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BIMONTHLY NEWSLETTER FOR CLUB
OFFICERS AND LEADER MEMBERS

AMA INSIDER



In this Issue

President to President
On the Safe Side
Leader to Leader
Club Corner
Editor's Picks
Tips & Tricks

AMA Mission

The Academy of Model Aeronautics is a world-class association of modelers organized for the purpose of promotion, development, education, advancement, and safeguarding of modeling activities.

The Academy provides leadership, organization, competition, communication, protection, representation, recognition, education, and scientific/technical development to modelers.

AMA Vision

We, the members of the Academy of Model Aeronautics, are the pathway to the future of modeling and are committed to making modeling the foremost sport/hobby in the world.

This vision is accomplished through:

- Affiliation with its valued associates, the modeling industry and governments.
- A process of continuous improvement.
- A commitment to leadership, quality, education and scientific/technical development.
- A safe, secure, enjoyable modeling environment.

President to President

Summer Events are Here

Bob Brown, AMA President, bobb@modelaircraft.org

National Model Aviation Day, which will be held August 17, 2013, is quickly approaching. If your club is not already involved, why not help celebrate and promote our great hobby? We are asking that those participating clubs also support a great cause, the Wounded Warrior Project. Please help those who have given so much for us! If you have any questions, please contact Mandee Mikulski, development communications coordinator, at (765) 287-1256, extension 277.

Our national championships, known as the Nats, has already started and continues until the end of July at the International Aeromodeling Center in Muncie, Indiana. The Indoor portion will be in held Champaign,

Illinois, August 7-10. Additional information can be found at: www.modelaircraft.org/events/nats.aspx. If you can't attend and wish to read daily reports, please sign up for the *NatsNews* at: www.modelaircraft.org/events/nats/natsnews.aspx.

The AMA Audit Report illustrates that we are managing your organization in a positive financial manner. In doing so, it becomes apparent that donations are put to positive use. Supporting the government relations effort with the FAA is one area for which funding is imperative. If it is at all possible, please forward a contribution to AMA Headquarters. Thanks to everyone who has helped this cause.

Have fun and fly safely! →



National Model Aviation Day August 17, 2013



Photos by Pat McHamars, Jerry Smith, Jay Smith, Greg Girmick, Jennifer Oresbaugh, AMA Staff

Making Modeling Memories

Register your club today!
www.nationalmodelaviationday.org

The inaugural National Model Aviation Day will be held on August 17, 2013. The event was established to commemorate and promote the hobby. Proceeds will go to support the Wounded Warrior Project, a group with a mission to raise awareness and enlist the public's aid for the needs of injured service members and their families.

Clubs can register to participate in National Model Aviation Day by visiting www.modelaircraft.org/membership/clubs/nmad.aspx. Registered clubs can share ideas for fundraising, generating media exposure, and attracting spectators.

AMA will give all donations received to the Wounded Warrior Project on behalf of the many clubs participating. With club and member support, we believe this will be a great event that will promote the hobby and aid an organization that benefits our heroes.

Frankenstructor

Jim Tiller, jtiller@hotmail.com

The name creates a mental picture, doesn't it? We likely can all remember a 'Frankenstructor' from sometime in our past. You never forget the one who made your learning experience miserable, although he or she may have taught you something. Let's hope that was not the one who taught you how to fly RC or, worse yet, was not the name that one of your flying students used to describe you.

As a veteran teacher, I can tell you there are no incompetent instructors or worthless students. However, as a teacher and a lifelong student, I can tell you that no teacher reaches all students and no student accepts information from every teacher.

Each teacher has a teaching style and each student has a learning style. Sometimes they mesh well and both are rewarded, but sometimes they clash and the time spent is wasted. Good instructors will recognize the differences in people and try to maximize the chances of having a meaningful learning session. The ones who don't are the best candidates for Frankenstructor.

"What we have here is a failure to communicate." As an instructor, that line from the movie, "Cool Hand Luke," should always be in the back of your mind. You may be saying all the right things, but your student may not comprehend.

