The AMA INSIDER
The National Newsletter
for Newsletter Editors and Club Officers

VOLUME 5 ISSUE 5 SEPTEMBER 2009

PRESIDENT TO PRESIDENT

Season Switch

by Dave Mathewson, AMA President

Hello again. I hope everyone has had a good outdoor flying season. As the temperatures get cooler heading into the fall months, for many of us in the colder parts of the country the indoor flying season is about to begin.

With the advancements in small electric models over the last couple of years, especially in the micro RC area, almost any facility of reasonable size can become an indoor flying site. School gyms, community centers, and sports domes make excellent indoor sites. More often than not all it takes to gain access to one of these facilities is to ask.

Facilities managers are always looking to get the maximum use out of their buildings. Sometimes there may be a reasonable fee associated with rental of the site, but in many cases use of the facility is free. There's one indoor club near where I live that has had the use of a church gym for as long as I can remember. The cost? Each pilot that comes to the flying sessions brings a canned good for the church's food pantry. That's a pretty reasonable use fee and everybody comes out a winner.

Give some thought to contacting some of the facilities near you this winter. It might result in getting a place to keep active during the colder months when outdoor flying can become a challenge for many of us.

This is also typically the time of year when many of our clubs hold their annual elections. For a lot of us, new faces will be sitting at the officer's table. For other clubs the current officers will be re-elected to continue for another year. Regardless, the success of any club lies within its membership. A title doesn't mean that all of the workload needs to fall on the shoulders of the title holder. In

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TIPS FOR CLUBS

Club Corner

by Jim Wallen, *Insider* Club Column Editor

All of our AMA clubs can use some fresh ideas from time to time that will make the club atmosphere more attractive to its members. Also, clubs need to focus on maintaining membership levels to keep the club financially stable and healthy. Again this month I will give you a smorgasbord of thoughts and ideas that can be used by your membership. Feel free to pick and choose those that make sense for your particular club and try them out.

Communication is the glue that keeps clubs active and makes all the members feel involved. Regularly scheduled club meetings are most important. If possible, arrange to have a simple bulletin board erected at your flying site. Newsletters are always interesting and informative to all, even those who no longer get "on the sticks" but want to be included in activities. E-mail is a must these days; it's inexpensive and relatively easy to use. Keep in mind that not all members use computers or e-mail so don't forget about them. A phone call or a simple note by "snail mail" will also work. The clubs that actively promote that feeling of being all inclusive and creating a family atmosphere are the ones that will stay healthy and prosper.

Do you have a hobby store in your community? Perhaps there is an opportunity there that you have not thought about. Most hobby stores don't exclusively focus on our hobby. They

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ON THE SAFE SIDE

The Attitude of Gratitude

Don Nix, *Insider* Safety Column Editor

Although there are regrettably a few among us who seem to occasionally think otherwise, flying model airplanes is a privilege, not one of the "inalienable rights" spoken of so eloquently in the U.S. Declaration of Independence.

And what a wonderful privilege it is that we live in an age and a country where all but those of the most meager means can afford to fly at least some sort of model. Thanks to present technology, most can afford to fly Radio Control, either electric or combustion-powered. For that, we modelers should be grateful indeed.

Here is where safety enters the picture: Anyone who has been flying more than a couple of months has undoubtedly seen a local hotshot who seems to think the rules are for you, and you, and you, and me, and not for him. After all, he "knows how to fly."

At the infamous (but no longer available to modelers) Mile Square Park in Orange County, California, where I usually flew when I lived in the L.A. area, we had 12 flight stations that were frequently all active at the same time. It was quite common to see 50 or 60 fliers out on a good-weather weekend. Clearly, this was an environment where courteous flying and "safety first" should have been the standard. Many times it was; too frequently it wasn't.

It always seemed as if some self-designated hot flier had to demonstrate his skill with shoulder-high passes at 120 mph a few feet in front of 11 others. Requests that he refrain from doing such were usually met with, "Get out of my face! I know how to fly!" I have to admit to a barely suppressed desire to wait until his airplane was far off the end of the field, clip his antenna at the base with bolt cutters and say, "You're through!"

