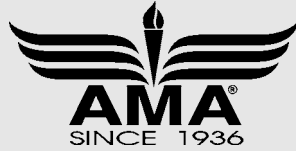


# NATIONAL NEWSLETTER

Academy of Model Aeronautics

July 2004



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## About the *National Newsletter*

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## FINISHES

# Covering materials for RC models

By PAT TRITLE

Many years ago, covering a model airplane meant hours at the workbench, inhaling dope fumes, spraying tissue or silk with water to draw it tight, and waiting many hours drying time between coats of dope to seal and paint the cover. I've heard this era of modeling referred to as "the good old days."

Personally, I really enjoy doing this type of covering, but for the modeler with a limited amount of hobby time, there are several alternatives that require far less skill and still produce a nice looking finish in less time and with a lot less effort.

Within the realm of iron-on covering, there are three basic types: the weaves, the Mylars, and the synthetic tissues. Within those major groups are some subgroups. For the weaves, there is Solartex (also found as Colortex) and Super Fabric. Also in that group, you'll find 21st Century pre-painted fabric, Nelson Lightfab, and Super Coverite. These materials are available in eight basic colors.

In the Mylar realm, there is MonoKote, UltraKote, TowerKote, EconoKote, Oracover, and Nelson Litefilm. The color selection of these materials is excellent.

Finally, there are iron-on synthetic tissues, found under the names Litespan, Airspan, and Black Baron Coverlite. Again, color selection is limited to about a dozen choices, including some fluorescents.

### Iron-on fabrics

As weaves go, my favorite is Solartex simply because it's the easiest to use. It lays down nicely, it's easy to remove the wrinkles, and it goes around compound curves beautifully. The downside is that over

time, the adhesive will release and the cover will fall off the model. A simple cure is to brush on a coat or two of Balsarite (the type recommended for film covering) before you cover your model.

Nelson Lightfab is a lighter grade of the same type of material. I recommend this one for .40 size or smaller models. For models larger than that, stay with Solartex or others in that family.

21st Century fabric is by far the most difficult of all the fabrics to use. I have found that this material is difficult to apply, does not tighten well, and is torture to use around compound curves. The shrinkage is limited, offers little rigidity when applied over open structures, and does not hold its shape well in direct sunlight. However, over sheeted surfaces, the material does lie down nicely, but it requires a fair amount of maintenance to eliminate the bubbles that occur when it is exposed to heat or direct sunlight.

With the exception of the 21st Century fabric, all of these materials, when used on liquid-fueled airplanes will require some type of sealer coat to eliminate fuel soaking that holds dirt and grime in the weave and is very difficult to remove.

### Iron-on films

There are two basic classes of iron-on films: MonoKote and UltraKote. The easiest way to distinguish one from the other is that MonoKote is stiff, where UltraKote is more pliable and rubbery. These films are available in several colors, but MonoKote still offers the best selection. The MonoKote class materials are applied and shrunk at a higher temperature

Please see **FINISHES** on page 2

than UltraKote, but UltraKote handles compound curves much more easily, though offers less torsional strength than MonoKote over an open structure.

Over fully-sheeted models, I prefer UltraKote since it goes on with much cooler temperatures and is not prone to bubbling like MonoKote. For trimming, UltraKote can be applied over MonoKote since it is applied with cooler temperatures, though MonoKote shouldn't be ironed onto UltraKote. Also, when MonoKote is applied with heat as a trim material over MonoKote, the adhesive will tend to gas off and cause bubbling between the layers. The only way to avoid this problem is to apply the trim with commercially available solvents or even Windex glass cleaner (or other types of cleaners that contain Ammonia D).

Finally, there is Nelson Litefilm, which is also available under the name Solar Film, and is recommended for small park flyer electric models, although I've heard of people using it on gas models up to .10 size with excellent results. This material is applied at very low temperatures, shrinks beautifully, and handles compound curves better than any other iron-on material I've used. What's even better is that it will shrink only as much as needed to eliminate puckers and wrinkles and will not distort even the lightest of airframe structures.

