads to a flight that ends with a dead-stick landing or a crash. When you start any engine, there are three things to remember. For combustion to occur, your engine needs air, fuel, and fire (heat). If your engine won't start, check the carburetor to make sure that air and fuel are available and check your glow plug to ensure that it provides enough heat to ignite the air/fuel mixture.

Remove the glow plug and attach the glow driver; its element should glow brightly. If it doesn't, replace it; if it does, reinstall it. Close the needle valve and then open it three full turns. Place your thumb over the carburetor, and flip the propeller several times until fuel is drawn through the fuel line and into the carburetor. If you remove any one of these three elements from the equation, your engine will not start.

Please see **TECHNOLOGY** on page 4

Two-stroke engine operation

The operation of a two-stroke engine is relatively simple. The crankshaft makes one complete revolution for every power cycle. During the piston's upstroke, the fuel/air mixture above the piston is compressed for combustion. At the same time, a fresh mixture is drawn into the crankcase below the piston. After combustion, the piston is forced downward, and the spent fuel charge is expelled through the exhaust port. Simultaneously, a fresh fuel/air mixture is drawn through the carburetor and into the crankcase. The intake valve is sealed, and the mixture is forced through the transfer ports and into the cylinder above the piston to start a new power cycle

Secure fuel lines

Proper fuel line installation is very important. If your fuel line is too big, it may leak air or even slip off in flight. Fuel lines come in several sizes, so use the size that best fits the carburetor's fuel fittings. Air bubbles in the fuel line may cause the engine to run lean, and if the line slips off, the engine will die. Be sure there is adequate slack in the line and secure it to the fuel fitting with a wire clip or a small length of fuel line slipped over the end of the main line.

Tight seals

If your engine begins to run erratically, and the mixture leans out even after you've adjusted the needle valve, you may have an air leak in the carburetor. Make sure the carburetor is firmly and properly attached to the crankcase. If the intake is sealed with an O-ring, check it for cracks or breaks and make sure that it's seated properly, lies flat, and isn't distorted when the carburetor-attachment screw is tightened. Make sure that all the adjustment screws and the needle-valve assembly are properly sealed and work correctly.

Check that the fuel-intake fitting is tightly screwed into place and that it isn't damaged or cracked. The fuel tank and fuel lines must be properly and securely installed. If you have previously nosed the model over or made a hard landing, the fuel pick-up clunk may have shifted forward in the tank; this can pinch off the fuel supply. The clunk and pick-up line should move freely, and you should be able to hear the clunk rattle in the tank.

Fuel flow

If your engine always runs rich or floods easily, check the position of the fuel tank. The tank should be installed in the fuselage so its centerline is at or slightly below the carburetor's spray bar. Use scraps of foam to position it securely so it can't move around in the tank compartment. If the tank is too high in the fuselage, fuel will tend to be siphoned out and run freely into the carburetor.

If the tank is too low or too far away from the carburetor, the engine may have difficulty drawing fuel into the carburetor, and it will run lean. To improve fuel draw, attach a line from the pressure fitting on your muffler to the tank's vent line. If you use a third filler line with your tank, close it off to allow the muffler pressure to enhance fuel draw.

from *RC Prop Wash*
Ocala Flying Model Club
Dick Smith, editor
Ocala FL

MEMORY LOSS

Two Radio Control hobbyists were talking after dinner one night. One of them remarked to the other that with oncoming age comes short-term memory loss. To help alleviate this condition, he had taken memory classes where he learned to remember things by word association.

Then, he told his friend about a new hobby shop he had visited the day before. The hobby shop had high-class merchandise with unusually low prices.

The other man got excited and asked for the name of the hobby shop.

The first man couldn't remember, so he said, "Let's test what I learned in memory class. What do you call the pretty flower that comes in many colors and has thorns?"

"A rose," the second man answered.

"That's it!" The first man turned to his wife. "Rose, what was the name of that local hobby shop we visited yesterday?"

from *Servo Chatter*
Anoka County Radio Control Club, Inc.
Stan Zdon, editor
Coon Rapids MN

RC HELICOPTERS

So you want to fly choppers?

By CHRIS MYERS

If you have access to a real flight simulator, a good rule of thumb is you are ready to start hovering when you can consistently hover a full tank on the simulator. There is no question that you can learn to hover with the training gear and a lot of restraint, but the probability of success is higher with practice on the simulator.

As you start to get comfortable with your hover, try sliding left and right while keeping the tail pointed toward you. As you progress, try sliding left and right while keeping the tail straight so that at times it's at a 90° angle to you.

There are two ways people get in trouble at this stage. If the helicopter gets too far out or too high, then it's easy to become disoriented. If this happens, keep the helicopter level. Then, get the tail pointed toward you and lower the helicopter to the ground. The mistake many novice fliers make is trying to do all three at once, overloading them and causing the helicopter to fall off the edge.

The number of things you have to deal with when flying a helicopter can create overload quickly so create a level flight first until it becomes second nature. First, make sure you can move left and right. Then, master forward and backward motion. When you can do this, start turning the helicopter and hovering left and right at approximately 15°, then 30°, and so on until you reach 180°. The ability to

Please see **RC HELICOPTERS** on page 5

hover past 90° is a challenge. Many people never learn to hover nose in, so be aware that this step may take several gallons of fuel. I believe that focusing on hovering nose in prior to flying around reduces you risk of crashing because your orientation skills will be superior.

To learn nose in, it may be helpful to try it at a higher altitude. That way, if you get in trouble, you have a chance to save yourself. I always worked low to the ground so if I was in trouble, I could drop the helicopter. Don't fly between eight and 20 feet because you will not have enough room to save the helicopter, and if you drop the helicopter, you will do some serious damage. I can't stress this enough.

Orientation training is something you will never stop as long as you fly a helicopter. You start with your nose in and then work on flying backward and upside down. Next, work with flying in a circle with a constant pirouette upright and upside down. After you master that, you can move on to picking a cloud in the sky and doing pirouetting loops around it. You will not get a proper start until you master nose in hovering.

Several people have asked me whether to buy 12%, 15%, or 30% fuel. If you are flying a basic machine and are not planning on pushing the machine to its limits, save a few bucks and buy the lower nitro. You also will increase your run time with the lower nitro. The only negative is the engine will operate at a slightly higher temperature, and you will not have as much power. For most people, this is not an issue.