L.A. and Orange counties compose a monster-plex of some 14 million people with all the accompanying potential interference generators known to human kind. Dear hearts, please write this down and date it: ***It does not matter how good you are if your frequency is suddenly zapped by outside sources.***

This was demonstrated one Saturday when a particular flier got "hit" and his model ended up going through the open tailgate of another flier's station wagon. Happily, no one was hurt … that time. Fortunately, our technology has developed to the point where such instances are becoming less frequent, but the potential always exists.

Of course, mechanical, electrical, or structural failures are quite common. A servo gives up the ghost, we fly a little too long for the battery power left, something somewhere breaks. When any of these things happen, skill is of little use.

It's not only appropriate to speak to anyone whom you see flying discourteously and perhaps dangerously, but for the safety of others and our hobby, an obligation. It can certainly be done in a non-confrontational manner, and if that doesn't work, recruit one or two others and approach him with some backup. Numbers do help in a touchy situation.

Comments (pro or con), personal experiences, and suggestions for future subjects are always welcome: flyerdon@aol.com. ✈

From the Wings RC Club, Le Mars, Iowa

Fun Fly Ideas

Taxiing Contest: This is a timed event. Airplanes will start at a start/finish line, taxi to a turnaround line, and taxi back to the start/finish line. Fastest time wins. Two wheels must remain on the ground at all times. In the case someone enters a tail dragger, the rear wheel can come off the ground.

Hints: Make sure your steerable wheel is aligned and that your airplane will track straight on the ground. Apply full down trim to the elevator to keep your airplane from taking off. As soon as possible apply full throttle while keeping the model moving straight. Somewhere between 40 and 50 feet from the turn around, decrease the engine's power to an idle to avoid tipping the aircraft while turning around. Keeping the model moving in a straight line with full power can be tricky; it would be a good idea to practice before the contest. You might have to apply a little down elevator to keep the model from taking off when it picks up speed.

Timed Take Off and Landing: This is a timed event. The airplanes take off from beyond a start/finish line. The stopwatch starts as soon as the model is airborne. The aircraft circles the field, comes in, and lands beyond the start/finish line. The stopwatch stops as soon as all three wheels are back on the ground.

Hints: Try not to gain too much altitude after taking off. After crossing the finish line a spotter will call out "turn." Make a sharp turn, cut power, and come in on a short approach. Make sure you carry enough speed for the model to land beyond the finish line or that run will be disqualified.

Spot Landing: Three circles are drawn on the field. Landing inside the small circle will count for five points, the middle circle four points, and the large three points. Two attempts are permitted, scores are added and the highest score wins.

Hints: This event is not timed. I suggest you make a long approach to the field, this will allow you to line up with the circles better. On approach a combination of engine speed and up elevator trim will allow you to make a shallow, controlled approach at a low speed. As you near the circles, decrease engine speed and drop down onto the field.

Hands-Off Event: This is a timed event. Take off and climb to 200 to 300 feet. Put in some left or right rudder or aileron trim, just enough to make the airplane fly a wide, slow turn. Add enough up elevator trim and engine speed to keep the airplane from losing altitude in its slow turn. When you are happy with the trim, put the transmitter down and tell the timer to start. Before the model hits the ground or flies out of sight pick up the transmitter and the stop watch records the total hands-off time.

Hints: You will have to adjust for any wind by starting upwind. How much engine speed you let the airplane fly with will depend on the design of your airplane. Too much speed and it will gain too much altitude. Not enough speed and you will have a short run. Make sure you have a full fuel tank. ✈

LEADER TO LEADER

Leader Members (LM)

Jim Rice, Chairman Leader Member Committee

The membership manual says:

"The Leader Member is the most important of membership categories in terms of the operation of the Academy." It goes on to say, "The Leader Member is identified as an individual performing an above average interest in the Academy and its functions. There is a provision in the bylaws which gives the Leader Member the right to vote in such cases as bylaws changes. Nominating procedures for national officers also require that a nominee be a Leader Member. ... The Leader Member is the highest level of membership and as such will be noted on the membership card."

There are three categories for LM: Administrative—requiring administrative model club experience and ability, Scientific—requiring a model aviation background of a scientific nature, and Industrial—for those with principal income from the model aviation industry.

Administrative is by far the most common and is the easiest to document when applying for LM status. Go to the AMA Web site at: www.modelaircraft.org /files/907.pdf for the LM application. The form is relatively simple to fill out and requires endorsing signatures from three current Leader Members or open members with an approving signature from the district vice president.