Even though Litefilm is applied at very low temperatures, the adhesive is very aggressive, and as a result, the material is prone to sticking to itself if

the adhesive side contacts itself. The instructions offer a clear description of the solution and should be followed closely.

TABLE OF WEIGHTS	
Litefilm	.600 oz./sq. yd.
Airspan	.673
Litespan	.849
Colored Transparent MonoKote	1.685
Opaque Colored MonoKote	2.224
Nelson Litefilm	1.600
21st Century Fabric	2.310
White Super Coverite	2.400
Colored Super Coverite	2.700

**Synthetic iron-on tissue**

The iron-on synthetic tissues are available in two types: Litespan and Airspan. Litespan is also available from Black Baron under the name Coverlite. Both of these materials are identical, except that Litespan has a sealer coat applied and Airspan doesn't.

This type of material is an excellent choice for electric park flyers, but I've also used it on gas models up to .074 size engines. Neither of these materials has adhesive applied, so before it is ironed onto the model, a coat of Balsa-Loc must be applied to the model, everywhere you want the cover to stick. Having used several different adhesives to apply Litespan, I found the water-based Balsa-Loc to be the best choice since it releases

with heat, allowing the cover to be pulled and tugged around to eliminate wrinkles.

The downside to this material is that it doesn't do compound curves well. Airspan is better than Litespan, but neither is all that great. Also, the material has a very limited shrink, so the wrinkles need to be pulled out before shrinking begins. Finally, this is a low temperature application and is very sensitive to overheating. Once overheated, it will never shrink again.

This is by far the most difficult of any of the lightweight iron-on covers to use, but once you get the hang of it, it works nicely for a "tissue look" cover. Trim is applied using Japanese or domestic tissue and can be applied using dope or water-based varnish. Since I always add tissue color trim, I prefer Airspan since it starts out lighter, and a sealer coat will be added over the trim anyway, ultimately producing a lighter finish.

**Conclusion**

The one thing all of these materials have in common is to get good results, they must be applied properly. More heat isn't necessarily better and won't cover a sloppy job of applying the cover or preparing the surface to which the cover is applied. The best advice is to follow the manufacturers' recommendations for application and shrinking temperatures, and to use the material best suited for the type of model you're building.

from *The Flying Machine News*  
 Rocky Mountain Flying Machine  
 Bob McCachren, editor  
 Albuquerque NM

## NEED MATERIALS FOR YOUR CLUB NEWSLETTER?

Check out [www.modelaircraft.org/templates/ama/newsletters.asp](http://www.modelaircraft.org/templates/ama/newsletters.asp). You'll find every issue of the *National Newsletter* published since 1997. It's a great resource for construction, safety, and how-to articles as well as hints, jokes, cartoons, and general AMA information.

# What to do with your left hand while you're flying

By BOB KARASCIEWICZ

Students typically do little with their left hands while learning to fly. Most of the throttle control is of the on/off type—on for takeoff and flying and off for landing. I'd like to tell you why you should use both controls on the stick.

Let's start with a fun maneuver that uses both rudder and throttle. I call it the "tail wag." Start with a nice, high and straight line (as all maneuvers are started) parallel to the runway. Have the throttle set to about half. As you go past yourself (the center), smoothly raise the throttle to full and let the airplane gain speed until it gets to full speed. Now it's past you and going fast. Pull up to vertical and go straight up.

As soon as your airplane is going straight up, start moving the rudder stick side to side. Take roughly a second to do this; don't stop until the airplane slows down and almost stops. At this point, push down elevator and resume level flight. Don't forget to lower the throttle to approximately half and make your turn back. Did you see the tail wag? Wasn't that cool?

Do it again. Each pass do the same thing and have fun. Now you are making the airplane do what you want! You're using the rudder and it's a ball. Let's try something a little more complicated. If you practice these things, using the rudder will be just like using the ailerons. You'll be doing it automatically.

## The flat turn

Flat turn? How does an airplane turn flat? Everyone knows an airplane has to bank to turn. My instructor told me that when I was just starting out! Relax and everything will be all right. Since you are using the rudder, you can do more things with that beautiful trainer. Let's try one.