Someone once remarked to me that he believed you should break the engine in with the highest nitro you plan to use, then switch to the lower nitro. My feeling is if you're learning with 30% fuel, it is overkill. I did it and still had to send my O.S. .32 back to hobby services because it was leaking like a sieve.

from *Notam*
Bayou City Flyers
Joe Chauffe, editor
Katy TX

THINK ABOUT IT

Why the English language is so difficult

We'll begin with a box, and the plural is boxes, but the plural of ox became oxen, not oxes.
One fowl is a goose, but two are called geese, yet the plural of moose should never be meese.
You may find a lone mouse or a nest full of mice, yet the plural of house is houses, not hice.
If the plural of man is always called men, why shouldn't the plural of pan be called pen?

If I speak of my foot and show you my feet, and I give you a boot, would a pair be called beet?
If one is a tooth and a whole set are teeth, why shouldn't the plural of booth be called beeth?
Then one may be that, and three would be those, yet hat as the plural would never be hose,
and the plural of cat is cats, not cose.

We speak of a brother and also of brethren, but though we say mother, we never say methren.
Then the masculine pronouns are he, his and him, but imagine the feminine—she, shis and shim.

Some reasons to be grateful if you grew up speaking English:

1) The bandage was wound around the wound.
2) The farm was used to produce produce.
3) The dump was so full that it had to refuse more refuse.
4) We must polish the Polish furniture.
5) He could lead if he would get the lead out.
6) The soldier decided to desert his dessert in the desert.
7) Since there is no time like the present, he thought it was time to present the present.
8) At the Army base, a bass was painted on the head of a bass drum.
9) When shot at, the dove dove into the bushes.
10) I did not object to the object.
11) The insurance was invalid for the invalid.
12) There was a row among the oarsmen about how to row.
13) They were too close to the door to close it.
14) The buck does funny things when the does are present.
15) A seamstress and a sewer fell down the sewer line.
16) To help with planting, the farmer taught his sow to sow.
17) The wind was too strong to wind the sail.
18) After a number of Novocaine injections, my jaw got number.
19) Upon seeing the tear in the painting, I shed a tear.
20) I had to subject the subject to a series of tests.
21) How can I intimate this to my most intimate friend?
22) I spent last evening evening out a pile of dirt.

Some pronunciations can mess up your mind! For example, if you have a rough cough, climbing can be tough when going through the bough on a tree!

Let's face it ... English is a messy language! There is no egg in eggplant nor ham in hamburger; neither apple nor pine in pineapple. English muffins were not invented in England.

We take English for granted, but if we explore its paradoxes, we find that quicksand can work slowly, boxing rings are square, and a guinea pig is neither from Guinea nor is it a pig. And why is it that writers write but fingers don't fing, grocers don't groce and hammers don't ham?

Doesn't it seem crazy that you can make amends but not one amend? If you have a bunch of odds and ends and get ride of all but one of them, what do you call it? If teachers taught, why didn't preachers praught? If a vegetarian eats vegetables, what does a humanitarian eat?

Sometimes I think all the folks who grew up speaking English should be committed to an asylum for the verbally insane. In what language do people recite at a play and play at a recital? Ship by truck and send cargo by ship? Have noses that run and feet that smell? How can a slim chance and a fat chance be the same while a wise man and a wiseguy are opposites? You have to marvel at the unique lunacy of a language in which your house can burn up as it burns down, you fill in a form by filling it out, and an alarm goes off by going on. And finally, if Dad is Pop, how come Mom isn't Mop?

submitted by Gene Wilkison
from *Flite Lines*
Case de Aero RC Club
Jerry Gill, editor
Prescott AZ

Contest fun from the Wichita Radio Control Club

Why don't you ...

Eat a hot dog and fly 3 loops and 3 rolls in 3 minutes

POKER CROSS COUNTRY RUN

Participant takes off, makes two "fuel stops" picking up two random cards out of a card deck at each stop, and upon landing, picks up the final card. The one with the best poker hand at the end of the cross country wins.

THE DREADED LIMBO

This event puts pilots against the limbo poles (and several airplanes against the limbo poles as well). The carnage is generally great, but the fun factor also is pretty high.

ENGINE REBUILD

Construct a disassembled engine from parts and start it in the least amount of time. All parts must be assembled in the proper place, and the engine must run for a period of time. The winner is the person with the lowest time.

SPOT LANDING *Allowed three attempts at landing on a predetermined spot. Closest wins.*

You fly your airplane at night. It doesn't get much simpler than that. **NIGHT FLY**

from *WRCC News*
Wichita Radio Control Club
David Wise, editor
Wichita KS

HELP YOUR FLYING

Proper use of transmitter neck straps and trays

By JOHN BURDIN

For years, I have used a neck strap to support my transmitter. I found this eliminates the urge to move the transmitter around, raise or lower it, and simply makes it more stable. Whether I'm flying a jet, helicopter, Pattern airplane, or Sport, the neck strap makes things more enjoyable and gives me less to worry about.

For maximum convenience and performance, the length of the neck strap should make your transmitter level with your elbows as it hangs in front of you. This enables you to rest your hands on the transmitter without feeling as though you must raise them up over the top of it. After all, the purpose is to put the transmitter in a comfortable and manageable position.

From here, it is easy to rest your hands on the transmitter, allowing your full concentration to be directed to your model instead of on holding your transmitter. As you move to higher performance aircraft, this becomes more useful. It's pretty tough to operate the different controls on a transmitter (i.e. levers, switches, and knobs) while flying and holding the transmitter at the same time.

A transmitter tray also might be useful. It accomplishes many of the same objectives as the neck strap; however, there are some tradeoffs. The tray is an extra piece of equipment that must be carried with your gear. The neck strap simply goes in your transmitter case, field box, or tool box.

From a safety standpoint, the transmitter tray is not optimal. It is very difficult, in most cases, to hand off the transmitter to another pilot in an emergency. It is not good for beginners or even moderately experienced pilots for the same reason.

Both neck straps and trays are popular with many levels of pilots, and some of the best pilots don't use either one. Most of the better pilots do use them, however, and almost all pilots of high-performance models use one or the other.