We have made several changes to the Bylaws in the last year and while the work to do that is accomplished by the Bylaws Committee, the Executive Council reviews that work and approves, forwarding the changes to our Leader Members who are then the only members who vote to ratify all changes for the Academy.

Several years ago our LMs numbered nearly 7,000, but that has now withered to about 2,500. These key people help us get information out to the membership, keep us focused, provide us with a pool of candidates for associate vice president, district vice president, and other positions besides ratifying bylaws changes.

We need to canvass friends and club members trying to find, as the Marines would say, "A few good men (and women)," to replenish this important resource. Please review the requirements and help us in this important area.✈

From *TRAC News*, Tampa Radio-Control Aircraft Club, Tampa, Florida

Improving Poorly Controlled, Dangerous Takeoffs

by Jim Devine

How often have you seen an airplane that is taking off veer toward the pilot stations? Usually the pilot gives the engine more gas and, using the ailerons, yanks the airplane back to the right. Occasionally, the airplane continues to the left, clears the safety barriers, and heads for the people in the pits and the cars just beyond.

If you have poorly controlled, potentially dangerous takeoffs, try practicing control of your aircraft on the runway. First, check the wheels and make sure they have a little toe-in. Also, the wheels should not continue to spin when given a flick. To create friction and avoid free-wheeling, slip a 3/16-inch long piece of fuel line on the axle and push the retainer collar in tight. With proper adjustment, the wheels will turn only if you push them with your finger. This braking action allows for a high idle speed without the airplane moving, which reduces the chance of the engine dying when the idle is too low. This also helps stop an airplane that might otherwise roll off the end of a runway during landing.

Choose a day when the wind is light and the runway isn't being used. Practice taxiing back and forth the length of the runway, using the rudder for control. Stay within a few feet of the yellow center line. When you have mastered taxiing at slow speed, click the throttle up another notch or two and keep practicing. With enough practice and a slow, smooth application of power, you can approach takeoff speed while moving down the center of the runway. You also can practice aborting the flight by shutting off fuel when you're about to lose directional control of the airplane.

With this improved directional control and practice at aborting a poorly controlled airplane, your takeoffs will be much safer and a pleasure to watch. ✈

President to President

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fact, the mark of a good leader is the ability to surround him or herself with good people who can help bear the load of managing a club. As you develop your club's activities agenda for the coming year, encourage your members to step up and help out. You'll find that when asked, many will respond favorably. In fact, many members are just waiting to be asked to help out. The end result is that chances are your events will turn out better while at the same time more members become engaged in the club's activities.

AMA membership renewals will be mailed over the next several weeks. Along with the renewals will be ballots for the AMA Executive Council elections for the period beginning January 1, 2010. This year all of the even numbered district VP positions are up for election, as well as a special election in District IX. Candidate statements will appear in the October issue of *Model Aviation*. Please take just a few minutes to read the statements and cast your vote. Unfortunately this year, in many districts candidates are running unopposed. If you're current district VP is running unopposed and you think he is doing a good job, take a moment and vote for him. A VP will use the election results as one barometer as to how well those in his district think he's doing.

See you next time…✈

Build for Better Performance

by Phil Bayly

Concept: We all know that a lighter-weight airplane is easier for the motor to pull through the air and will perform better, especially with a stunt ship—right? "Lighter" also means the airplane has a more favorable wing loading (weight vs. wing area) and stunt maneuvers are done more easily. The airspeed doesn't sag off during maneuvers, and this preserves the energy needed to continue the flight smoothly without stalling. We also know that we need to build in enough wood to give the strength needed to withstand the forces of flight, landings, and engine power, including vibration. So, here comes the weight penalty. Therefore, the real question is, how can we get the best of both worlds? Obviously a light weight and strong airplane is the ideal solution. But, reality says we probably need to find a compromise between the two.

With this accepted, the intent of this article is to outline some of the tricks of the trade that should help you lighten up your airplane without losing strength and achieve better performance. In fact, the first principle to understand is that a lighter airplane has less inertia. Therefore, less force is available to drive an airplane to its destruction as easily as a heavier one under similar conditions, e.g. crashes, air loads, etc. The guiding theme then says that what is really needed is just the right amount and kind of wood in the right places, and no more. This will give the optimum between the airplanes weight and its required strength. That's it! Now, let's examine some of the important details of construction principles, techniques, and wood selection that let us do this—the key to it all.

