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PRESIDENT TO PRESIDENT

Reach Out to Curious Observers

by Dave Mathewson, AMA President

We've all heard the saying "You only get one chance to make a good first impression." That holds true no matter if you're meeting someone in a causal setting for the first time, in a job interview, or maybe even when you're at the field getting in a couple of flights and a spectator or two stop by to watch.

Most all of us want our clubs to be active, viable, and thriving organizations. We want that new blood—and the enthusiasm that comes with it—found in new members. It's that enthusiasm that supplements and compliments what the more longtime members of the club bring to the table. For a club to reach its potential it takes the guidance of its experienced members coupled with the zeal and passion found in its newer members.

Many spectators who stop by the field already have an interest in model aviation. After all, they've taken the time to stop by to see what's going on. Sometimes all it takes to turn that spectator from an interested observer into a new modeler and member of your club is to simply take a few minutes to walk over and say hello. Chances are the spectator will have some questions about model aviation. And, since we all like to talk about our hobby, my bet is that you will enjoy the conversation.

Many of us have been in the hobby for so long it's hard to remember what it was like when we first decided we were interested in modeling. But I'll bet for many of us we got involved after visiting a local hobby shop and then taking a trip to the local field. And I'll also bet, for

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CLUB CORNER

The Club Corner

by Jim Wallen, *Insider* Club Column Editor

How involved are you in your local club? Perhaps you just want to pay your dues and go fly your planes when you want. Maybe you volunteer to cut the weeds on a tidy-up day at the field but you don't want to do much more. Maybe you seldom go to a club meeting or perhaps you make it a point to attend all of them.

Have you ever submitted an article for your club newsletter? Do you go to some of the club social functions? Have you ever cornered your club field marshal to share with him or her some ideas you would like to see implemented? Do you show up for your training night at the field to help out? Keep in mind that all skill levels can find a role to help out with the new guys and kids!

Have you ever had the urge to put together a fund-raiser for the club? Can you find a way to show up early for club meetings and help with setting up refreshments? Have you ever thought about setting up a Valentine Day Fun-Fly to get some of the ladies involved? Did you ever think about becoming a club officer?

You get the point. The list goes on and on. You will find that the clubs that have more people involved tend to prosper and those that don't tend to stagnate and even fail. We all know that 10% of the members do 90% of the work. It doesn't have to be that way!

If you are in any sort of leadership role in your club, think about ways to motivate some folks and change that ratio. Things do not just happen by themselves. It takes you to initiate change. Take that first step and watch how your club benefits. ✈

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THOU SHALT NOT STEAL

Contact Don at *flyerdon1@yahoo.com*

Don Nix, *Insider* Safety Column Editor

However, I'm afraid I'm going to have to break that commandment this month. We've been on the road RVing for several months and at the moment are in Quebec City, Quebec, trying to make ourselves understood when conversing with the French-speaking citizens. That can be especially challenging when one has a heavy Texas accent.

As a result, I haven't had much time to give a lot of thought to this column, so I'll have to resort to a little literary theft.

Actually, the first part was given to me by Charlie Castaing of New Iberia, Louisiana. I've known Charlie for quite a while, and we were able to renew our friendship while guests of Ronnie, Liz, and Marie Segura during our visit with them in New Iberia in late April.

The Seguras treated us with an authentic Cajun crawfish boil—35 pounds of crawfish, plus corn on the cob, boiled potatoes and onions; all this for seven people. If you've never had the experience, I can assure you that you won't wolf down your meal. Peeling the crawfish and eating all that food is an all-afternoon experience.

Charlie offered several suggestions for the column, so I'll just quote directly (Charlie speaking):

"One of the problems I have noted is that in training beginning pilots, they tend to want to fly either directly over the runway or worse yet, directly overhead. Sometimes over the pit area, the pavilion or even the parking lot! In addition to causing strained neck muscles, it's almost impossible for the student to recognize the attitude and positioning of the model. I usually stress (demand!) that the student fly a considerable distance beyond the runway. The result is a much better perspective of the model in flight. (This same thing was also mentioned in an issue of *Hi-Sky R/C Flyer* edited by Lewis Jordan, location unknown).