Your head is full of aeronautical knowledge, trivia tidbits, and war stories that are worth passing on, but an 11-year-old student, who does not know the difference between an aileron and a rudder, may not be ready to appreciate them. Your old Marine drill instructor's "in your face" explicit instructions surely stuck with you, but a 65-year-old retiree who is all thumbs may not need to hear them repeatedly. If you want to communicate better with your students, try these simple steps:

- **Work the plan.** How can your students excel if they don't know what to do or how their performance will be measured? You or your club should have a training plan. This plan should include an explanation of the progression of training

and what the student should expect at each level. Some clubs have a formal skills review with other members of the organization.

If your club does not have a plan, it should. I have included a great example. These club members put much thought and work into this instruction guide: Patuxent Aeromodelers Radio Control Club, Hollywood, Maryland, AMA Charter #675, Student Handbook, www.paxaero.com/studenthandbook.pdf.

There are plenty of others. Do a Google search and you will find them. The AMA website also has some good references, including this one: The Newcomer's Guide, www.modelaircraft.org/files/education/docs/newcomerguide.pdf.

- **Objectives.** When you have a plan, each of your lessons should have an objective, such as "on this flight I want you to take it up to about 150 feet and do three figure eights with the center of each 8 right in front of you."

That's simple and direct and you and your student know the outcome. Some learn best visually, so you may want to demonstrate the figure eights the first time and then turn the airplane over to your student. As the student executes the lesson, keep your comments brief and to the point, such as, "A little more elevator in your turns." At the completion of the lesson, land or take the airplane back from your student and then ask him or her if he or she has any questions.

Save most of your criticism or suggestions for this post-lesson debriefing. Your drill instructor's harsh words may have stayed with you all of these years, but most agree that constructive criticism is best.

- **Patience.** It is okay to demand perfection, but make sure you have a lot of patience with your students as they get there. No student *wants* to fail. If they don't get it the first time, or even tenth time, keep trying, but try something different and try to get the root of the problem by asking questions. Sometimes, it is a look or a sigh that might be the indicator of frustration. Try to read your

student's non-verbal cues.

- **Teachable moments.** If your student pulls up too sharply and stalls, that is the perfect opportunity to talk about stalls and how to recover. In dog training, it is believed that 90% of the learning takes place in the first three minutes. In humans, it may be slightly longer, but you will still find that most of the learning takes place at the beginning of the session. An increased level of mistakes and a decrease in conversation are two good signs that your lesson for today is nearly complete.

If you have a couple of hours to spend with your student, break it up into shorter sessions. Use the intermissions to discuss safety, vocabulary, or aerodynamics. Teachable moments also apply to the learning environment. It might not be the best day to shoot your first landing if the wind is blowing 15 mph across the runway.

- **Use common sense.** Make sure you are on time for each lesson, even if your student is not. Treat your student with respect. If something breaks, help fix it. Remember what it was like when you were the student.

- **Safe flying habits are learned behaviors.** Safety should not be the glue that holds your plan together. As an instructor, you are the example. Make sure that you do not shortcut any of your safe flying rules.

Begin your lessons by discussing safety and end each with a safety-related issue. Make sure your student knows that his or her fellow fliers will be tolerant of a beginner's mistakes, but not for long.

Your student should know the rules and etiquette of your flying site and follow them. Make sure they know that a crashed airplane requires proper repair and inspection before it goes back into the air.

- **This is supposed to be fun.** Remember that this is a hobby and it is

Frankenstructor

continues on page 4

First Impressions

Rusty Kennedy, Chairman Leader Member Program, amalprogram@gmail.com

First impressions are lasting impressions and you only get one chance to get it right. Few clubs don't need new members.

When a new person arrives at your field with all of his or her new equipment, make it a practice to be as inviting and friendly as possible. Greet him or her with a smile and a handshake. Introduce the person to others at the field. People are usually slightly intimidated when they see several people whom they don't know, but want to get to know.

I'm at my club field nearly every weekend and I make it a point to meet and greet anyone who comes to the field. I give him or her an issue of *Model Aviation* and if he or she has a child, I give the youngster a small balsa glider. I answer questions, provide

club information, and explain how much fun model aviation is. If possible, we try to have an Intro Pilot give him or her a buddy-box flight.

All clubs have a gregarious member who spends much time at the field. Point out new people to this person and let him or her break the ice. If the new pilot has his or her equipment, point the person to a club instructor or one of the clubs more-experienced members to get things checked out. Take the time to make sure everything is shipshape and point out what needs some work. Be nice. We were all new members at one time.