Bending Moments and Force Distribution: From physics we find that something breaks when enough force is applied to distort it beyond its elastic limits. When this happens, one side gives in compression and/or the other gives in tension. When less force is applied, we only get minor bending or distortion with a return to original form as the force is reduced. We should visualize this principle of breakage each time we select the wood (type, size, and density) for every part of the airplane, joint locations, and reinforcements. Try to imagine what forces each part will actually experience and choose the wood type, density, and size accordingly without any excess anywhere. You should use as little (light) as possible, but as much as necessary in every location throughout the airplane. This assessment includes the wood's size, density, grain, location, etc. in conjunction with the stress expected. Most important, realize that extra weight is simply unnecessary cargo that actually increases the inertia and force that is extended to the weaker places that break under stress.

The wing: So, where and how can we save this extra weight? Logically, you must attack the heaviest parts first to make the most difference with less effect elsewhere. So, let's start with the wing since it is normally the heaviest part of the airplane. In practice, diminishing the weight towards the wing tips with proper limits will make it stronger. Why stronger? Because the weight toward the tips is the major leveraging force that finally causes the wing to break at the usual spot, the intersection of the fuselage or edge of the wing capping, whichever is weaker. On nose impacts, especially with profiles, you typically find the wing's trailing edge tears loose at the body as the leading edge compresses, or the wing buckles up or down from the vertical force during flight maneuvers or when bellied in to the ground. With this understood, you can and should taper spars, trailing edges, leading edges, and capping to effectively reduce the overall weight progressively towards the wing tips without sacrificing the wing's strength. Other parts of the wing, including the tips, should be made of very light weight density wood. But think a minute. The outboard wing tip is usually weighted for flight stability. Therefore, heavier and stronger wood is always better than lead for tip weight, except for the need for a small amount of adjustable flight trim. Since the outboard wing needs to be heavier, it accordingly needs a little more strength throughout the outboard wing (higher density in the main spar is probably enough, so select the heavier one for the outboard).

Joints are the next consideration. Always be careful how joints are designed and where they are placed. Butt joints are the worst for strength! Diagonally cut, well matched, and glued joints are the best, especially with the reinforcement since the stress is distributed over a large area. Matching a diagonal joint is an easy fit if you overlap the two pieces of wood and cut the diagonal with a razor saw without letting them move.

Overlapping spars vs. diagonal matching and reinforcement is a great technique for strength and weight reduction since reinforcement is unnecessary, but difficult to achieve except with Free Flight wings. Since all joints become stiff and strong when reinforced, the wing spar's bending and breakage usually begins at its edge or thereafter. If not, you should reexamine your methods of jointing, including the type glue you use. Clamping joints while the glue dries is always best and can double its otherwise holding strength. Clothes pins work well too.

The wing's spars' distribution of force, beyond the stiff center area, should be diminishing toward the tip to optimize its overall strength. This means you don't want the forces to be able to over-concentrate at one spot causing the compression-tension relationship and breakage to happen as discussed earlier. You also want to trade off to have more wood (density and size) toward the fuselage at the tip. Smoothly distributed (non-visible) bending absorbs the force by spreading the load throughout instead of applying most of it at one place. Therefore, tapered spars, reinforcements, gussets, and anything else that helps the forces to be distributed smoothly throughout the spar is what we are looking for as we progressively have more wood approaching the fuselage where it is needed to help counteract the increasing leverage (breaking) force. This happens because most of the forces will now be concentrated there (as balsa spar enters a rigid reinforcement) when leveraged from the tip or from the wing during its high levels of flight loading (such as 90° or 120° turns).

Additionally, wood in the center of a spar or a wing does less for its strength (and stiffness) than the same amount at the

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surface. Therefore, for the maximum strength for its weight, intelligently laminated spars and V- or U-shaped and tapered reinforcements add the (least) wood at the right points where there is little compression and tension and the most wood near the surface where the stress is greater. You may recognize this as an "I-beam" concept for the spar with its veneer capping on a wing. Light weight sheet balsa on the surface adds much greater strength (and prevents distortion) than the same wood will do near the center of the wing. Its curvature to the airfoil also improves its rigidity. The ideal structure for weight vs. strength is tubular for stress to be applied from any direction; whereas, an I-beam wins for vertical stresses alone. Again, because this puts most of the mass of the material at the point of compression and tension where breakage begins or is countered for flight stresses. Additionally, you are always tasked to consider where some wood's weight would be better removed for use somewhere else or not at all.