(Charlie speaking again) "At our flying field, we have a couple of benches in the pit area on which the model is placed for starting, performing adjustments, etc. It allows old-timers like me to more comfortably attend to the models. Even the younger guys can more easily adjust the engines. I personally have no problem squatting down to start or work on the models, but getting back up is the problem!"

Charlie also mentions the problem of bees and other stinging insects. This same problem was mentioned in some club's newsletter that was forwarded to me by Jim Rice, District VIII VP, but I can't remember the source. In that newsletter, the writer suggested putting the model into a number of tight loops while trying to deal with the critter du moment, holding it in position with one hand while taking care of the situation with the other. Might work … and is better than having the model fly off out of range. Obviously, the pilot should yell for someone to take over if any one else is nearby.

Quoting again from an issue of *Hi-Sky R/C*, the writer cautions against subconsciously pointing the antenna directly at the airplane, especially when near the ground. As most know, this can cause a "cone of silence" at the receiver, resulting in a delay in response. Keep that antenna up during landing, which is usually the most critical time.

Someone suggested that servos are a poor place to save money, especially on larger aircraft, or even smaller ones which will be subjected to heavy loads during aerobatics. The writer says the only place he uses "standard" servos is on the throttle. That's no doubt good advice, since better servos will not only hold up under high loads but will last a lot longer as well.

Shifting subjects for a moment, on our way up north, we stopped by Muncie to renew some old friendships among those competing in the 2010 Nats, as well as some of the AMA staff and spectators. Great to see Sandy Frank doing so well after a near-fatal auto accident about three years ago.

We also got to visit with now retired but long-time AMA staff member Jay Mealey, as well as my buddy, Liz Helms (Senior Editor of *Model Aviation*) and with Joyce Hager. Joyce is the longest-term AMA employee, marking 40 years with our organization. It was neat to meet the editor of my column, Ashley Rauen. How great to see the walls of her office decorated with RC models, which she builds and flies.

Those of you who have never personally visited the nearly 1,100 acres of AMA headquarters and the adjacent National Model Aviation Museum, I urge you to do so. You will come away with an exciting new vision of your AMA.

That's about it for this issue. As always, your input, criticisms, and suggestions are always welcome at flyerdon1@yahoo.com. The best columns are built upon such. In the meantime, "Au revoir" from French-speaking Quebec! ✈

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many of us, when we visited that field, we were befriended by one of the club's members and that's what really sparked our interest in becoming modelers. For many it was that first contact that resulted in a lifetime of enjoyment as modelers, and the friendships and camaraderie that resulted from belonging to a club.

The next time someone stops by your field to watch the action, why not take a moment to greet them? That one simple act may result in gaining a new member of the model aviation community, a new member of your club, and quite possibly a new friend. All of this is possible with just one simple act of outreach. You only get one chance to make a good first impression.

See you next time…✈

Make Your Club "User Friendly"

Frank Geisler, Chairman Leader Member Program Development Committee

"User friendly." That was a catch phrase used by personal computer makers a few years back but it caught on big time. Cars, TV, DVDs, cameras, and many other product manufacturers all wanted their items to be more "user friendly." Even large corporations did studies to make sure their employees' work environment didn't cause them to walk around more than was necessary to get the job done. Although they called it a different name, it's just making his or her workday more "user friendly" so employees could be more productive. It's time to take a good hard look at your club to see if you can make it more "user friendly."

First, put yourself in the shoes of a newcomer as he/she plans on going to your flying field/club for the first time. Are there signs to the club field? Is it easy to find? Is the address correct on AMA's Web site? When they get to your field, do they see a sign with the name of your club on it? Does your sign give a brief description of your club or do you have a club flyer available that describes your club to the visitor and what you have to offer? Are club points of contacts listed on the sign or in the flyer? How about intro-pilot or instructor pilots' names and numbers? Are they on there as well? If you have a gate, is there a welcome sign on it with club hours and contact info? Can a newcomer know what your club is all about and what you do and how they might be able to participate without actually having to talk to anyone if they just show up? Information is valuable and some people may be intimidated by talking to strangers. Some just want to "get a feel" of your club without actually talking to anyone or when they stop by when no one is around. Having information about your club with names and contact info goes a long way into making your club more "user friendly."