First establish a nice high and straight line parallel to the runway. As I said before, most maneuvers

start that way. Have the throttle set to approximately half again. Just before the airplane gets to the center (right in front of you), raise the throttle to full. The airplane will gain speed. As the airplane gets to the center and is going fast, slowly go to roughly half rudder (this stick movement should take about a full second). Use the rudder to turn the airplane away from the runway. If you're going from left to right, give left rudder. If it's going from right to left, give right rudder.

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**Students do little with their left hands while learning to fly. I'd like to tell you why you should use both controls on the stick.**

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As you input the rudder, the airplane will start to do two things: roll and yaw (turn). At this point you will give opposite aileron to prevent the bank (roll). If you gave right rudder, give left aileron. If you gave left rudder, give right aileron. Move the aileron stick enough to keep the wings level. Depending on the wind, you will adjust the roll correction by adding or removing aileron input.

To reiterate: If you're going left to right at full throttle, give approximately half left rudder, and as the airplane starts to bank, use right aileron to keep the wings level. The airplane will be turning but not banking. You will only see the yaw. On aerobatic airplanes, when you give rudder, the airplane will do little or no banking.

This rolling as you give rudder is called roll coupling, and it has a lot to do with the amount of dihedral in the wing. This is not an aerodynamics column so I will not go into why. Hey, my airplane is turning without banking and I don't know what to do next? Sorry, student!

Let's get you out of the flat turn. When you have turned enough, just let the sticks (meaning both the rudder and aileron) go back to

neutral. Please don't just let go of the sticks. That "boing" drives me crazy, not to mention it will quickly wear out your transmitter as it will reduce the accuracy of your stick input.

Practice this stuff and while you are practicing using the rudder don't forget to have fun. There is one danger you may run into while doing flat turns. After doing a 90° flat turn, you will no doubt want to do more. That is, you'll want to complete a flat circle. They are really great and very impressive. Do them, but beware. The flat turn is a high drag maneuver. After all, you are forcing the airplane to go sort of sidewise. This causes more drag and speed goes down, causing less lift. Also, there is even less lift because of the sidewise airflow over the wing. Less lift means you could run out of lift. Running out of lift means a stall. Now don't start worrying. You are nice and high, remember. If you do stall, release the rudder and aileron and return them to neutral, maintain full throttle and point the nose down a bit. As you gain speed, give a little up elevator and you will have full control as before.

In all, it's no big deal. Stalling is part of flying. Actually, there is no need to even go that far. With today's trainers you could do full rudder flat turns and multiple circles before you'd ever get into trouble. Okay, now let's get to the really interesting stuff. We're going to combine all you have just learned and do an amazing maneuver that you've seen and admired ever since you started coming to the field.

## The stall turn

You know what to do. That's right, high, straight, half throttle and parallel to the runway. As you pass the center of the field, you will go to full throttle and maintain heading at a high rate of speed. When you come to the place where you would normally

Please see **RUDDER CONTROL** on page 4

turn around you will instead give full up. Go up straight, vertically, and at full throttle. After you have gone a few airplane lengths and your airplane has slowed down, lower the throttle to roughly one-third (keep it well above idle). As your airplane slows, give full rudder and after about a second, enough opposite aileron to keep the aircraft from rolling.

If you catch it just right, your airplane will turn flat within its own wingspan. Now you will be heading straight down. Release the rudder and aileron, raise the throttle to about half, and when you have gained some

speed, return to level flight by giving up elevator.

One of the things that can go wrong is the aircraft flops over on its back or front. Recovery is the same. Most likely you were going too slow before giving the rudder. Input the rudder control sooner or don't throttle down as much. If you still can't catch this maneuver, you may want to talk to your instructor about increasing the throw of the rudder. Many trainers have very little rudder throw.

You may not catch the stall turn with a first try. Try it again! Don't be afraid to go back to one of your instructors and ask for help. This can be a little tricky. You will be able to do this within a couple of tries.