Finally, you should inspect all spars and stringers for minor nicks. Forces can concentrate here too and cause easy breakage under stress. You are much better served to sand out all of the nicks to help the distortion under stress to be uniform instead of concentrated at a flawed point. Don't leave it "rough cut" or as is. Strange enough, sanding the spars is more for strength than saving weight, unless you significantly change the dimension of the wood.

The fuselage: A proper combination of woods, good design, and craftsmanship is essential here. The engine must be mounted on hardwood beams with a plywood firewall and gear mount. The sides must be hard and strong balsa reinforced internally to solidly support the power, vibration, and G loads of the motor while the sides continue to support the tail section's air loads. The top and bottom blocks are the final elements that require good wood selection for lightness and strength, whereas a removable cowling contributes no structural strength and can be ultra light. In flight, leverage stresses are amplified at the wing's leading and trailing edges and are enormous for stunt airplanes with long moments. Ultimately, cracking occurring at these high stress points is normal, even through the top and bottom blocks.

Don't discontinue internal beefing there unless you expect a short life airplane. Strange as it seems, thin plywood will provide the required beef-up strength at less weight than more volume of balsa, since it does not tear or compress easily, e.g. 1/64 inch. All of the same rules apply. Internally trim away all of the wood that does not contribute to the strength of the airplane while filling (non load bearing) holes such as cowlings with light wood. The tail portion of the fuselage may progressively get lighter (thinner) as your proceed rearward from the stabilizer's leading edge, but leave enough to support the tail wheel stresses. They are high stress during a hard landing, so a ply mount is best here.

The Stabilizer, Elevator, and Rudder: The previously described considerations for the wing's construction and stresses apply equally to the entire tail section except that the shorter linear dimensions do not have as much leverage to cause breakage. Therefore, lighter materials and designed construction should be used accordingly. Equally important, the tail section is critically important to the airplane's horizontal (nose to tail) center of gravity and must be kept as light as possible to prevent addition of nose weight for balance and performance degradation. Most tail sections are overbuilt (with heavier and too much wood) well beyond what is needed. The stabilizer and elevator intersecting spars must endure the continuing air loads and control system forces and care must be taken to select strong wood for them. Proper wood selection is even more difficult for solid wood stabilizer-elevator construction to achieve light weight and the required strength. After that, you may go very light, including the entire rudder and fin. Examination of many crashed airplanes seldom finds damage in the tail section! So, judge accordingly.

Wood Selection: Good wood selection is also an art and a science. The serious modeler will never rush down to the hobby shop to buy all the wood he needs to build the airplane he is ready to build. It's too late. The right selection of wood will likely not be there. The right approach is to always look over the wood every time you go to the hobby shop and buy the good stuff when you find it! This way, you will have it available when you are ready to build. Your inventory of wood on hand is a quick measure of how light you will be able to build your airplanes. Kits are typically terrible for wood selection (and fit). Therefore, don't hesitate to replace the heavy parts accordingly. In fact, it is best to look the wood over before buying any kit to be sure you are getting what you expect. Otherwise, you may have only bought a set of plans. Your first indication of the weight your airplane will be is the "as is" weight of the kit in the box, right off the shelf. Too heavy will always be too heavy unless you plan to change out the kit's bad wood.

Wood grains or "cuts" is an article of its own, therefore, it won't be covered further here except to say that all woods of the same weight are not equal for all applications. The is A, B, and C grain with correct and incorrect use for each that goes well beyond its weight considerations alone, e.g. do not use C grain for spars or linear strength. Its strength is undirectional and doesn't like to bend. For additional information, SIG provides an excellent information brochure on balsa grains and correct uses. Also, remember the earlier comments suggesting you visualize the stress each part will experience as you select its type, size, density, and grain of the wood for them.

Covering and finish: The covering and finish are great contributors to an airplane's weight and strength. The primary job of the finish is to provide the protection needed to prevent weakening from fuel penetration. To most, it significantly adds to the overall strength of the airplane, especially since they are at the surface where the maximum (tension and compression) stresses occur. If you are planning to go light on the covering and finish, additional strength will be required in the wood construction to survive. And, if you experience a tear in the wing's covering near the fuselage,

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From the Mid Atlantic Radio Kontrol Society, Snow Hill, Maryland

Getting the Harrier Down: a building-block approach

by Jeremy Chinn

Part 2 of 5

If you have followed along with the previous article, you now have a simulator to learn on as well as the right kind of airplane to learn with. This is a point at which many people just begin banging the sticks around and thrashing the airframe around the field. Not only does this not necessarily turn into the safest situation, but it does not often yield success.