The neck strap is my choice and recommendation for simplicity and ease of use. If you give it a try, don't make a snap decision on how you like it during your first flight. Like most other things, you must learn to use it, and once you do, you'll likely love it!

from *RC Prop Wash*
The Ocala Flying Model Club
Dick Smith, editor
Ocala FL

DO-IT-YOURSELF

How to construct a transmitter stand from pipes

You can make an excellent stand to hold your transmitter in an upright position when it is on the ground. The stand works like a tripod. All you need is some 5/8-inch OD plastic water pipe, a 5/8-inch pipe cap, and a few tools. A 10-foot piece of pipe should be long enough to make stands for everyone you know.

This stand works well on my Vanguard and a friend's Quasar Airtronics transmitters and should work with any other transmitter if the handle is round and sticks out from the back of the transmitter case. If the handle is even with the back of the case, the stand will not fold up flush with the back.

Measure from the transmitter handle to the bottom of the transmitter. Then, cut a length of pipe 1/2-inch longer than that measurement. Cut one end of the pipe square and the other end at a 45° angle to make a point that will keep the transmitter from slipping on smooth surfaces.

Measure the diameter of the metal handle attached to the top of the transmitter. Find a drill that is only a little smaller than the diameter of the handle. One-half inch from the square end of the pipe, drill a hole through the center of the pipe. Looking through the hole, the point at the bottom of the pipe should be to the right or left of the hole.

Now take a small-toothed saw and making two cuts, cut a slot from the end of the pipe to the hole. This slot should be a little wider than the hole at the top but smaller than the hole at the bottom. When finished, it should resemble a key hole. Holding the pipe with the point of the pipe next to the transmitter, snap in onto the handle. It should fit tight enough so it won't turn by itself on the handle. It will still work if it is loose, but it is annoying when holding the transmitter.

To finish the job, buy a plastic pipe cap and slip it over the handle end of the pipe. It should fit tight enough that there is no need to use glue. If you did not leave enough room between the end of the pipe and the handle, you might need to file small rounded cuts in the end of the cap so it fits down all the way. The cap also will tighten the fit of the stand.

from *Thrustlime*
Sky Streakers R/C Club
David Marin, editor
New Gloucester ME

ALMOST-READY-TO-FLY AIRCRAFT

Give your ARF a second chance ... re-cover it

By KEN CHADWICK

Are you ready to re-cover your Almost-Ready-to-Fly (ARF)? If the structure is sound, why not? Here's what I did with a bargain from our club auction.

It had sticky-backed covering similar to contact paper. Fuel seepage had turned some of the adhesive to goo. The forward fuse was fuel-soaked from leakage under the covering and through unsealed holes in the firewall. To treat this, I put two cups of dry plaster powder into the forward fuse. Then I cut foam to push the plaster against the fuel-soaked wood with at least ¼-inch of plaster touching the wood. To let the magic work, I set it aside for a week or so.

On the wing, the covering adhesive gave me problems. When I used the heat gun, the covering blistered and balsa came off with it. Most of the covering came off in bits and pieces. Once the covering was off, I made repairs to some of the wing ribs and removed the adhesive residue with acetone. *Note: Do this outside and wear rubber gloves.*

After filling the holes and low spots with spackle, I sanded with 200, then 400-grit sandpaper, tack ragged and applied new covering. I didn't use any Balsarite, but I would have if I found any spots where the covering wouldn't stick.

After a week, the plaster had pulled the fuel from the fuselage sides. I removed the covering, cleaned, and filled it as I did the wing. Next, I blocked the fuselage level and checked the incidence of the wing to the horizontal stabilizer. I found the stabilizer was tilted slightly. To remove these pieces without breaking them, I put the heat gun on the epoxy, keeping the gun moving so the balsa didn't scorch. In five minutes, I was able to wiggle the parts loose. I scraped the old glue onto a wood scrap.

I adjusted the stabilizer slot by sanding and filling it until it was straight. After applying epoxy, I rechecked the incidence before pinning it. I made a small fillet of spackle with my finger along the joint to fill and smooth the gaps. Then, I sanded, tacked, and re-covered the fuselage.

I coated the firewall with a thinned layer of epoxy and after refitting the fuel tank, I filled any gaps with household caulk. A couple more hours were spent reinstalling the hardware, radio, and engine, and I was ready for the field with my "previously owned" new airplane.

from the Tucson Radio Control Club
via *Propbuster*
Rapid City Propbusters RC Club
Jim Tiller, editor
Rapid City SD

BATTERIES

Using a timer can improve battery life

By RED SCHOLEFIELD

This article originally appeared on Red Scholefield's Web site, www.rcbatteryclinic.com.

One of the failure modes in Ni-Cd cells is shorting. While many things can contribute to shorting, one of the significant problems is cadmium migration through the separator where it forms a conductive bridge, ultimately shorting the cell.

Cadmium migration is a function of the time the charge current is flowing through the battery and less a function of the level of current. Therefore, we have found that high pulses of charge current to maintain the charge state are better than a steady low rate (trickle) current. This is difficult to quantify as many other factors contribute to the life equation, but improvements in battery life of 10-20% by pulse charging versus trickle are not unrealistic.

We have found that sustaining a pack at the fully charged state by way of pulsing the charge is better than a continuous trickle charge. Some charges employ this technique. You can do essentially the same thing at a low cost using the following instructions.

Simply connect your regular wall module charger that came with your system to an appliance timer. Intermatic makes a good unit for around $5. Set the trigger pins on the timer so that it is on for one hour each day. When you return from a flying session, turn the timer wheel so the on/off triggers come up in 14-16 hours. Then turn the timer knob on. This will give your pack a full charge and then a sustaining charge for one hour a day. The battery can be left in this manner for a long time between flights and can be maintained at a fully charged state with minimal overcharge.

If you only fly a couple of flights, you can just set the timer so you get six or eight hours before you go into the one hour per day mode. If we assume a normal two-hour flight time for a system and you only fly 20 minutes, then the charge you need to return is 20/120 times 16 hours, or about three hours.