Remember that you never know who you are talking to. I can give you several instances in which I was speaking with

someone whom I did not know and was surprised to learn who they were. One was the former vice mayor who, 20 years ago, was instrumental in my club getting its field. I spoke with him about 20 minutes before I knew who he was.

Recently, I was assigned as administrator of estimate and have been dealing with a local certified public accountant (CPA). I had meeting with the CPA and had my AMA hat on. The CPA said she knew about AMA. As it turned out, she is the sister of a former AMA senior executive. It's a small world!

As Leader Members, we want to set the example for others to follow. You never know who your next club and AMA member will be.

Have a fun summer of flying. →

Club Corner

Let's Expand Our Horizons

Jim Wallen, Club Corner author, sjwallen@tde.com

Let's create some diversity and adventure in our hobby. It is remarkable how many different directions our hobby has taken in the last several years.

It was only a few years ago that helicopters were branded as the "bad boys" by many clubs. They interfered with fixed-wing activities and were deemed to be a general nuisance. Today, they are one of the favorite activities of our newest generation of fliers.

The same can be said of the world of electrics as opposed to "wet fuel" aircraft. Even the older generation of fliers seems to be transitioning to electrics in small and larger aircraft. Smoke and fumes are becoming less popular, while sparks are becoming more prevalent.

There is a new breed of fliers that looms on the horizon while

AMA is working diligently to properly incorporate them into our hobby. RC aircraft that can be programmed to fly a specified path, detect and avoid other aircraft, and even return to the same landing spot they took off from, are now available in local hobby shops. All of these new technologies must adhere to AMA's Safety Code.

Many of the pilots of these aircraft are more interested in the technology than actual flying. The technologies are intriguing to a large segment of the public and are changing at a whirlwind pace.

If some of these newer facets of our hobby seem intriguing to you, be brave and take a jump to some new activities that will broaden your horizons, create diversity, and spark some new interests in our hobby. Try it. You may like it! →



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WWW.MODELAIRCRAFT.ORG/SHOPAMA

Frankenstructor continued from page 2

the safe enjoyment of it that we all seek. Emphasize the aspects that you find most enjoyable about flying and explain all of the different ways people in this hobby challenge themselves. Let them find their own passion, as you did.

Find some time during each lesson for your student to bore holes in the sky or do a loop or two.

There may have been a Frankenstructor in your past, but there likely also were some teachers whom you remember fondly—the ones who you thank for the skills and knowledge they passed on to you. Maybe you can be one of those to someone in the flying community. What a legacy to leave behind!

Hun in the Sun Follow Up

I received this message from Tom Lauletta after the publication of my last article. It is good advice, so I will pass it on to you:

“I just read your article about flying in the sun. At our field

we fly looking south-southwest so the sun is in our face all [of] the time. We all pick an area where the sun is not so we can see better. No matter how much we try to avoid the sun, every flight will cross it at some time.

“One trick I use is to close one eye when the plane enters the sun and open it on the other side. When I open the eye, it does not have to recover and you can see the plane easily although your depth of field will be off a little until the other eye recovers. It works for me.”

Thanks to all of you for the kind words and remarks about my column. That feedback means a lot to me. Keep them coming.

If you get up here to the Black Hills of South Dakota—the Outback of the US—send me a message. We don't get many people here who say, “I was just in the neighborhood and thought I'd drop in.”

Enjoy your summer. →

Editor's Picks

Basic Servo Linkage Geometry (Part 2)

Jack Sallade, website: www.flyrc.com; email: jack@flyrc.info

This is a continuation of an article that ran in the March 2013 issue of *AMA Insider*.

Last time I discussed the force and motion changes that occur if we alter the control horn to servo arm/length ratio. What I didn't discuss were speed and resolution.

In the same way that a longer servo arm gives less applied force and more motion, it also affects resolution and speed. Because our radio decodes our stick motions into a set number of steps, there are only a certain number of positions our control surfaces will move to. The resolution of the radio system is constant.

When I increased the servo arm length I divided that same number of steps over a longer throw, which means less precision in positioning the control surface. Conversely, the speed of the surface movement has increased.

Yes, the elapsed time of the overall motion is similar, but it is covering more distance so if the motion is increased from 2 inches to 4 inches we are covering that 2-inch motion that used to take .15 seconds, which now only takes .075 seconds.