Second, when a newcomer shows up at your field what will his first experience be with your club members? Will someone walk up to the newcomer first and introduce themselves and welcome him to your club or will he be ignored until the newcomer either says something first or they simply leave. If it's the latter, then that is definitely not being "user friendly" and I suggest that you make this a point of discussion at your next meeting to extend the welcome mat to all visitors and make it a point to greet everyone that shows up to your field.

Third, when a newcomer does show up with a new aircraft and asks for help with it, is it common practice to nitpick his decision on his aircraft choice, equipment, or place of purchase? Do you tell him he could have saved $10 by buying it online instead of at your local hobby shop if in fact that's the case? If so, he will probably either complain to the shop owner or not go back to that store. Do you help the newcomer with his aircraft the best you can with what he has brought? Keep in mind that not everyone is going to make the right decisions about what to buy for his/her first aircraft, radio, or equipment. Some do not have the money to buy "the best" that is available. A "user friendly" club will take the time to show the newcomer how everything works and do the best he can with what he has brought without a negative attitude.

Fourth, while we are discussing attitudes, I hope that your club is not in the mindset that one power system is better than another. If a newcomer shows up at your field with a brand new shiny electric-powered ARF is he or she shunned by your club members because they do not think that an electric-powered ARF is a "real" model? If that's the case, then I suggest you discuss this at your next meeting and educate/retrain your local club members that there are advantages to either power system, one is not "better" than the other. It is just a matter of personal preference what one wishes to fly. Does your club offer pilot training/instruction for electric-, gas-, and glow-powered models? If not, have you considered doing so? A "user friendly" club welcomes all power systems to be flown there unless the club is power-specific.

Fifth, people want to join a club or become involved in model aviation for a number of different reasons. Many times we do not know what those reason are and there are way too many to list them here. We cannot always know their reasons and we should not assume that we know what their reasons are without getting to know them first. We cannot and should not try to lump everyone into the same mold. A "user friendly" club will be open to new ideas, attitudes, and ways of doing things as long as they don't compromise safety or your club's bylaws.

The above may sound to be overwhelming at first and you may be thinking that being a "user friendly" club may just be too much work. But I bet if you gave this some thought and discussed these ideas with your club members, these suggestions are not difficult at all to implement and will only cost you and your club mates a little bit of time and effort and will certainly make a newcomer feel welcomed at your club. Keep in mind that everyone has something to offer and this newcomer may very well turn out to be an excellent addition to your club as well as a new friend. Because after all, when it all boils down to it, this sport is not just about building and flying model aircraft, it is about the people involved in the sport of model aviation. ✈

From *Buzzard Droppings*, Barnyard Buzzards RC Club, Duvall, Washington

Mechanics-Control Linkage and Hinges

The purpose of control linkage is to take the motion generated by the radio control servos and transfer it to the airplane's control surfaces and other control devices. Since this motion is mechanical, there are considerations for choosing one technique over another.

In its simplest terms, a control linkage will include a servo control arm, push rod, control horn, and a way to attach the push rod to the servo control arm and control horn, some way to adjust the position, distance of movement, and the controlled device itself. This is obvious to those of us who have been around the RC circuit for a while, but for the newcomer, this is a challenging topic.

Always plan ahead and avoid mechanical interferences between the moving parts. Engine vibration, inertia, and G-forces will cause our control linkages to behave erratically. These forces introduce stress and must be considered, even in a docile trainer.

Cost

The real cost of the control linkage is the price of the entire model if it were to fail doing its job! If we take into consideration the initial cost of the hardware, the time it takes to install, adjust, and lock, special tools, as well as any maintenance during the life of a model, we might want to consider using the higher initial price of carbon fiber push rods (titanium ends give you special bragging rights!), nylon brushed control horns, ball/stud clevises, etc.

The old adage, "you get what you pay for," comes into play here, especially for the Giant Scale and Speed models. Often, we use parts because they are part of a kit. We forget that the kit manufacturer makes choices based on cost—many times providing parts that "will do" as opposed to those best for the application. Some don't even provide these parts, leaving the choice to the preference of the model builder.

Precision and Strength

The important measurement for the control surface is whether it will provide the proper movement, with no slop, exact mechanical repeatability, no wear, and no maintenance. It must tolerate the stress placed on it during normal, reasonable flight. It should tolerate changes in temperature, and wear slowly. Parts that have been problematic over time are:

- Threaded metal clevises that can split apart and/or become stripped by vibration (Sullivan provides an interlocking design that is good).
- Nylon parts that are too soft or too brittle.
- Wooden dowels that twist and warp from moisture.
- Incorrect application or numbers of supports.
- Incorrect application (i.e. braided wire for elevators … yikes)!