If you are using a second airplane for this maneuver, you will probably have less roll coupling with the use of the rudder so be moderate with the use of the aileron corrections. At my club, we invite all soloed pilots to keep coming on training nights. There is plenty to learn after you solo. After all, we (as do most clubs) only require the most rudimentary maneuvers and takeoff and landing to solo. Most of your learning will take place after you solo.

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

## Contest fun from The Farragut Flyers

*Over the years The Farragut Flyers have tried to make their Fun Fly contests less about who has the fastest model or who is the best pilot and more about having fun. With this in mind, the club developed events to even the field between the "ace" and the "novice" pilots. Events can be flown with any type of airplane.*

### Whifferdill

Give pilots a target time, or before they take off, have them roll two die to determine their time. Randomly assign numbers 90-120 to the numbers 2-12 that are possible to roll with the dice. Number rolled is the time the pilot has to fly before he/she lands. The pilot takes off and climbs to a safe altitude and calls "start timing." Begin timing at that point and end when the wheels touch the runway.

As soon as the pilot calls "start timing," he/she must execute an abrupt, radical 90° heading every five seconds. If the pilot fails to do that, he/she is penalized 20 seconds of time for each infraction. These abrupt maneuvers may be in any direction—up, down, left, or right—as long as it is a radical departure from where the pilots was headed. When the pilot is ready to land, he/she calls "landing" and the Whifferdilling portion of the flight is over. Closest time wins.

### Timed glide with a twist

Most timed glides begin with 20-30 seconds of engine run to get the pilot as high as possible, then the engine is shut off, and the pilot tries to glide for as long as possible. This gives an edge to those with high performance aircraft and puts the novice with a trainer out of the running.

In the fun fly version, the pilot takes off, climbs to a comfortable altitude, and when ready, shuts down the engine. Give the pilot five seconds, then have him/her advance the throttle. If the engine keeps running, let the pilot try again until it is shut down. As soon as the pilot has verified that the engine is stopped, begin timing and give the pilot a target time, which in the interest of keeping the event moving along, is usually between one minute 30 seconds and two minutes. The pilot's job is to land on the runway as close as possible to that time. Timing stops when the wheels touch the runway. To make it a little harder to count seconds, ask the pilot questions about the model they are flying for the first 30 seconds to one minute of the flight. Closest time wins.

### Five-card draw

Assign maneuvers to each rank of a deck of cards.

- Ace=free pass, no maneuver required
- 2=1 roll
- 3=2 each 360° right turns
- 4=2 rolls
- 5=2 each 360° left turns
- 6=1 loop
- 7=1 loop and 1 roll
- 8=1 left 360° turn and 1 right 360° turn
- 9=free pass, no maneuver required
- 10=5 loops
- Jack=5 rolls
- Queen=3 loops and 3 rolls
- King=5 each alternating loops and rolls
- Joker=free pass plus drop one of your five picks

Pilot starts the airplane and the helper holds it on the runway. Time starts when the pilot rolls the dice on the first attempt to get a seven. Pilot continues until a seven is rolled. The pilot takes off and flies the maneuvers. Time stops when the wheels touch the runway. Fastest time wins.

*Submitted by Matt Jacobson • The Farragut Flyers • Falls ID*

# Reducing RC engine noise

Here are some things that may help you reduce noise levels from your engines so that you can meet the club's noise requirements.

**Use a good muffler system.** The original muffler should provide a good level of sound dampening—if the baffles haven't been removed. There are quite a few after-market mufflers available if your engine is particularly noisy. You can also try feeding the output of your muffler into an additional expansion chamber for more quieting.

**Add a rubber exhaust deflector.** This can reduce noise from 1-3 dB in certain cases. It also extends the exhaust gasses out a few inches from the airplane.

**Use a larger propeller.** Increasing the propeller diameter by one-half to one inch can have a 2-5 dB reduction in noise. This slows the engine rpm.

