



PRESIDENT TO PRESIDENT

Update on the FAA

Dave Mathewson, AMA President

By now, nearly everyone should be somewhat familiar with the FAA's intent to create regulation for the operation of small unmanned aircraft systems (sUAS) in the national airspace. There's been a lot of speculation about what will be contained in the sUAS proposed rule that is scheduled to be released as a notice of proposed rulemaking (NPRM) sometime in June 2011.

The NPRM will contain proposed regulations that will likely have some impact on model aviation. The FAA is prohibited by law from disclosing the exact language in the NPRM until it's released in the Federal Register. However,

we have been able to determine, in a generic sense, what some of the proposed language might be. The NPRM will likely address things such as how high, how fast, and where a model aircraft may fly. We know that the FAA has drawn a hard line between recreational use and commercial use.

AMA is continuing to work with the FAA's Unmanned Aircraft Program Office (UAPO) and is in contact with the UAPO on a weekly, if not daily, basis. Face-to-face meetings between AMA representatives and the UAPO staff take place in Washington on a regular basis.

AMA's internal workgroup, consisting

of members with a diverse and knowledgeable model aviation background, meets weekly by conference call and continues to develop standards that will eventually be submitted to the FAA for adoption that will allow modelers who follow these standards additional latitude from the rule.

We're fighting a tough battle between keeping our members informed and not painting an overly tenuous picture of the future of model aviation. Not knowing

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CLUB CORNER

The Club Corner

Jim Wallen, Insider Club Column Editor

Have things gotten a little stale in your type of flying? Is the weather a little too cold to get out and fly at your flying site? How about trying something new? A group of flying enthusiasts in the Denver area has found a new wrinkle to our hobby, flying with CO₂ motors! (The Black Sheep Squadron in California has an interesting Web site featuring CO₂.) These guys were predominately flying electrics before they found this new type of entertainment. They meet weekly at Frank Dilatush's place of business to do a little indoor flying and solve some of the world's problems as well. Frank submits the following article:

"Some of you know that every Wednesday from 3-5 p.m., the employees at RFS and Whipchek are free to go play and Chuck and I lock the front door and host a gathering of our friends back in the warehouse where we fly little airplanes and helicopters, drink mild and strong spirits, and also solve many of the world's problems through civil, yet animated discourse.

"It's always fun, and of course the non-flying employees love it, I mean really who doesn't love recess? Yesterday was especially enjoyable because a little eBay find of mine had shown up and we got to play with it.

"CO₂ model motors predate RC and were used in Free Flight models going back before WW II. They are powered by 8-gram seltzer (siphon) bottle CO₂ cartridges. Not the easiest things to find but Burt, our favorite octogenarian, and

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Where is Your Center of Gravity?

Contact Jim at jtiller@hotmail.com

The Swan Sings

As I've mentioned in the past, in June 2009 my wife and I became full-time RVers. Since then, we've covered some 32,000 miles in 30 states and five provinces in Canada. In a few days we will be off again from our native Texas ... off to see the Wizard, perhaps.

At times we have had pretty good Internet access; other times not so great, or not at all. But that's largely an excuse. To be honest, I've run dry on ideas for the column and have asked my editors to allow me to "retire."

Knowing a good thing when they see it, they have graciously agreed, and as of this month **Jim Tiller** of District IX will be taking the reins. I'm sure you will enjoy his efforts. In the meantime, fly safely, and thanks to the many who did so graciously feed me input and ideas. Oh, yes ... MERRY CHRISTMAS AND HAPPY NEW YEAR!

—Don Nix, flyerdon1@yahoo.com

Where is your Center of Gravity?

A modeler reported to me recently that he crashed a new airplane on its first flight. After some research he found that the Center of Gravity (CG) location printed in the manual was off by more than two inches and this tail-heavy condition contributed to the crash. When he spoke to the distributor about the incident, the company told him the proper CG was in an addendum on its Web site—an addendum that, obviously, was unknown to him. He reported this to me, not only out of personal frustration, but also as a safety issue. The errant model could have caused a lot of damage on its short, first flight.

In its remarks to the modeler, the distributor reported it was not at fault, because it had published the addendum and, additionally, the builder is solely responsible for what happens to his model. As you know, most manuals actually go to great lengths stating the manufacturer and distributor are not responsible for the airplane after it is sold.

There are two questions here. First, should the distributor have made a greater effort to correct the misstated CG location? That answer is simple. Yes it should have. The correct center of gravity is a critical measurement for safe flight. It is boldly stated in many manuals, but in some manuals, mostly those intended for trainers and other beginner airplanes, the critical CG is not even mentioned. It assumed to be in the correct spot if the builder follows instructions.