Size and Space

These seem obvious until you consider that each model has many moving parts that may interfere with each other as they move. Some planning for the elevator and rudder push rods is required, even on ARF aircraft, or problems will occur.

Some problems occur with the aileron movement, noticed only when the wing is mounted to the fuselage (parts hit items mounted in the fuselage). Sometimes the needed supports cannot be installed because the construction has already progressed past the point of making this easy (think of an ARF fuselage).

Mechanical gain and differential

Many times the control horn and servo arm have different locations for installing the push rod. If the push rods (or pull-pull cables) are installed at the same distance from the pivot center, the travel is linear.

Some modelers will install the push rods so they are in a mounting hole farther from the pivot center in the servo and closer to the pivot center at the control surface. This will increase the travel. For precision, moving the push rod to the innermost hole on the servo arm and farthest from the pivot point in the controlled surface provides the greatest precision but the lowest possible movement.

Some vendors provide longer servo arms to help get the amount of travel a control surface needs.

Wear

Providing free movement for our control linkages is one of the goals. Checking that wear has not created slop is one of the routine inspections we should make. Those nylon parts will wear oval holes where they were once round. This introduces a great amount of slop. Check and replace these as needed. Make sure the parts aren't too tight. This speeds up the wear and causes repeatability problems.

Weight

Although not usually a primary factor, weight in some of the lighter models is a big thing. Building with components that add unnecessary weight is poor practice. Using composite materials such as carbon fiber rather than wooden dowels or threaded steel rods makes a difference in both weight and precision.

Usually the choice of materials is dependent on several of the factors already mentioned. A good scale (digital or otherwise) is a wise investment for the builder. Choosing parts that perform identically based on their weight is the right way to build. If a model needs additional weight for balance, why not choose the parts that will help balance the model rather than installing dead weight (i.e. lead) later.

Coolness

Advertisers being good at what they do, the neatest products might not be what you want in your model. Sometimes the simplest, tried-and-true parts are the ones to stay with.

Ask your fellow modelers if they've used the new products. You might save yourself some headaches.

You may want to avoid:

- Clevises that have multiple parts that could get lost.
- Plastic stuff that can wear (due to vibration).
- 2-56 linkages.
- Parts that require a special tool to adjust might not be field-friendly.

You do want to avoid metal-to-metal connections.

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Ease of use

Using parts in control linkage that make adjustments easy to do and will hold those adjustments from outside the model is a huge plus. Also, make sure the adjustable bits can be locked in place and unlocked for later adjustments. Some modelers CA their threaded parts; others use lock nuts. Some use thread locker; some use safety wire. Many use a combination of these.

Ideally we want our adjustments to stay forever; however, if we've selected less-than-ideal components, parts with a different coefficient of expansion (the ratio of change in length or volume of a body to the original length or volume for a unit change in temperature), or incorrectly installed our components, the model may have very different flying characteristics from one day to the next.

A few tips:

- Keep the control linkage as short as possible.
- Use mechanical adjustment to set end points and center rather than relying on a computer radio.
- Use silver solder on these types of joints. 60/40 rosin core solder (electrical) should not be used! Make sure to use flux when soldering. Clean the flux off; it is usually an acid.
- Coreless digital servos are expensive for a reason: They are fast, precise, repeatable, and strong.
- Control systems always fail at the weakest point. If you use balsa servos mounts or thin light plywood, guess where the weak link is …
- Providing bearings for push rods and attachment points for the plastic sleeve is a good thing. Depending on the load and power requirements, you may need to put one every six inches or less.
- Bending the control wires to reach the attachments points weakens the system.
- Slop causes flutter. Slop occurs in the servo output spline, control horn holes, hinges, and push rod itself. Installing the control rods so they run straight between the servo and the control horn is best but not always possible.
- Counter balancing control surfaces (equal weight on both sides of the hinge), usually prevents flutter.
- Some ARF vendors supply 2-56 or 2 mm metric parts. Sometimes the threads are rolled; sometimes they are cut. Metric and standard (SAE) are not exactly compatible or interchangeable. Close is not good enough. Check your parts and make sure they fit correctly.