Know what your system consumes in the way of energy per minute of flight. This can be determine by first charging a pack and then discharging it on a cycler to see how much capacity is has when fully charged. Then, recharge and go fly. Record your system on time and immediately discharge the pack when you return home. This will tell you how much capacity you have left. Let's say you fly for 40 minutes, and when you discharge the pack you get 390 mAh. From your initial discharge from a fully charged pack, you got 585 mAh. This means that you discharged 195 mAh in the 40 minutes you flew, or about 5 mAh per minute. From this information, you know that your pack is good for 116 minutes of flight time under the actual flight loads. Now, you don't want to take it this close, so give yourself (and your airplane) some margin of safety, about 25%. This sets your safe flight time to 75% of 116 minutes, or approximately one hour and 27 minutes.

Do this for each of your airplanes. Also, you should do this for your transmitter at least once to accurately characterize its "flight time." The system usage will vary, depending on your flying style, the size of the airplane, and the number of servos used.

from *Carrier Wave*
Phantom Flyers R/C Club
Ed White, editor
St. Louis MO

Thirty-five seconds ago, I valued your advice.

BUILDING SEASON

Winter aircraft storage hints

With the weather turning colder, many of us will be storing our airplanes for the season. Here are some tips that will make a happy aircraft and a happy flier come next spring.

The engine

When you finish flying for the day, you should always get the unburned fuel out of the engine. Do this by pulling off the fuel feed from the carburetor, attaching the glow driver, and flipping the propeller. The engine may run a little or it may just pop. When there are no more pops, all the fuel is gone.

Next, make sure all the fuel is out of the tank. You would not believe the green, slimy crud that grows inside a tank with fuel left in it!

After removal from the airplane, the outside of the engine should be cleaned off. Block the carburetor inlet and the exhaust outlet with some wadded up paper towel. Then,

Please see **BUILDING SEASON** on page 9

get an old toothbrush and some engine cleaner (Formula 409, Fantastic, Windex, Comet, etc.) and scrub the engine. When everything is clean, wipe it down with a rag.

Oiling the inside of the engine comes next. Use Marvel Mystery Oil or plain automatic transmission fluid for this. For two-stroke engines, squirt some oil into the exhaust outlet, then remove the glow plug and squirt some into the combustion chamber. For four-stroke engines, squirt oil into the crankcase vent and for the top end, remove the glow plug and lubricate the valve train by squirting oil into the combustion chamber.

Use your electric starter to turn the engine over for a second or two. This will distribute the oil throughout the inside of the engine (including the front bearings). Be sure to lubricate the carburetor too so it doesn't get stuck. Put the glow plug back on and wrap your engine in a clean cotton rag. This will allow it to breathe over the winter. Don't put it in a plastic bag because it could trap moisture and cause rust and corrosion.

The airframe

Build some more wing racks if needed and store your wings on them. Don't stack them in a pile or lean them in a corner. You'll end up with warped wings. Hang the fuselage somewhere up out of the way.

The radio

Once a month, charge your system overnight. Keep a log book to record when you do this. Once every two months, after you finish the overnight charge, use a ESV, battery cycler, or just run the system for 1 ½ to 2 hours. Charge the system overnight again. Don't store the radio in a place where it will get too cold, such as an unheated garage.

from *Contact*
First State R/C Club
Timothy Mihalski, editor
Hockessin DE

HOW CAN WE HELP?

About the *National Newsletter*

By SARAH GREINER

How can the *National Newsletter* help you as a club newsletter editor? Let me explain how the production of this newsletter works.

First, AMA receives copies of club newsletters from all over the United States. As editor of the *NNL*, I read each of these newsletters to decide if any of the articles could be used in the *NNL*. After we have reviewed the articles to make sure they haven't been previously published in the *NNL*, they are E-mailed to our technical editor, Ed McCullough, who checks each article for technical problems. Once the article passes Ed's inspection, it is sent back to me to include in upcoming issues of the newsletter.

The *NNL* is provided as a service to club newsletter editors. The articles are available for your use (with proper attribution). We encourage you to share *NNL* articles with your fellow club members through publication in your club newsletter. In return, we hope you encourage your club members to write articles that are insightful and useful to modelers across the country. As you can see, we don't just publish technical, how-to articles. We also like to include articles about interesting contests, universal club issues, and safety at the flying field. Overall, we want to publish articles that give our members helpful hints and more knowledge and understanding than before.

I encourage each of you to contact me with ideas or suggestions for the *National Newsletter.* After all, its main purpose is to serve the interests of our members. Although the AMA staff does not write the stories, I will do my best to scour the club newsletters for articles you want to read, so give me your input.

To help club newsletter editors, past issues of the *NNL* are available on the AMA Web site, www.modelaircraft.org. Go to Publications, then click on *National Newsletters.* You have access to all newsletters published since January 1997.

If you have questions regarding the *National Newsletter,* write to Sarah Greiner, *National Newsletter* editor, 5161 E. Memorial Dr., Muncie IN 47302; call (765) 287-1256, ext. 228; or E-mail sarahg@modelaircraft.org.

The *National Newsletter* staff

Sarah Greiner
Editor

A graduate of Ball State University in Muncie, Indiana, Sarah has worked as the design/production assistant at AMA since February 2003. Her responsibilities include editing the *National Newsletter* and *Cloud 9,* the National Model Aviation Museum's newsletter. In addition, last summer she helped design and produce *Nats News,* the daily newsletter for the National Aeromodeling Championships. She also works on several other projects for AMA.

Ed McCullough
Technical Editor

Ed flew his first Free Flight model more than 50 years ago. His first Control Line flight followed shortly, and he flew his first Radio Control airplane nearly 30 years ago. Ed saw his first model in 1941 when his father started a Cleveland kit of the B-25.

Ed received his bachelor's degree from Rocky Mountain College in 1956 and his master's degree from Rensselaer Polytechnic Institute in 1965. He spent most of his working life teaching chemistry and physics (with some math, physical science, earth science and computer classes) to high school students. Along the way, he was one of the authors of a science program for high schools, which was recognized as one of the best in the world, he worked in forensics, and wrote a magazine column for 18 years.

TRY SOMETHING NEW

Experiment: Flying gliders can be exciting, fun

By MICHAEL HEER

In the past year, we have had a number of new members whose primary interest has been flying electric park flyers or, in some cases, gas airplanes. They have not flown gliders nor have they shown much interest in trying to fly gliders. If it doesn't "float your boat," I certainly wouldn't force you try gliders, but I would urge you to reconsider and give it a try. Since Radio Control (RC) is a hobby, there is really only one reason to fly gliders: it is fun!