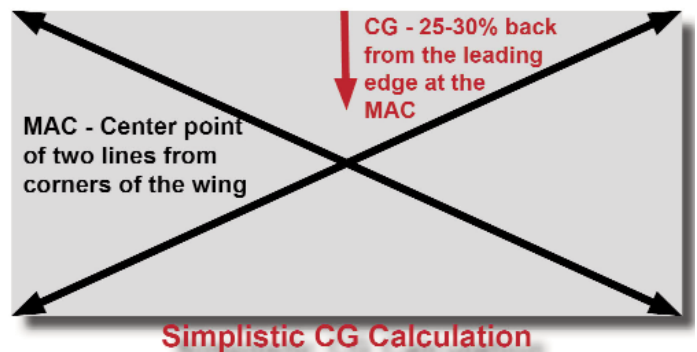
I think modelers, magazines, and reviewers should make every effort to report inadequate instruction manuals. The phrase "this is a builder's kit" or "designed for the experienced modeler" is the innocuous tagline that alerts us to manual deficiencies in most reviews. We are far too tolerant of poor instructions. Many online sales sites allow the buyer to post reviews or comments. We should complain loudly about inadequate instructions or, in the case of many Chinese imports, the total absence of coherent instructions at all. The squeaky wheel gets the grease—demand better instructions. If the comments affect the sales dollars, they will listen.

And, in like fashion, the companies that take the time to provide great manuals should be commended for their efforts.

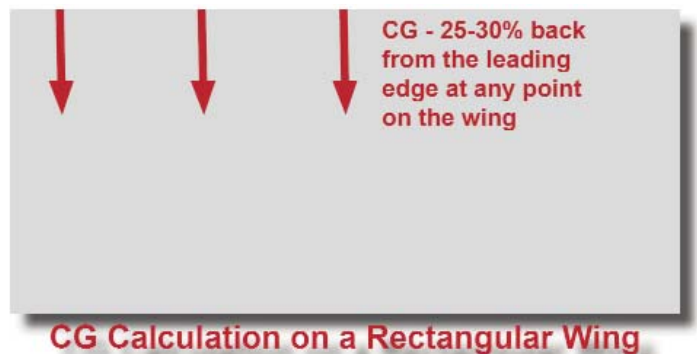
The second question: Is the modeler ultimately responsible for the CG of his airplane? The answer is, again, yes.

Builders often replace parts from their ARFs they believe are sub-standard or too weak to hold a load. They do that to protect their investment, but also in the interest of safety. In light of this, and other incidents like it, we should also be skeptical of the CG reported in manual. Don't blindly trust that it is correct. Do a rough calculation yourself.

The CG is not hard to figure and there are many references out there that explain the calculation. Google: "calculating CG on an airplane wing" and you get pages of results. The general rule of thumb is that the Center of Gravity is about 25-30% of the wing cord (wing width) at the Mean Aerodynamic Chord (MAC). The MAC is the center of a rectangular wing or its equivalent in a tapered or swept wing.



That sounds very technical, but for a rectangular wing (constant cord) the CG is 25-30% back from the leading edge anywhere on the wing. If the wing is 10 inches wide, the CG should be about 2.5 inches in from the leading edge. Many model designers put the main spar at this point, making it even easier to locate.



On a tapered or swept wing it is a little harder to find the MAC, but not impossible. For those mathematically impaired, like I am, it is simplest to go to a web-based CG calculator like the one at the National Association of Scale Modelers site: www.nasascale.org/howtos/cg-calculator.htm.

please see **On the Safe Side** ... on page 3

You Are Model Aviation's Ambassadors

Frank Geisler, Chairman Leader Member Program Development Committee

Some of you may not have realized this, but there are people in this sport who look up to you. They look to you for support, knowledge, advice, and wisdom (sounds a lot like being a parent).

It does not matter how young or old you are, when it comes to model aviation, newcomers to this sport will typically look to others for help in learning what model aviation is all about—especially when it comes time to put that aircraft in the air. Whatever your discipline—Radio Control, Control Line, Free Flight, soaring, scratch-building scale airplanes, etc.—newcomers will look to you for guidance because you are the experienced modeler. They will see how you act and react to certain situations, and they will learn from you by how you handle those situations. I am not telling you anything you don't already know, but people will base a lot of what they perceive model aviation to be by your behavior whether it is at the field, club meeting, or on one of those RC forums that are becoming more and more popular with newcomers.

I have heard different complaints from people who say they went to a club in their area, some by themselves or some had their sons with them, and not one single person had approached them to say hello, welcome them to their field, or ask them if they needed something or had any questions. They were just simply ignored.

Of course those folks said they left upset, to say the least, and vowed not to return. I also have heard of folks saying that if they took their <insert aircraft type here> that they are ignored because others there are not flying the same style of aircraft. I have never personally observed this kind of behavior, but I must believe that it has happened one time or another for these folks to at least mention it.