The two tradeoffs could be important depending on your goal. If you are into International Miniature Aerobatic Club-

style Precision Aerobatics, you may only need a small amount of elevator throw. Many of these big aerobats need as little as +/- 20° of elevator motion to execute the prescribed maneuvers. At the same time, you want a massive amount of torque and precision to move the large surfaces that are common on these aircraft and maintain a high level of precision.

Revisiting our tradeoffs, torque is gained at the expense of motion with a shorter arm or longer horn while the same change trades speed for better precision. If the motion of the surface only needs to be +/- 20° so your servo arm can move +/- 60°, why not take advantage of all the precision and strength that a 3-inch servo arm and a 1-inch control horn would provide?

A compromise is typically made between this ideal and the limitations of available hardware, control rod routing options, etc., resulting in something such as a 1.5 or 2 to 1 ratio and then limiting the throw electronically, along with the use of the exponential function. This gives away some of the precision gained, but our radio systems typically have more precision than the pilot has!

Here is one last note about servo arm geometry. We have learned that the proper way to connect our linkage is with

the servo arm at a 90° angle to the servo case at mid-stick. This is the most linear motion available from a rotating servo arm, which is what typically we want. An exception to this is the throttle servo for gas engines. It's a fact of life with gas engines that linear throttle motion leaves the upper half of stick motion with little effect.

If set up traditionally, we often build a throttle curve on the radio to lessen the initial motion of the servo in response to stick motion. This makes each “click” of throttle have a more linear effect. Assuming the throttle servo is pushing forward to increase throttle, try starting with the servo arm pointed nearly straight toward the rear of the airplane. The first 45° of travel will result in a small forward motion as much of the movement is to the side of the airplane in those first “clicks” of travel.

When past roughly 45°, the motion moves toward the front of the airplane, and quickly throttle. When combined with some endpoint adjustments, this can give you a similar effect to the throttle curve radio function. There is other “magic” available by changing the starting position of that arm. Have you ever heard of aileron differential? You don't need a computer radio for that either. Give it a try. →

Pushing the Bubble

Bob Wilson, 3dbob37n@frontier.com

I don't know how many times I've witnessed someone drop out of RC flying when he or she got bored, and often it's because he or she didn't keep pushing the bubble, and by that I mean failing to improve his or her flying proficiency.

Some pilots go to the field on a Sunday and fly a couple of flights and then sit around and gab with the other pilots, and for them, flying is a social event and there is nothing wrong with that.

But for others, it was all about flying to begin with and now when they have mastered the basic elements, they quit flying because of a lack of challenge. This is senseless. Aerobatics offer that little spark—the challenge they need not only in their flying, but perhaps in their lives.

The following comments are for the pilot who has recently learned to fly and is looking for the next step and enjoys challenging himself or herself:

Many of us (even old goats such as me) need to push the bubble so we don't stagnate. At my age, I need to push the bubble simply to stay in place and can't pretend to keep up with the sharp, young pilots flying today. But flying aerobatics is a good way to avoid that boredom and to challenge yourself. It does not have to be the complicated form you see the pros flying.

When a pilot has become proficient enough to reliably take off and land (a good landing is one when the doors still open in full-scale) it's time to start thinking about challenging yourself. Aerobatics trains your brain to work with your eyes and fingers and to maintain spatial and visual orientation with the model. You develop the ability to not only see your model in any attitude you throw it in, but the ability to recover from any situation (most of the time).

Depending on your experience level, one should start with some basic maneuver such as the loop. In any maneuver you attempt, always anticipate where your airplane is going to end up so that you don't scratch the paint. Fly high enough to avoid running out of sky,

but close enough so that you can fully see your model.

You'd be surprised how much work there is to making a good loop and not one that comes out egg shaped or looks similar to a bad pear. As you get near the top of the loop, slightly back off on the power. You don't want over speed on the backside. It should be a round loop that ends at the same altitude as it began.

Nearly any airplane will do a loop, but let's assume you have an aerobatic aircraft, or at least a trainer capable of doing a snap roll. Are you tired of practicing loops now? Okay, let's spice it up and do an outside snap at the top of the loop. A snap is simply done by using full elevator, in this case, full down, and full left rudder.

Oops! It performed the snap okay, but it's headed away from me. Cheer up, most of the problem is a question of timing and if you time things correctly, the snap will begin shortly before the top of the loop. You will come out entering the remaining part of the loop headed in the right direction.