Some new pilots say gliders aren't fast enough for their taste, so let's deal with that argument first. Until a few years ago, the RC speed record for all airplanes was held by a glider. A glider might still hold the record, but I am not certain. The reason a glider held the record is it has no propeller or ducted fan to slow it down. It can be soared to altitude, and, if it is built strong enough, it can dive to great speeds and can be flown across a speed trap at speeds in excess of 200 mph. Slope airplanes have been flying at speeds above 100 mph on the front side of the slope for years. This past year, they have been flown behind the slope in Dynamic Soaring at speeds exceeding 200 mph. So if you want speed, gliders are a good way to go.

Some argue that they like to do loops, rolls, and aerobatics. At the slope, you can do unlimited maneuvers and don't have to land every few minutes to recharge batteries or to refuel. With the right battery pack for your radio, you can fly for hours. You don't need to go to the slope for speed or aerobatics with the new breed of Hot Liner sailplanes. If all you're looking for is speed and aerobatics, I will acknowledge that if you don't try and thermal gliders, you could just as well be flying any electric or gas airplane. It is the soaring aspect that sets gliders apart from other airplanes.

I know pilots who once flew very fast power-scale fighter airplanes and Pylon racers and looked down at soaring and sailplanes … until they tried them. There is something majestic and extremely fulfilling about flying a glider, keeping it aloft by finding a thermal, and being able to use that thermal to climb your airplane high into the sky. You can stay aloft for five to 15 minutes, and on good lift days, for an hour or more. Fun flying with your glider can be extremely relaxing. On the other hand, if you enter competitions, glider flights can be sheer stress.

Some people love slope airplanes, some enjoy thermal duration, and others are drawn to large full-scale gliders. Whether towed aloft by a powered airplane or pulled up by a winch or hi-start, the grace of a large-scale glider is hard to equal.

To new members, I suggest you consider giving the glider a try. You can probably catch a ride with the club glider or someone else's model when it is up at altitude. Give it a chance and see if it doesn't capture you the way it has many other club members. Don't dismiss soaring as "not your thing" until you've tried it.

from *Thermal Topics*
Modesto R/C Club
Michael Heer, editor
Stockton CA

WINTER FLYING

Put skis on your models (for your winter wings)

By BOB KARASIEWICZ

You've probably noticed it's gotten pretty cold and unfriendly outside. That only means it's time for the winter duds. Did you ever think how cool it would be to fly from the snow?

Get some skis, dress warm, and go flying! I like the DuBro line of skis because they have a good torque rod set up to keep them at the proper angle to the airplane. The proper angle means the front of the skis is higher than the back with respect to the airplane fuselage. This means when you land, the skis won't dig in and flip the airplane.

There are other commercial skis out there so don't hesitate to use them. Look for a sturdy spring system to keep the skis at the proper angle. Also, look for a reliable way to put the skis on the landing gear.

If there are several inches of snow, don't think dressing for cold weather will keep you warm for hours. Waterproof boots, double socks, and long underwear are needed. Hunters already know this. If your flying field has a heated shed, that is the best way to keep warm. You can run out and fly for 15 minutes, then run back inside to warm up.

If you have floats, you'll find that flying off snow with them is easier than flying off water. Snow can be an abrasive, so if your floats are painted, using them on snow may require another coat of paint later. I wouldn't use molded fiberglass floats in the cold as the material gets brittle. Plastic floats work great, such as the ones made by GeeBee Products.

Taking off and landing on snow is as easy (or as hard) as doing it on grass. And it is often much prettier.

from *Ramblings*
Roxbury Area Model Airplane Club
Michael Ramsey, editor
Chester NJ

HOW-TO

Soldering pushrods, mechanical connections

The following information originally appeared as a Tower Hobbies technical tip.

Silver solder is recommended for soldering pushrods and other mechanical connections where strength is required. Hobby-grade silver solder is available at most hardware stores or hobby shops.

Use denatured alcohol to thoroughly clean the pushrod. Use sandpaper to roughen the end to be soldered. Apply a few drops of the soldering flux that comes with the silver solder to the end of the pushrod.

Then use a soldering iron or torch to heat the pushrod. "Tin" the heated area with silver solder by touching the solder to it. The heat of the pushrod—not the flame of the torch or soldering iron—should melt the solder, allowing the solder to flow.

Lightly coat the end of the wire with solder. Place the clevis, threaded coupler, etc., on the end of the pushrod. Add another drop of flux, then heat, and add solder. As before, the heat of the parts being soldered should melt the solder, allowing flow. Let the joint cool slowly without disturbing it. Avoid excess blobs but make certain the joint is thoroughly soldered. The solder should be shiny, not rough. If necessary, reheat and allow it to cool. When cool, wipe off excess flux.

from *West Jersey Wind*
West Jersey Radio Control Club
Tom Voorhis, editor
Haddonfield NJ

CONTEST FLYING

Qualities that make up a good contest timer

By LENNY BRZEZINSKI

The pilots who have flown in competition know just how important the timer's job is, but many of us don't realize how big a role the timer has in a contest pilot's flight. Let's look at some specific qualities found in a good contest timer. As you read this, think of your fellow club members. You will chuckle to yourself as you recall which timers are good or bad at the following:

- ✔ Beginning of the contest round
- ✔ During the flight
- ✔ Readying for landing
- ✔ After the flight

Note: Most of these examples are centered around the duration-style contest piloting; however, many of the issues are applicable to an average day of sport flying or even a fun day on the slope.

Beginning of the flight

When the contest round begins, a good timer should make sure the pilot has a radio frequency pin. In large contests where a radio impound is used, the frequency pins often are mixed up. The pilot will be worried about the upcoming flight, so make sure the needed frequency is clear before he or she turns on the radio.

Before your pilot launches, set the timer watch, take a look at the sky over the launch zone to ensure it is clear, and look around. Also, plan your pilot's exit from the launch area. Make sure your pilot does a control check on the model and that the radio's transmitter antenna is up. After your pilot's model comes off the towline, you should be worrying about only one thing: getting your pilot out of the immediate launch area. In a regional-level contest, the launch zone could be full of pilots and timers waiting to launch. In addition, the launch area will likely be cluttered with generators, extra winch batteries, tools, wires, retriever lines, etc. Your pilot won't be happy if he or she trips over an obstacle while trying to get to a clear patch of ground.