Hinges

Another area that brings modelers' opinions to the forefront is hinges. Many use the hinging techniques that become familiar. This is all right if you are building models in the same class (size, weight, power, capability, etc.).

When you migrate from Peanut or .40-size Sport Scale to other types of models, different choices must be made.

Many kit manufacturers include or at least recommend the type and number of hinges to use. Lately, the larger 3-D type ARC/ARF kits do not include any reference to hinging (or control linkages). They leave it up to the modeler to use the components he or she likes.

There are several new tools available to make hinging easier. The idea is to provide a strong connection between parts that have no slop, small or no air gap, no friction or binding, and are simple and repeatable in use.

CA: Many vendors make these glues, but they are not all equal. I have seen many hinges installed with CA fail. When they do, it is tough to fix, often involving cutting the control surface off and rehinging. Still, some modelers swear by them and not at them.

Non-CA: Most hinges are installed with epoxy or white glue. If you use the hinges with a metal hinge pin, before gluing these in, it is a good idea to put oil or Vaseline on the hinge-pin area to prevent glue from migrating to these areas. Pinning the hinge is a very good idea and may save your model someday. ✈

From the Greater Detroit Soaring and Hiking Society

Misplaced Center of Gravity

Misplaced center of gravity (CG) is a perennial killer of newbies and old pros alike. Since it's almost building season, this is a good time to go over the basics. A new airplane with the wrong CG location is almost a guaranteed crash. (I can write authoritatively about this since I've screwed it up so often myself.) If you're an experienced builder/pilot please bear with me, I'll try to pass information to the newer guys without talking down to you.

The basic deal: any and all airfoils in any fluid—air, water, peanut oil, whatever—share this perverse characteristic: when they move through a fluid at a slight angle (the angle of attack), they experience lift forces that act "as if" they are ahead of the CG. This effect makes the foil want to tumble. We've all seen this since we were kids. When you toss a simple strip of wood or a wing-shaped piece of paper and expect it to fly, it won't! It starts tumbling right away.

To stabilize the main wing, most airplanes (and birds) use the same approach. The CG is placed a small distance forward of the center-of-lift of the wing. The slightly forward CG overcomes any natural pitching-up moment of the main airfoil and makes the "plane" want to pitch forward and down. This overall pitch-down tendency can then easily be controlled by a force (normally down) from a stabilizer/elevator mounted rearward of the main airfoil.

You might ask why the initial step of adjusting the CG ahead of the foil wasn't good enough to control the foil. Why do we need the additional step of adding a rear stabilizer? The answer is that the CG needs to be only a very small distance ahead of the center-of-lift and, if the wing has no other form of stabilization, its location is sensitive and difficult to maintain. On the other hand, a small stabilizer mounted some distance behind (or ahead of the wing as in the case of a canard) makes the job relatively easy. The farther away from the CG the stabilizer is located, the smaller it needs to be. At the extremes, planes with long fuselages like a Blaster hand launch or a super-ship can use what appears to be a relatively small stabilizer. Aircraft with very short distances from CG to stabilizer need

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relatively large stabilizer-elevators. Flying wings recurve the entire airfoil or use full-span elevons to act as stabilizers.

Let's go through some of the implications of CG location: The farther forward of the airfoil center of lift you put the CG, the more stabilizer down force you need. Generating lift, even in the down direction, generates drag. The more lift, the more drag. So, a plane with CG too far forward will need a stab set to a high-lift, high-drag condition in the down direction. Think of the center of lift of the main wing as kind of a fulcrum or pivot point. The farther forward the CG is from that point, the longer its effective moment arm becomes and the harder it is for the elevator at the other end of the "Teeter-Totter" to swing it around. This makes the model less responsive to elevator control and the airplane can feel sluggish. (This is only a partial reason for control insensitivity but I won't turn this article into a book.) Even though forward CG makes an airplane less sensitive and increases overall drag slightly, the slower response time can be a good thing for beginners if it isn't overdone.

Going the other way: as CG is moved rearward and closer to the center-of-lift, the required stabilizer down force will decrease and the airplane will become more sensitive to elevator, but eventually the model will get twitchy and hard to control. If the CG gets on top of the center of lift, the plane will become neutrally stable and won't automatically tend to pull out of a dive. It's for this reason that we use a "dive test" to help fine-tune the CG location. It's not a perfect test, but it is helpful. If you're not familiar with how to do it, ask one of the old dogs.