Each model will respond differently and you have to know your airplane, so be patient. Now you are practicing loops and an impressive snap at the top of a loop. It's sure to wow everyone.

If you're still flying your old high-wing trainer, many will snap if pushed, although you may have to increase throw on your control surfaces using dual rates on your radio.

Now you've gotten the hang (more or less) of two aerobatic maneuvers: a loop and a snap roll at the top of a loop. You've been pushing the bubble and learning to "see" your model in different attitudes.

By golly, you feel good enough now to do a spin. There's nothing to it. You simply climb at roughly 45° while easing back to approximately 1/4 throttle and when the model stalls, jam in left rudder and full up-elevator. Some experts also jam in left aileron, but I only use rudder and elevator. If you have enough control throw, even an otherwise gentle trainer will spin.

Start with the model high, but maintain a clear view of it and let it spin down. When you've scared yourself half

to death, let go of the controls, apply throttle, and the model will come out of the spin on its own. If for some reason it does not come out of a spin, punch in some opposite rudder, and if that doesn't work, ask for your money back.

Let's be honest, nearly all of us fly because of the adrenalin kick we get. Some get that adrenalin fix climbing mountains or skeet shooting. In our case, we get that boost from flying RC, and if we no longer get that thrill, we have a choice of either getting out of the sport or challenging ourselves to learn aerobatics. If it weren't for that adrenalin fix, we'd all be making quilts or knitting socks for a hobby.

You can download the various aerobatic maneuvers learn more about aerobatics on the AMA website (www.modelaircraft.org). Who knows, you may soon be flying in an International Miniature Aerobatic Club contest or doing 3-D maneuvers a few inches off the ground. This epistle is not so much about learning to do aerobatics as it is to challenge you to challenge yourself and keep improving. Your club probably has people who can work with you on your aerobatic maneuvers.

One good thing about it is you won't drop out of the sport because of boredom. There's always something new to learn and something else to master.

Go for it! Push the bubble and get that adrenaline fix. It feels great! →

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How to Fix Warps, Dents, Twists, or Un-Crunch Foam Airplanes and Parts

Ed Anderson, aeajr@optonline.net

I never crash, but maybe you do.

Crashing can crunch the foam of a Radian or other foam airplanes to the point that the parts don't fit or you introduce a twist or warp as you try to put it back together. The repair can also introduce a twist or warp in the fuselage.

I am going to outline a method of getting the foam back to straight or un-crunching parts. This can also be used to take twists or warps out of new parts and it will take dents out of your foam wings or even bagged wings, like DLG glider wings.

Let's suppose your Radian, Easy Glider, Easy Star, etc., has a tendency to turn in the air requiring you to trim in a lot of rudder to get it to fly straight. How can you fix it? Well first you have to find the cause. Turn your foamy over and site down the fuselage seam. It should be straight from nose to tail. Or, tape a piece of string to the tail end of the fuselage, again inverted and then gently stretch the string to the nose. It should track down the center of the fuselage. If it does not, you have a warp. We are going to fix it.

This can happen at the factory, from a fuselage not sitting right in the box, or from a crash where one side of the fuselage compressed from an impact. This can also happen if you leave a foam airplane in a hot car for a long time. Believe me, what you will learn here will come in handy for the rest of your foam-flying life.

Heat does wonderful things to foam. It can stretch it, expand it, and help straighten it. You can put twists in or take them out. You can use this when making some foam replacement parts too.

Since we are fixing the fuselage, take the wings off; you won't need them. Take the horizontal stabilizer off if it comes off. Tape the rudder so it is straight.

Try to figure out where the warp is centered. I am going to guess it will start behind the wings, somewhere along the boom. Flex the fuselage to see if you can get it to look straight. You may have to use something to apply pressure in the center of the curve on the opposite side to get it straight. If you can flex it to straight, you can fix it.

Basically you are going to apply heat

to the inside of the curve as you flex the boom away from the curve and a bit past straight. As you apply heat, the gas that is trapped in the foam beads will expand. As the beads expand, they extend that side of the fuselage making the heated side longer and helping you take that warp out. If this was caused by a crash this will un-crunch the crunched beads.