Guide your pilot out of the launch area to a safe spot where he or she has an unobstructed view of the entire field. You can guide the pilot by holding on to his or her shirt and inside the upper arm. Whatever method you use, make sure the pilot is expecting it. The timer's eyes should be focused on the terrain, watching for holes, wires, or other hazards.

During the flight

During the main portion of the flight, your job as the timer includes the following:

- ✔ Be an extra set of eyes
- ✔ Be aware
- ✔ Help make decisions
- ✔ Reduce your pilot's load

As a timer, don't just stare at your pilot's model as it glides around the sky. You are the extra set of eyes! Scan the sky for signs of rising air. Look for other models or birds that may be flying in a thermal and keep an eye on ground signs too. Speak with a calm voice; don't sound panicked or worried. Then, provide your pilot with clear, concise communication of what lift conditions are.

Don't give your pilot useless information. For example, if your pilot's Sailplane is downwind and committed to the only thermal in the area, telling him or her about the

Please see **CONTEST FLYING** on page 12

huge thermal a 1/2 mile up is useless. If, however, you see a promising chunk of air within reach, position yourself in front of the pilot and use your arm to point to the area where the lift is. Use your arm to draw a line in the sky, one that the pilot can see with only peripheral vision. While steering the pilot into the lift with instructions, use phrases like "airplane right, keep coming right, roll out, fly that heading." Remember there will likely be sinking air in the patch the Sailplane is flying on the way to the lift so keep your pilot from flying away from the lift. Say something like "push your airplane through the sink."

The pilot will occasionally find that his or her model has flown into trouble. For example, the model may have gotten very low to the ground two minutes into a 10-minute flight. If your pilot finds a small patch of lift, he or she must stay committed to the new thermal. This is a time when, as a timer, you can only watch the model. Let the pilot concentrate. Don't overload him or her with too much information. It is helpful, however, to sometimes say things like "that looks good, keep flying smooth" or "stay with the thermal's drift." If you are certain where the thermal has moved, tell the pilot where it is in relation to the Sailplane. Again, use an easy voice and keep instructions brief.

Landings

Landing a model sailplane on a tiny target at a precise moment in time is the single most difficult task a pilot performs during contest flight. This is especially true in U.S. Thermal Duration contests, but it is just as important in other types of timed duration flight tasks.

A skilled timer will reduce the pilot's workload, helping to ensure competition success.

As a timer, your job is important during this phase of flight. Some of these tasks should have been taken care of before the flight began, such as agreeing on a count down (or count up) with your pilot. Next, as you approach the landing zone, walk your pilot into position so he or she can see the landing target as the model turns into its final approach. With the pilot in position, make sure you are standing behind him or her so you don't block the view.

Now read the stopwatch carefully. Do not look at the model all the time during the last minute of flight. Make sure you are accurately calling out the seconds remaining in the flight to the pilot, not the crowd. Ensure that you make your pilot aware of any strange conditions in the landing zone, such as a big thermal blowing into the area or another model landing short in front of your landing zone. Also, make sure the landing area is clear.

As the model turns into final approach, raise the watch and look over the pilot's shoulder while keeping the watch, landing zone, and the model in your field of vision. Use this technique to make sure you are stopping the watch at the proper time as the flight ends. Also, this method will help you remain aware of an errant over flight of the landing zone by your pilot's aircraft.

After the flight

A good timer reviews the flight with the pilot. As a timer, you should ask how your pilot felt about the flight. Was there something you could have done better? How can you help during the next round?

Also, note that you should never clear the stopwatch until after the flight scores have been turned in, just in case there is a question. Typically, the timer helps the pilot by returning the radio and score card to the impound area. At this point, be certain the radio is off. It is also worth mentioning that many airplanes have been lost because radios were left on when they were returned to impound.

Timers are important

The timer is an important member of a small competing team. The team's goal is to complete the competition's task. The timer cannot simply read the stopwatch. Rather, you have an important job to do. You can make the difference between winning and losing a contest, having the pilot's airplane suffer an off-field crash, or alternately taking the model up to "speck" altitude.

The final decisions made during any flight rest with the pilot. A skilled timer, however, will significantly reduce the pilot's workload, helping to ensure competition success.

from *Gull Wings*
Torrey Pines Gulls Radio Control Soaring Society
Cody Barnes, editor
San Diego CA

RULES FOR BEING HUMAN

1) You will receive a body. You may like it or hate it, but it's yours to keep for the entire period.

2) You will learn lessons. You are enrolled in a full-time informal school called "life."

3) There are no mistakes, only lessons. Growth is a process of trial, error, and experimentation. The "failed" experiments are as much a part of the process as the experiments that ultimately "work."

4) Lessons are repeated until they are learned. A lesson will be presented to you in various forms until you have learned it. When you have learned it, you go on to the next lesson.

5) Learning lessons does not end. There's no part of life that doesn't contain its lessons. If you're alive, that means there are still lessons to be learned.

6) "There" is no better place than "here." When your "there" has become a "here," you will simply obtain another "there" that will again look better than "here."

7) Other people are merely mirrors of you. You cannot love or hate something about another person unless it reflects something you love or hate about yourself.

8) What you make of your life is up to you. You have all the tools and resources you need. What you do with them is up to you. The choice is yours.

9) Your answers lie within you. The answers to life lie within you. All you need to do is look, listen, and trust.

10) You will forget all of this.

from *Wingflaps*
Windom Eagles Model Airplane Club
Bob Byers, editor
Windom MN

MAINTENANCE

Notes about engine bearings

By JIM McNERNEY

Make sure the fuel you use has sufficient lubricant. Regardless of the fuel used, it's a good idea to insert after-run oil when you are finished flying for the day. Some fuels, particularly those with high castor oil content, will cause a varnish to build up inside the engine over a period of time. If you remove the glow plug and rear plate and immerse the entire engine in denatured alcohol overnight, then remove the varnish with a stiff brush, the engine will be ready for an application of oil. Make sure it gets on the bearings and coats the piston and sleeve. On four-stroke engines, lubricate the cam gear, tappets, push rods, and valve lifters.