Okay, but you've gotta get the plane set up initially before you can even go out and do a dive test … how do you get close "on the bench?" Mother Nature helps us here, because the center of lift of almost all airfoils tends to act as if it's at a point about 25% from the leading edge of the wing. (To become more accurate, it's 25% of the "effective chord length" for the leading edge of the "effected chord.") A simple general rule is that the CG should initially be set at 23-25% of the average chord of the wing. (For a flying wing this should be 16-20% of the effective chord.) Most modern kits and plans show an initial CG location, but a surprising number of older kits don't. And, more troubling, even with modern kits, some of the locations shown are just plain wrong! If you don't know how to determine the effective chord for a given wing, I can quickly show you how.

I don't mean to belabor the moment-arm thing, but the longer the relative moment arm of an airplane (the longer the wing-stab distance of the "longer legged" plane is), the more tolerant it will be of CG location. A long-bodied glider with CG at 33% might fly beautifully while a short-bodied fun-fly plane or scale model with CG at 33% could be uncontrollable.

Be smart: make darn sure that the CG is at or slightly forward of the 25% point for your initial flight with a new plane! Don't bring it home in a garbage bag! After you know how the thing flies, you can adjust the CG rearward to suit your own nervous system.

Last year Wolfie talked me into buying one of the Great Planes balancing stands. If I recall it was about 19 bucks but it's been the best plane saver I've had for some time. When I started using it I was embarrassed to find that the CG locations of some of my planes weren't where I thought they were. I'd been careful balancing them with wing supports, string hangers and so on, but they were off enough to make the planes seem like poor flying machines. They weren't. They were just improperly balanced.

Have fun, lead a balanced life! ✈

From the *Rocky Mountain Flying Machine*, Albuquerque, New Mexico

Servo Arms

by Richard Lindberg

"Those pesky servos—why can't I ever find one that's properly centered? Every time I attach an arm, it seems as though the servo center shifts! What's going on here?"

Sound familiar? What causes this and what can you do about it?

All (standard-sized) servos today have splined shafts on which those servo arms are bolted. The problem arises because of the number of splines (teeth) on those shafts—Airtronics and JR use 23 splines, Hitec uses 24, and Futaba uses 25. (Your radio may be different—grab a servo and count the splines on the shaft to find out. Use a magnifying glass!) This is a really neat feature, and you should take advantage of it when you set up your airplane!

Put a servo arm on a servo. Now, every time you lift and rotate the arm by one spline, you change its position by a fixed number of degrees: for Airtronics or JR, this is 15.65º, for Futaba its 14.4º, and for Hitec it's an even 15º. The formula is simple: 360º divided by the number of splines. Now consider that your servo arms have an even number of fingers—two, four, even six. You can see by experimenting that rotating the servo arm and putting each finger as near as possible to where its predecessor was (about 90º, or 180º, or 60º) will result in a shift in position of 3.91º, 3.6º or 3.75º for Airtronics/JR, Futaba, and Hitech respectively. The formula is equally simple: 360º divided by (the product of the number of splines times the number of fingers). So, for Futaba, finger one is assumed at 0º, finger two (rotating clockwise) is placed at 3.6º offset, finger three at 7.2º, and finger four at 10.8º. (For Airtronics/JR, use multiples of 3.91º, and for Hitec use 3.75º.)

"Whoa, that's too complicated for me!" I hear you exclaiming. Well, don't worry about it—just keep rotating and pressing on the servo arm until you get a finger as close as possible to that magic 90º position.

One of those fingers will be right. (Actually, Futaba makes it simple—the fingers are numbered! Choose number one and you're there. JR has a raised dot in the lower right of its number one finger. It doesn't matter as much with Hitec, as there are even numbers of splines, and two of the fingers (out of four) will be right at any time.

Incidentally, the number of splines being different is the reason why servo arms are not interchangeable between servos of different brands—don't try to use Futaba arms on JR servos, etc.