This goes under various names, but you might hear it called the Elapor soup method as it really became popular with the Multiplex Elapor foam models. But it works well with most bead-type foams. Easy Star pilots would crunch the nose of the airplane in a crash. They would plunge the nose, Elapor foam, it into boiling water and the foam would expand, thus the soup reference.

Heat Methods

Hot running tap water: You hold the part to be expanded under the hot water while you shape it. In this case you flex the fuselage just a little past straight while it is under the running hot water. The foam beads will expand, extending that side of the fuselage. After a minute or two, take the fuse out from under the water, still holding it and let it cool. Then site and see if it took. Go back under the water if needed. As tap water is only 100-140° sometimes this is not hot enough to do the job. So we need more heat.

Place the part into boiling water: This works well for small pieces like a rudder, a wing tip, or a crunched nose. You can also pour boiling water over the area.

Steam from boiling water sometimes works. Use a big pot and make lots of steam. This works well for large areas such as wings.

My favorite is using a heat gun/hair dryer to heat a wet cloth or paper towels. Don't let the towels dry out completely. You heat the wet cloth till it steams and starts to dry out. You have the part stretched while you do it, just as above.

By the way, this works well for bagged composite wings, like DLG glider wings. It can take a dent out by heating the foam under the skin. I use paper towels and my covering iron. They magically disappear. This works well for dents in your Radian,

Easy Glider, etc. Here you want to be more focused, so a covering iron or a hot clothes iron is best. Just use the tip to focus the heated area over the dent.

In each case, the purpose of the water is to keep the foam from getting too hot and melting. We want to get it up to about the temperature of boiling water, though sometimes hot tap water, 120-140° can do it too.

Using these methods I have taken Radians and Easy Gliders that have been broken into numerous smashed and crushed pieces, reshaped the foam, and glued it back together with great success. Recently I shredded my Radian while Slope Soaring. A high-speed crash through bare tree branches did a nice job on the fuselage. The wings got a few dents, but the fuselage was in five pieces. It flies today!

Regardless of the method, you want to spread the expand over a somewhat broad area, not a pinpoint. Again, in the case of dents in a wing you want to be more targeted. That is why I use my covering iron rather than a heat gun.

In the case of the fuselage we are using as our example, you want to expand the most in the center of the warp curve, but you want to extend that somewhat forward and back of the center or you will have to overheat one area too much and perhaps not have enough expansion ability to make it work.

Try it! If you have some scrap Styrofoam or other beaded foam you can try this out for practice. Take a foam drinking cup and cut out the bottom. Now do a top-to-bottom slice. Use the method above and see if you can take the curve out of the foam and make it flat. You may not get it totally flat but you will see the impact. Note that the cup material is thin so don't heat it too much at once or you will expand all of the beads instead of just the ones on the inside of the curve. The heated beads will get bigger.

When working on a fuselage, wings, or other parts, be sure you don't introduce a twist as you do this or you will have another problem. But no worries, that can be fixed too.

Clear skies and safe flying. →

Cowl Repair for Modelers

Ron Smith, Barnyard Buzzards Model Airplane Club, Monroe WA

- Locate and keep all of the fiberglass pieces.
- Wipe all of the grass, gunk, etc., from the pieces.
- If using wet fuel, put the cowl into the dishwasher and wash with Cascade or Dawn dishwasher soap.
- Lightly sand the cowl with 120-grit sandpaper.
- Identify all of the stress cracks, extraneous holes, and areas that need reinforcement.
- Prepare fiberglass cloth, Kevlar cloth, carbon fiber, etc., for the repair areas by cutting the shapes with scissors.
- Using a microwave, preheat the 30-minute epoxy for 15-20 seconds.
- Mix the epoxy for about 2 minutes.
- Put the epoxy on the area to be repaired.
- Place fiberglass cloth or other material on epoxy and press into the epoxy.
- Using a heat gun, gently heat the epoxy and using an acid brush, spread the epoxy over the fiberglass so there is a thin film over the fiberglass. The epoxy will run like water and will be easy to spread.
- Use toilet paper or paper towel to pat excess epoxy from the area.
- Clean any excess epoxy from the cowl using alcohol and a paper towel.
- Set the cowl aside for at least 20 minutes to allow the epoxy to set.
- Sand the fiberglass/epoxy to remove the wax-like glaze. Reapply as necessary—do other areas as required.
- Sand the entire cowl using 120-grit, then 200-grit sandpaper.
- Add body fill, glaze, and spackling compound to fill cracks, etc.
- Sand again until the exterior surface is smooth.
- Apply primer to the cowl and sand with 400- or 600-grit sandpaper.
- Check from imperfections and repair as needed.
- Paint the cowl and let it dry overnight.
- Add decals, etc., and install on the model using screws, washers, and fuel tubing to prevent “filling” the mounting holes.