*Note:  
Important! If you have a damaged propeller, it should be used for paint stirring. Only if there are very minor dings or surface flaws should the following suggestion be done. Clean and smooth; do not remove material.*

**Clean, smooth, and balance the propeller.** Clean edges will cut the air smoothly with less noise whereas cuts and dings on the edges can cause friction and drag in the airstream, thus causing noise. Use 150-grit sandpaper for the rough areas and 400-grit for finishing work. When you consider that a 10-inch propeller at 10,000 rpm is traveling at 297 mph, the aerodynamic profile of the propeller makes a difference. A cut in the outer edge can cause a hissing sound and add to the engine noise. Balancing the propeller can reduce airframe noise.

**Lower the fuel's nitro level.** For every 5% increase in nitro, expect a 1 dB increase in noise level. Reducing the nitro in the fuel from 15% to 5% can reduce the noise by 2 dB.

**Keep the airframe tight.** Often, noises develop in the fuselage and/or wing areas due to mechanical resonance from engine vibrations. This can be caused by loose hardware, not enough internal wing bracing, and the covering over open bay areas acting as a drum. Soft engine mounts can reduce or eliminate these noises by decoupling the engine from the firewall. This essentially lowers the resonant frequency and partially damps the high frequency vibration. If the wing covering is the culprit, also consider side mounting the engine to eliminate the drumming effect.

**De-tune the engine.** Richen the engine's fuel mixture to reduce rpm.

This obviously reduces power, but the engine is quieter.

**Check the carburetor.** The carburetor air

intake can be a source of noise. Attaching an air filter can reduce noise considerably.

**Two-stroke vs. four-stroke engines.** Switching from a two-stroke to a four-stroke engine can make the noise seem quieter. Although four-stroke engines are just as noisy, the lower rpm and power impulse every other revolution can make the engine noise less objectionable.

from the newsletter of the  
Valley City R/C Club  
Carl Koehn, editor  
Parma Heights OH

## 21 WAYS TO KILL YOUR CLUB

*The following list was obtained from a leading national community service organization. We can all learn from it.*

- 1) Don't attend meetings, but if you do, arrive late.
- 2) Be sure to leave before the meeting is over and make sure everyone hears you leave.
- 3) Sit in the back so you can talk with other members during the meeting.
- 4) Never have anything to say at meetings; wait until you get outside, then always be negative.
- 5) After meetings, find fault with club officers and fellow members.
- 6) Hold back your annual dues as long as possible, or better yet, don't pay at all.
- 7) Never accept an office or serve on a committee. It is much easier to criticize than to do.
- 8) When everything else fails, abuse the club's officers.
- 9) Don't bother enlisting new members; let the others do it all.
- 10) At meetings, agree to everything, then go home and do nothing.
- 11) Don't tell the club how its policy can help you, but if it doesn't help you, tell everyone else it's useless.
- 12) Do nothing more than what's necessary, but when other members roll up their sleeves and willingly use their ability to help matters along, complain that the club is being run by a clique or dictator.
- 13) Talk cooperation but never cooperate.
- 14) Get all that the club has to give but give nothing in return.
- 15) Threaten to leave the club if something isn't the way you want it.
- 16) If you're asked to help, always say you don't have time.
- 17) Never read any mailings or seek information. You might find out what's going on.
- 18) If appointed to a position, never devote any time to it. Let someone else do it all.
- 19) Overlook your own shortcomings and concentrate on what *they* are not doing.
- 20) Repeat all the unpleasant things about your club to anyone who will listen.
- 21) Always criticize club officers whenever the opportunity arises.

from *Smoke Signals*  
Meroke Radio Control Club  
Joe Di Prima, editor  
Franklin Square NY