This also clears up the apparent servo-centering shift. Most of the servos today have electronics that are so good that mechanical centering is a thing of the past and isn't necessary. If you in fact have a servo that won't center properly, or consistently, it's probably *bad*! Send it back for repairs! ✈

From The Plane Truth, The Circle City Flyers of Corona, California

Some Helicopter Nitro Tuning Tips

By Ron Keith

Low Needle Pinch Test

The pinch test is the first method to tune your idle setting:

1. Hover the helicopter for 30 (somewhat) seconds.
2. Land it and drop the RPM to idle.
3. Pinch the fuel line closed just before the carburetor (where the fuel line is connected to the engine) and start counting the seconds.
4. The engine should rev up and die because of lack of fuel.
5. If it is between three and five seconds it's all right.
    a. Sooner? Too lean. Turn the mixture control screw leaner for 10° counterclockwise.
    b. Longer than five seconds? Too rich. Turn the mixture control screw leaner for 10° clockwise.
6. Return to step one until you have it right.

Tuning the High Speed/Main Needle

Step One: Hover the helicopter and check if the RPM stays stable and smoke is "normal."

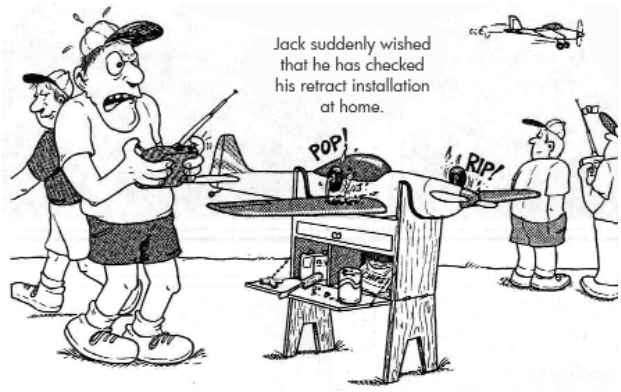
- Is the RPM increasing after a while? Then it's too lean.
    - Land the helicopter and turn the main needle three clicks counterclockwise (richer).
- Is the engine losing power after a while? Then it's too lean.
    - Land the helicopter and turn the main needle three clicks counterclockwise (richer).
- Is the engine sluggish and not getting up to speed? Too rich.
    - Land the helicopter and turn the main needle three clicks clockwise (leaner).

Step Two: Fly the helicopter full speed horizontally.

- If the engine is losing power, it is too lean.
    - Land the helicopter and turn the main needle three clicks counterclockwise (leaner).
- In doubt?
    - Play around with the main needle until you get the optimal performance.
- Another way to fine-tune this is to do a fast-forward flight and do a hard climb into a stall turn. Listen to the engine bog down. Play with the main needle to get your optimal performance on this maneuver.

Let's go fly! ✈

From the 1995 Warped Wings Calendar by Bob Zimmerman



Tips & Tricks

From the newsletter of the Rocky Mountain Modeleers, Ft. Collins, Colorado

Vinegar

To remove epoxy from yourself safely, use white vinegar. It's smelly, safe, and very cheap!

Flexible sanding block

A flexible sanding block can be made by contact cementing sandpaper to one side of a urethane sponge. Your sanding block can conform to any curve.

Handy soldering jig

Here's an easy way to solder a threaded coupler. Place the coupler in the jaw of a wire stripper and stretch a rubber band around the handle. This provides the needed tension to hold the coupler (or whatever else) in place while soldering.
—Mel Marcum, Eugene, Orgeon

Installing landing gear

When installing landing gear onto the fuselage with plastic or nylon bolts, place a thin 1/16-thick sheet of light plywood or balsa between the aluminum gear and the bottom of the fuse. This way, if by chance you land hard and sheer the plastic screws, you have a better chance of getting a grip on a section of the broken plastic for easier removal. [**Tech editor's note:** Possibly. But better would be to heat the tip of a screw driver in a butane touch and push the hot screwdriver into the broken bolt, it will make a very nice screwdriver slot.]

Wire bending

When bending identical parts from small gauge wire, tape the wires together and bend both simultaneously.

Radial engine cowling

Some two-liter soda bottles have a black plastic reinforcement on the bottom. This piece makes an excellent radial engine cowling for your next project. [**Tech editor's note:** The rest of the bottle can be used for canopies and emptying the bottle first can be fun, too.]
—Jim Trump, Corvallis, Oregon

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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