To learn to 3-D well, you need to learn with a building-block approach that builds a good foundation of basic 3-D maneuvers and progresses from there. This progression will use much of the basic aerobatic knowledge you have previously learned to control the airplane in all attitudes and situations.

While most people think the core maneuver to flying 3-D is the hover, that is unfortunately incorrect. The most basic and fundamental maneuver for learning 3-D is the Harrier. The Harrier is a part of a majority of 3-D maneuvers and skills learned during training to help build rudder-control skills necessary for more complex maneuvers.

To learn to Harrier correctly, we are going to use another simple maneuver called an elevator. Learning to Harrier this way initially allows this first maneuver to be flown at a higher altitude and with an easy escape route.

Start by climbing to an altitude of "five mistakes high." Level the airplane at center field with the nose into the wind and cut the throttle to idle. When the airplane has slowed significantly, hold full-up elevator and allow the airplane to fall. If your airplane is set up correctly with an appropriate center of gravity and control throws, it should descend slightly nose down or level. An idle set too high will cause the airplane to descend nose high.

As the airplane descends, use the ailerons to hold the wings level. During the descent, the wings may rock back and forth. Careful correction with the ailerons will help correct this problem with most good designs.

When the airplane has reached an altitude of one mistake high, decrease the pressure on the elevator and increase the throttle to fly out level. You have just completed an Elevator. Congratulations! Continue practicing this maneuver until you are comfortable with the airplane descending in this manner.

Next up, prepare to fly an Elevator just as you did before, however for this round of exercises, you should begin to use the rudder to steer the airplane as it descends. Remember to use the ailerons to keep the wings level during the descent. Try descending while steering the airplane through a gentle circling descent and exit as before. Continue flying this exercise until you are comfortable using the rudder to steer. This exercise may feel odd to many sport pilots who are not used to using the rudder on a regular basis.

In the next phase, we will begin the Elevator just as before and use the rudder and ailerons. As the airplane reaches the midway point of its descent, begin to increase the throttle until the nose rises slightly. The airplane will also move forward more than in previous exercises and its rate of descent will slow. Do this repeatedly until you feel comfortable increasing the throttle and maintaining control of the airplane.

Once you are comfortable descending in this increased throttle state, allow the airplane to descend to one to two mistakes high and increase the throttle more while easing off the elevator backpressure. Your goal now is to find a point of equilibrium where the airplane maintains a nose-up attitude of approximately 30° to 45° while slowing the descent to no altitude change.

When you can complete this last exercise, you have successfully flown a Harrier. You can successfully control the heading of the airplane with the rudder and its attitude and rate of descent with a combination of elevator and throttle control. It's now time to take your efforts to the next level.

Once you feel comfortable finding that balance between elevator back pressure and throttle input, you need to take the next big step.

In the next phase of this exercise, you are going to fly at a very low level. This is a point at which many students get very uncomfortable. They reason that, since they are closer to the ground, they are more likely to hit the ground. That is not an unreasonable thought; however it fails to take all the factors into account.

Learning to fly 3-D, especially learning to Harrier, at a very low level is absolutely the best place to perfect your Harrier. Optimally, you'll fly with your tail one to two feet off the ground.

By learning to Harrier at a low level, you:

- Fly at an altitude and proximity to yourself that allows you to see every movement of the airplane no matter how small, and react to it promptly to keep the airplane flying the way you want it.
- Keep the airplane low so that in the event it does get into an "out-of-shape" attitude, it does not have enough time or altitude to build up momentum that will cause significant crash damage.
- Impress your friends!

Start this phase by flying low, level, straight-line runs down the runway into the wind. Remember to be courteous to your fellow fliers and yield the runway to those who need it. Pilots taking off or landing always have the right of way. If you get uncomfortable with the airplane at this altitude because of a gust of wind or other factor, use the ailerons to level the wings, cut the throttle back somewhat and let the airplane drop to its landing gear.