## WD-40 USES

- Protects silver from tarnishing
- Cleans and lubricates guitar strings
- Gets oil spots off concrete driveways
- Gives floors that 'just-waxed' sheen without making it slippery
- Keeps flies off cows
- Restores and cleans chalkboards
- Removes lipstick stains
- Loosens stubborn zippers
- Untangles jewelry chains
- Removes stains from stainless steel sinks
- Removes dirt and grime from the grill
- Keeps ceramic/terra cotta garden pots from oxidizing
- Removes tomato stains from clothing
- Keeps glass shower doors free of water spots
- Camouflages scratches in ceramic and marble floors
- Keeps scissors working smoothly
- Lubricates noisy door hinges on vehicles and doors in homes
- Gives a children's play gym slide a shine for a super fast slide
- Lubricates gear shift and mower deck lever for ease of handling on riding mowers
- Rids rocking chairs and swings of squeaky noises
- Lubricates tracks in sticking home windows and makes them easier to open
- Spraying an umbrella stem makes it easier to open and close
- Restores and cleans padded leather dashboards in vehicles, as well as vinyl bumpers
- Restores and cleans roof racks on vehicles
- Lubricates and stops squeaks in electric fans
- Lubricates wheel sprockets on tricycles, wagons and bicycles for easy handling
- Lubricates fan belts on washers and dryers and keeps them running smoothly
- Keeps rust from forming on saws, saw blades, and other tools
- Removes splattered grease on stove
- Keeps bathroom mirror from fogging
- Lubricates prosthetic limbs
- Keeps pigeons off the balcony (they hate the smell)
- Removes all traces of duct tape
- I have even heard of folks spraying it on their arms, hands, knees, etc., to relieve arthritis pain
- One fellow claims spraying it on fishing lures attracts fish

## HISTORY LESSON

# The story of WD-40

Submitted by DAVE DAGGY

The product now known as WD-40 began as a search for a rust preventative solvent and degreaser to protect missile parts.

It was created in 1953 by three technicians at the San Diego Rocket Chemical Company. Its name comes from the project that was to find a "water displacement" compound. They were successful with the 40th formulation, thus WD-40.

The Corsair Company bought it in bulk to protect their Atlas missile parts. The workers were so pleased with the product, they began smuggling it to use at home. The executives decided there might be a consumer market for it and put it in aerosol cans. The rest, as they say, is history.

It is a carefully guarded recipe known only to four people, one of whom is the "brew master." There are about 2.5 million gallons of WD-40 manufactured each year. It gets its distinctive smell from a fragrance that is added to the brew.

WD-40 has been designated the "official multipurpose problem-solver of NASCAR," a ringing endorsement

if there ever was one. I told my NASCAR-loving sons about this, and they said they couldn't imagine how WD-40 could solve the Jeff Gordon problem.

In celebration of their 50th year, the company conducted a contest to learn the favorite uses of its customers and fan club members (yes, there is a WD-40 Fan Club). They compiled the information to identify the favorite use in each of the 50 states. I was curious about Georgia and Alabama and found the favorite use in both states was that it "penetrates stuck bolts, lug nuts, and hose ends." Florida's favorite use was "cleans and removes lovebugs from grills and bumpers." California's favorite use was penetrating the bolts on the Golden Gate Bridge.

Let me close with one final use—the favorite in the state of New York: WD-40 protects the Statue of Liberty from the elements. No wonder they've had 50 successful years.

from *The Tail Spinner*  
Longmont Aircraft Modelers  
Association  
Mike Guliza, editor  
Longmont CO

## TIP TIME

# How toe-in helps model aircraft

Submitted by RUSS O'BRIEN

In airplanes, toe-in aids in keeping an airplane going straight during takeoff roll and landing roll-out, particularly with tail-draggers. Airplanes with tricycle gear have the center of gravity (CG) forward of the main gear. This helps straighten out an airplane that has developed a yaw angle between where it is pointed and where it is actually going. A tail-dragger has the CG behind the main gear and a slight yaw angle is not automatically corrected but is made worse and can result in ground loop.

Here is where toe-in of the wheels helps both types. An airplane rolling straight ahead has equal drag from each of the wheels. When it takes an unwanted turn to the left, the drag from the left wheel goes to zero while the drag at the right wheel increases. The net effect is the unbalanced drag exerts a retarding force and turns the airplane back to the desired direction. This wouldn't happen without toe-in.

from *Plane Talk*  
Aerobatic Aces  
Bob Van Singel, editor  
Three Rivers MI

# WORKSHOP ASSISTANCE

## HINTS & TIPS FROM FELLOW MODELERS

### TOP TIP

#### Free building materials

It's election time and soon there will be tons of free building material available. In most parts of the country, coroplast signs are used by people running for office. Almost everywhere, the signs have to be down within a few days of election. If you see a sign up past that date, do your civic duty and toss it into the trunk of your car. It's great for things like elevators or even building whole 1/2A airplanes. Last year, I saw a 75 mph airplane with the wing built out of coroplast. Check out some of the SPAD Radio Control sites on the Web for some creative uses.