Replacing engine bearings is not difficult, but if you are not used to disassembling an engine, don't try to replace the bearings yourself. Send the engine in for an overhaul.

The following is gleaned from many sources, including experience, reading, and recommendations from bearing suppliers.

New bearings are provided with shields on both sides. The rear shield must be removed on the front bearing, and both shields should be removed on the rear bearing. This is best done by making a small hole in the shield and carefully removing them with a small, sharp pointed instrument, such as an awl.

To remove old bearings, disassemble the engine down to the crankcase with a crankshaft. Place the crankcase in the oven and heat to 350°. Don't use a torch as the case can become distorted (or worse, melted).

Place the new bearings in a plastic bag in the refrigerator. The difference in the coefficients of expansion and contraction will cause the crankcase to expand to its maximum size and the new bearings to shrink.

After you have heated the crankcase, remove it from the oven (remember, it's hot). Gently tap the case on a wooden board until the old bearings fall out. Now, install the new bearings. Remember, the shield is forward on the front bearing, and the rear bearing has no shield. This ensures adequate flow of lubrication. All you have to do now is find the rest of the pieces and lubricate and reassemble the engine. No additional break-in should be required.

Note: Smaller, lower priced engines are frequently equipped with sleeve bearings rather than ball bearings. Do not attempt to replace sleeve bearings.

from *The Beacon*
via *Propwash*
Heart of Texas Miniature
Aircraft Club, Inc.
John Hill, editor
Chilton TX

CONSTRUCTION

Drilling bolt holes

By RICK GIANNINI

On most of the glow engines we use today, the propeller reamers that are currently available usually work for propeller hole enlargement. However, when we move up to larger engines, there is a need for a hole larger than the reamer is capable of making. So we need to drill an accurate, centered hole.

If you have a drill press, try this:

- ✔ Move the drill plate off to the side a few degrees so the hole is not under the bit chuck.
- ✔ Drill and tap a hole for a 1/4-20 bolt.
- ✔ Thread a 1/4-20 bolt up from the bottom of the plate about 1/4 to 3/8 of an inch.
- ✔ Bevel the end of the bolt with a 1/4-inch bit.
- ✔ Set a new propeller over this short alignment pin (bolt) and accurately drill the larger propeller hole.
- ✔ Center the pin using the beveled tip of your drill bit to align it.
- ✔ Drill about halfway down the propeller hole, move your plate back to the regular position, and continue to drill through the propeller.
- ✔ Hold the propeller firmly to prevent spinning.

If your engine uses a multibolt hub, the front plate usually has a short-threaded post for a spinner bolt. This post is conveniently the same size as the factory centered hole on a big wooden propeller. Put the front plate on the propeller with the post in the hole and drill the outer holes as needed.

I suggest that if you are drilling larger propellers, you use a drill press. If you try this by hand, it is practically impossible to get an accurate hole, and on larger propellers, you get a lot of vibration from an inaccurately centered hole. If you do not have a drill press, ask around the club or have someone you know help you. In my book, ruining a $15 propeller is not a good thing.

Happy flying!

from *News-O-Flyin'*
The Desert Hawks R/C Club
Rick Giannini, editor
Lake Havasu City AZ

WORKSHOP ASSISTANCE

HINTS & TIPS FROM FELLOW MODELERS

TOP TIP

Is that iron hot enough?

A good way to see if your iron is hot enough, or worse yet, too hot, is to place the iron on a stand (I use a 6-inch scrap 2 x 4) so the foot is facing up. The top of the iron should rest on the 2 x 4. Get a scrap of the material you are using to cover the airplane. Using a Coverite thermometer, heat the iron to the recommended temperature. Then, rest the scrap on the shoe. If it shrivels into a ball right way, the iron is too hot. Readjust the temperature and try again. If nothing happen, then the iron is too cold. Keep adjusting until the scrap barely shrivels. I wait until it shrivels rather slowly and use that temperature as my hot setting. For my low setting, I watch for the piece to shrivel in a few seconds. Since I use MonoKote almost exclusively, I just mark on the iron where the two settings that work best for me are located. You might have to experiment to see what works best for you.

from *Circus Flyer*
Camarillo Flying Circus
Ron Boyer, editor
Camarillo CA

Fuel cans

If you have a favorite or otherwise standard fuel can in your flight box, then you routinely transfer fuel from one can to another. While you are doing this transfer, you have the perfect opportunity to make sure you are using only the cleanest of fuels. Put a coffee filter in the funnel you use for the transfer for super-fine fuel filtration.

Scrap aluminum

from Mark Kallio

One of the most useful and inexpensive tools in the workshop are pieces of scrap aluminum angle iron cut to various links and of various sizes. I find that a selection of 1-inch, 2-inch, and 3-inch pieces, varying in length from one to six inches, is quite helpful, and these can be obtained at a metal supply shop. If you have a metal fabricator near you, you might try asking him to sell you some scraps of angle about these sizes. Since these lengths are considered trash to these fellows, you may get lucky and get them for free. Even if you don't, the cost should be minimal, and as useful as these are I would have purchased new stock and cut it up into pieces to obtain these tools.

What good are they, you ask? Well, here are a few of the things I use them for, and I'm sure you can come up with more once you start using them. First off, this is a great way to align the table on disk/belt sanders, drill presses, band saws, etc. You can use them to hold items to be glued or drilled exactly perpendicular to the work surface, such as drilling into the edge of sheeting, or holding ribs at 90° to the table while your adhesive dries.

Glasses and paint

Do you wear glasses? Do you spray paint your models? The next time you do both at the same time, try this. Stretch a piece of Saran Wrap over the glasses using some Scotch tape to hold it in place. Now when you finished painting, simply peel off the Saran Wrap and you'll have glasses you can still see through. *(Technical editor's note: Using safety goggles is another idea.)*

Epoxying hinges

from Mark Kallio

An easy way to epoxy hinges in control surfaces and to be sure to get the glue to fill the hinge slot is to use a plastic drinking straw as a disposable "hypodermic." Flatten the end of the straw between your fingers and test fit it into the hinge slot so you will get the hang of inserting it. Then mix your epoxy, scoop some up in the end of the flattened straw, insert it into the slot, and "milk" the epoxy into the slot. You can wipe the outside of the hinge slots off before inserting the hinges. This assures that each slot is filled with epoxy. I like to take a small drill and drill though the control surface to pin the hinges with a toothpick. The toothpick should be cut off flush and a small piece of covering placed over the pin. These are only noticeable upon close inspection, and the benefit to the control surface is substantial.