You could also purchase a replacement part from the manufacturer. You could even carve a plug and build up your own part using the same procedure as the repair building up layers of epoxy, fiberglass, Kevlar, carbon fiber, etc. It takes patience and time, but the results can be fantastic.

So if you see a model at a swap meet that has an ugly set of wheel pants, wrecked cowl, etc., maybe you could negotiate a lower price and repair it yourself! →

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Did you know youth members can add a subscription to AMA's flagship monthly magazine, *Model Aviation*, for only \$15? Or *Park Pilot*, the quarterly magazine that inspires, informs, and instructs small-field and indoor aviators, for only \$9.95?

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Check out the digital version of the July issue of *Model Aviation* at <http://>

library.modelaviation.com/ma/2013/07 (AMA members can also browse the entire online Library of back issues).

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If it's more content you are seeking to enjoy the sport of model aviation, AMA has you covered! Subscribe today! →



Some Rules of the Air

From the newsletter of the Anoka County Radio Control Club, Inc., Coon Rapids, MN

1. Takeoffs are optional; landings are mandatory.
2. When in doubt, stay at altitude. No one has ever collided with the sky.
3. The propeller is just a big fan in front of the airplane to keep the pilot cool. When it stops, you can see the pilot start sweating.
4. The only time you have too much fuel is when you're on fire.
5. Stay out of the clouds. The silver lining everyone keeps talking about might just be another airplane traveling in the opposite direction.
6. You start out with a bag full of luck and an empty back of experience. The trick is to fill the bag of experience before emptying the bag of luck.
7. There are three simple rules for making a smooth landing. Unfortunately no one knows what they are. →

Tips & Tricks

Handy Nylon Motor Spacer Tip

I'm assembling a BITSA (bits a this and bits a that) Goldberg Cub. I was given a bag full of parts and had a partial kit, also a gift. When I'm building something like that, I try not to spend any money that I don't have to.

I needed some standoffs for my Himax 5030 (itself a half price purchase). I had some 1-inch nylon pieces from ACE, but I needed some 1/2 inchers. As I was plowing around my "Nylon Salvage" bin I came across a bunch of nose-gear mounts. Bingo!

I cut off the mounting tabs and had my nylon spacers. Then I realized that the tabs could also be used (they are a little less than 1/4 inches). Since I rarely use nose gear I now have a good supply of spacers.

— *From Walt Thyng, The Electric Flyers Only, Inc., Commerce Township MI*

Use Heat to Treat Tail Surfaces to Fix or Prevent Warps

Use white glue or nitrate dope to attach the tissue to the tail surfaces before mounting. This could also be done with a glue stick.

Sandwich the stabilizer or fin between two 1/8- or 1/16-inch thick flat balsa sheets. Preheat your oven to 220° and place the "sandwich" in the oven with a weight on top.

After 10 minutes, let it cool to room temperature with the weight on top. Be cautious if you have used thinned white glue to attach the covering. Make sure you let it dry overnight before giving it the baking treatment. Tail surfaces rarely warp after the heat treatment.

—*Dick Baxter*

Checking Fuel Tanks for Leaks

Have you discovered fuel leaking from a tank in your model? There is a way to determine if the leak is curable (i.e. a loose screw in the front bung) or terminal (i.e. a split seam). If the leak is not large or obvious, this technique can help you find the problem. This is also good for checking new tanks prior to installation, and is good for all tanktypes.

Take the tank to be tested and seal all the outlets. You can link two outlets with a single piece of fuel tube and fit a piece of blocked tube into the third. Immerse the whole tank into hot, but not boiling, water. As hot as you can stand with rubber-gloved hands is more than sufficient.

As the air in the tank expands because of the heat from the water, you will see a small stream of bubbles from the offending leak. If it is around the bung, tighten the screw until the leaks stops. If it's a split seam, throw the tank away!

—*Wings R/C Club, Iowa*

The Academy of Model Aeronautics'

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