Another thing to keep your eyes open for is new-home construction. Formica discards are great for making durable templates to cut foam wings. Even short lengths of two-by-fours can be cut into pine wing spars if you have a table saw. Scraps of foam bead board are useful to cut foam wings or even wing tips.

from *Great Plains Combat News Control Line Combat Newsletter for the Great Plains*  
Bob Furr, editor  
Omaha NE

#### Cut-off wheel sets

from Fred Huber

Sears sells a diamond cut-off wheel set that fits Dremel and Black & Decker "Wizard" moto-tools. These wheels eliminate the frustration when dealing with fragile "sand" wheels you buy 20 at a time and break each time you use them. The package comes with two wheels and the mandrel and is inexpensive. No more fragments of cut-off wheel flying around the shop (but you should still wear safety glasses)!

#### Fixing longerons

from Gerald Sullivan

We have all broken a longeron or small spar on a model from time to time. A neat way to fix them is to first poke a couple of holes in the tissue to

allow CyA to penetrate. Then, use a needle and thread to poke through the paper in line with the break and get the thread just behind the break. Have a helper hold the model and gently pull the thread to bring the break back in line. A drop of CyA will penetrate and fix the break. A great advantage is you can pull the thread at an angle and tighten both panels of tissue at once. On heavier longerons, two threads can be used by actually poking a small needle through the longeron on each side of the break.

from *Brainbuster Newsletter*  
Brainbuster Free Flight Club  
Ambram Van Dover, editor  
Newport News VA

#### Storage drawers

A friend built a deep drawer to hang under his workbench for lots of storage, but it created a new problem. The tools he wanted were always at the bottom of the heap. He solved this by adding upper and lower removable trays. The upper tray is just over half-size so it can slide back and forth on top of the lower tray for easy access. Both trays are removable so he can carry them closer to whatever project he is working on. He made the trays out of scrap <sup>3</sup>/<sub>8</sub>-inch pine and assembled them with glue and brad nails.

from *Great Plains Combat News Control Line Combat Newsletter for the Great Plains*  
Bob Furr, editor  
Omaha NE

#### Holes for wing dowels

A standard scenario for installing holding dowels in the leading edge of the wing is to put the wing in place on the fuselage, mark it through the pre-drilled holes, remove it, and drill for the dowels. The problem is when you drill, the drill bit "wanders" slightly and the alignment is off.

Solution? Use a piece of brass tubing as a hole saw. Cut teeth in one end and glue into a piece of hardwood for a handle. Now you can start the hold with the wing in place. Pushing and twisting the tubing allows you to cut right through balsa and even light plywood with little effort. Put a small piece of dowel in your first hole so the alignment stays accurate for the second hole. *Note: A longer piece of brass tubing, with teeth on the end, can cut nice holes in the aft fuselage for nyrod exits.*

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Bob Van Singel, editor  
Three Rivers MI

#### Repair tip

When removing a cylinder from the crank case, I use a heavy tie wrap inserted through the exhaust port and gently use the piston by turning the crank to push the sleeve the first <sup>1</sup>/<sub>16</sub> to <sup>1</sup>/<sub>8</sub> inches out of the crank case. If it does not move with relative ease, apply heat to the outside of the crank case with a propane torch. Never use a piece of metal or screwdriver blade in the port, as this would result in damage to the piston and sleeve.

When replacing a piston ring, always check the surface on either side of the ring. Using a fine wet stone that is flat and not worn, or wet and dry sandpaper (400- to 600-grit) on a piece of glass with a little thin oil, be careful to apply even pressure on the ring. Apply only enough pressure to obtain a good pattern. You don't want to change to dimension of the ring; however, it must seal in the ring gland. This small step can make a big difference in your motor's performance.

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