Instrument panels

from Mark Kallio

An easy and cheap way to obtain an instrument panel for that sport model is to look through a full-size airplane magazine for an advertisement showing instruments. I found one I liked and used my scanner to scan the image into the computer, and then pasted it into my word processor, scaling it to different sizes. This could also be done using a copy machine that will reduce. If using the computer, any size can be easily scaled, and I printed out several different sizes to have on hand. The ones I did were all in black and white, but if you have access to a color scanner and color printer, some really nice instrument panels can be created this way. You also could add color to black and white copied instruments using markers or colored pencils so they look more realistic.

Mylar covering

Have you ever had trouble peeling the backing from mylar covering material? I certainly have, especially with the lower temperature coverings. The easiest way to prevent a nervous breakdown when you are trying to peel this stuff is to use two pieces of masking tape. At a corner of the mylar, stick a piece of masking tape on the front and back of the covering, with about half hanging over the edge so that the pieces of tape stick together past the edge of the covering material. Then peel the two pieces of

tape apart, and presto! The backing peels right off. Happy covering!

from *Tangled Lines*
Tampa Bay Line Flyers
Phil Bayly, editor
Tampa Bay FL

Removing oil residue stains

To remove oil residue stains from a four-stroke exhaust, take the exhaust from the engine and pack it into a can of hand cleaner, such as Goop or Gojo. Leave it there for a couple of days (the longer the better). Upon removing the exhaust from the cleaner, rinse it with warm water, and the baked-on residue comes right off with some light scrubbing.

from the newsletter of the
Holly Cloud Hoppers
Scott Rhoades, editor
Holly MI

Light, strong servo mounting

The servo trays that come with the radios require a 6-point mounting. They never fit right in your airplane, and they allow the servos to flop around too much under stress. A lot of kits include hardwood servo rails, but these are heavy, require reinforcement on the typical fuselage side, and are a pain to fit correctly.

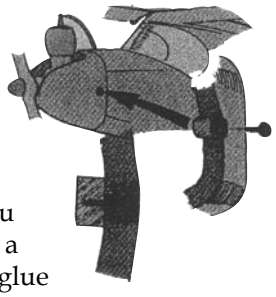
Try making your own mount out of light plywood. It becomes a strengthening part of your airplane, is very light yet rigid, and you can set up your servos in the configuration you desire. Glue in a couple of light scrap balsa rails to the sides of the fuselage for guidance and to increase the gluing area. Cut the light plywood to fit the sides of the fuselage snugly and cut appropriate holes for the servos. Add an extra small piece of light plywood underneath, where the servo mounting screws will go. Now you're all set.

from *The Beacon*
Miramar Radio Control Flyers
Dick Doucet, editor
San Diego CA

Easy mount cowl

from Howard Schmidt

To prevent cowl screws from crushing balsa, drill a large hole through each side of the cowl. Drill holes through two dowels to make wooden bushings (If you are able to, use a lathe). Finally, glue in the now suitable diameter hardwood bushings. The screws can be driven into the wooden blocks or into the engine bearers.



Custom trim sealer

from Donald Kavanaugh

Cut the ends off large aluminum rain gutter nails. Then bend, file, and polish the resulting "rods" to make custom trim-sealer tools that can be inserted into your Top Flite trim-sealing iron.

Cutting corners

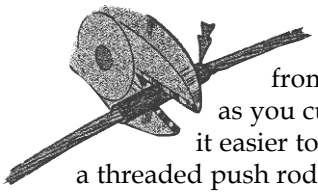
from Roy McGuckin

For a better fitting joint when using triangle stock, sand a little off the 90° corner to provide clearance for any glue fillet that may exist.

Captured on tape

from John Clark

Before cutting steel control cable, wrap it tightly with masking tape to prevent the strands from unraveling as you cut. It makes it easier to solder into a threaded push rod end too. Remember to wear safety goggles.



from *Circus Flyer*
Camarillo Flying Circus
Ron Boyer, editor
Camarillo CA

Push rods

Did you ever go through all the trouble to make up your control surface push rods only to find at installation that they were a quarter inch too short? Try this easy way to get the lengths just right. Tie a string to the control horn on the control surface. Drop the free end of the string through the fuselage. With the control surface in the neutral position, tie the other end of the string to the servo arm. Cut off the excess string at both tie points. Now, cut the string at the two and what you end up with is a piece of string that is the exact length of the push rod you will need to fabricate.

Paper circles

Use a paper punch to cut out little circles of gummed paper. Stick these pieces to the backside of firewall blind nuts. Once you do this, you can fuel proof the tank compartment with resin without fouling the threads of the blind nuts.

Pellon

Fabric stores sell a product known as "pellon." This can be used for general reinforcement and is especially good for wing center sections. Be careful when you do apply it as it does have grain and should be applied in the direction that affords maximum strength.

from *The Fly Paper*
South Bend Radio Control Club
Jack Allinger, editor
South Bend IN

Firewall gasket

Where you have a screwed-on, removable firewall/motor mount, oil seepage can occur. RV suppliers have flexible "putty tape" that can be hand-formed into a squishable, removable gasket. Silly Putty might also work.

from the newsletter of
SAM 26, Central Coast Chapter
Bob Angel, editor
Santa Maria CA

Sandbag weights

Fill plastic Ziploc bags of various sizes approximately three-quarters full of fine sand and seal each well. Use these to hold down large parts of your airplane, such as wings, while building. The sand conforms to the shape of the parts. The bags also work well when gluing sheeting.

from the newsletter of
The Orbiting Eagles
via *WIRCS Touch & Go*
Mike Mosbrooker, editor
Oak Harbor WA

Academy of Model Aeronautics
5161 East Memorial Drive
Muncie, Indiana 47302

Non-Profit Org.
U.S. Postage
PAID
Permit No. 810
Muncie, IN