As you get more and more comfortable flying your Harrier down the runway, begin to add turns into your exercise. Start with circles one direction, then the next. When you feel comfortable flying circles in a Harrier, modify your exercise to include figure-eights over the runway.

These simple exercises are a great way to build, refine, and improve your fundamental 3-D skills.

You now have a great foundation to begin building more 3-D maneuvers into your repertoire, so what is next? Before moving to an entirely different skill, you need to go back to the

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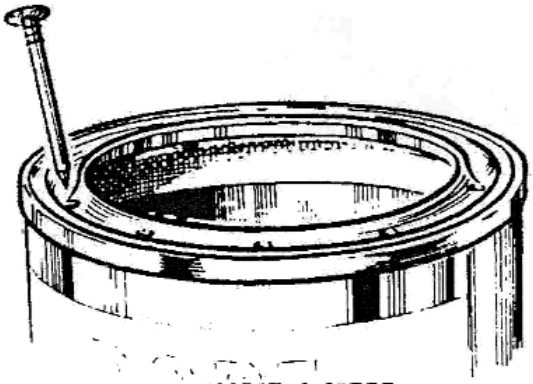
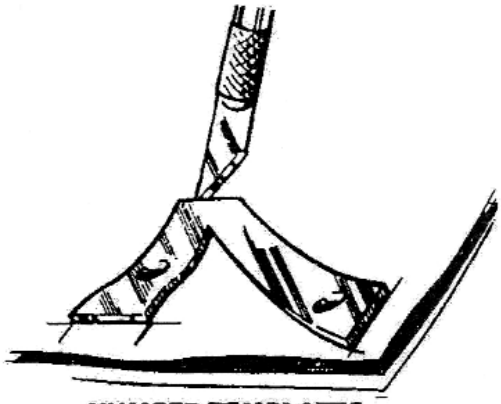
Tips & Tricks



AVOID A MESS

Punch holes around lip of dope can to allow overspill to drain back into can. Also reduces splatters when resealing.



NUMBER TEMPLATES

Use metal house numbers as templates when cutting AMA numbers from tissue. Sandwich tissue between sheets of writing paper to prevent tearing and use a new blade.

—from the newsletter for the First Weed Wacker Aerosquadron, Lakeside, California

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sell all sorts of products not related to RC. In many cases the employees are not well educated in modeling products. Ask the store manager or employees to come to one of your meetings or meet you at the flying field to watch or even get on a buddy box. It is a great chance to expose them to building and flying. They are very good candidates to join your club. The exposure also positions them to better serve their hobby store customers.

Do you have some thoughts about doing things in a new and creative way with your club? If so, give me a shout at sjwallen@tde.com. I would love to share them with the rest of our *Insider* readers.

Till then … Jim ✈

Getting the Harrier Down

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beginning of this Harrier lesson, but progress through it inverted. A successful inverted Harrier is another important building block of learning to 3-D.

As you move through the inverted version of the Harrier lesson, remember that your rudder and elevator require inputs opposite of those you use in an upright Harrier. Most people find it extremely helpful to use their simulator at a slower time rate to build this skill before moving to the real world.

Becoming proficient at flying your airplane in a Harrier is one of the most important building blocks or fundamentals of becoming a great 3-D pilot. Don't be afraid to take your time moving through these exercises. Some pilots will progress through the Harrier lesson in a weekend. It may take others a month. You should also not be afraid to break this lesson out again when you have progressed past it. ✈

Build for Better Performance

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without repair you may easily buckle the wing during a subsequent flight. A complete article on good covering and finishing techniques is in order for this complex subject. Maybe next time.

Conclusions: No airplane is crash proof. Still, the better airplanes incorporate the building techniques discussed herein so they will last longer, fly, and look better. If you still crash a lot from inexperience, this article can improve your survival rate and guide you toward building a better flying airplane. But just as important, examine every crash (not just your own) for the evidence of what broke and use your new knowledge to improve the weak spot(s) on the next airplane you build. Our progress only comes from doing it better the next time. ✈

Need Articles for your Club's Newsletter?

In the Archives section of the *AMA Insider* Web site you will find every issue of the *National Newsletter/Insider* published since 2003! It's a great resource for construction, safety, and how-to articles as well as hints, jokes, and cartoons all for you to use in your club newsletter!

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AMA Vision

We, the members of the Academy of Model Aeronautics, are the pathway to the future of aeromodeling 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.

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.

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