So now the newcomer, still needing advice, turns to an online RC forum for help. And as soon as someone suggests he or she stops by the local club for help, he or she will instantly be turned off by this idea based on his or her experiences and will most likely repeat the tale online to be read by hundreds of people. This is not how we want to introduce our sport to any newcomer.

Typically a newcomer will see a

chartered club as the AMA. In his or her eyes, he or she believes the actions or inactions, whether good or bad, are a direct reflection of the AMA. We of course know that is not true and also know that the AMA provides very little control over the chartered clubs much beyond providing safety guidelines, field size, and bylaw recommendations.

But the newcomer does not know this. We know that each club is governed by its own bylaws that are written by the club's officers and approved by the club's membership based on its specific set of standards and needs. One club's needs may be totally different than another based on noise restrictions, field size or location, model size, glow or electric power, or no powered aircraft at all. But to the newcomer the chartered club is the AMA just as are the members that belong to that club are.

I'm not saying that we need to be on our best behavior 24/7, and I totally understand that some people will rub some folks the wrong way. It's just human nature. But, I would like for you to remember that we all participate in model aviation for one reason or another and we joined the AMA for the same number of different reasons. I am asking that you at least stop and think the next time someone stops by your field so that you do not ignore that person. It doesn't take but a minute to walk over, introduce yourself, and ask if he or she needs something or if there are some questions you can answer for him or her.

Consider this. One, you might get a new club member; two, he will most likely be the first one to welcome a newcomer when they come to the field because he was helped in a similar manner; and three, the next time someone mentions something about a local club in an RC forum, he will gladly relay the story of how friendly and helpful clubs are for all to see.

I encourage all LMs to speak with your respective clubs and remind your club members when newcomers stop by your field to greet them and ask them what they are interested in learning more about what your club does. All it takes is a little consideration for your fellow modeler and

Contact Frank at murocflyer5@gmail.com

consider what you are about to say or how it will reflect upon you, the Academy, and model aviation.

These new folks can either come away with the idea that RC pilots and the AMA is something they would like to know more about, or they can walk away disgusted never to return. That scenario is left entirely up to you. I ask that you make the best of it for them, yourself, your club, and the AMA. Don't miss the golden opportunity of a first impression with a positive attitude and willingness to lend a helping hand. →

On the Safe Side

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Before you techie guys get too critical, this is an oversimplification of the CG calculation, but focus on the message. All modelers, beginning and experienced, should know how important the calculation is, and check it, before the first flight. Also, the definition of the CG and its importance should be part of the instruction manual for new fliers.

Before the first flight, mark the manufacturer's CG location on the root of each wing. Put one finger on each side of the fuselage at the CG and lift the finished airplane (minus fuel) off the work bench. It should stay level or tip slowly nose down. If it falls quickly toward the tail, you need to do your own CG calculation. Be skeptical—get it right. There is an old saying “A nose heavy airplane doesn't fly very well; a tail heavy airplane doesn't fly very long.”

We are ultimately responsible for the models we build, but manufactures and distributors should step up too. This is a safety issue. Safety should be as big a driving factor as sales. →

Visit the AMA *Insider* archives
online at

[www.modelaircraft.org/
insider/archives.html](http://www.modelaircraft.org/insider/archives.html)

The Importance of Setting Headings

Mike Lynch

One of the first goals of flying RC is to be able to make smooth, level turns. As early as your first practice flight, your instructor will tell you to bank with ailerons, maintain the turn with the elevator, and straighten with the opposite aileron. The goal is to maintain a smooth turn with no gain or loss of altitude. The time it takes to master this first step varies from one beginner to another. And the good feeling you get from mastering this step is but one of many you will enjoy as your flying improves.

With this step mastered, you will be able to “keep the airplane in the air.” However, you may not be able to enter and exit the turns you make as predictably as you would like. You may find that the airplane is flying you, wandering all over the flying field. The second step to flying is to master entering and exiting turns precisely—and the importance of this step cannot be over assessed. As you begin learning how to land, it is mandatory that you are able to exit your last turn (during final approach) in a manner that has you perfectly aligned with the runway. You can master this very important talent only by knowing how to set headings.

Practice with figure eights. Once you are relatively comfortable making smooth, level turns it is time to begin

practicing more precise turns. Figure eights are excellent for this purpose because they force you to make left and right turns equally to avoid the “I can only turn left” syndrome. To begin, we recommend making left turns on your right side and right turns on your left side. This way the airplane will always be turned away from you. (Many beginners feel uncomfortable when the model is coming directly at them, even in a turn.)

At first, you may find this quite difficult. The goal is to exit each turn with the airplane heading directly toward a corner of the field (with the center of the figure eight directly in the middle of the field). You will find that you must begin exiting the turn slightly before your desired heading is reached, which can be tricky. Your first few attempts will probably not be perfect and will force you to make minor corrections; you must be quite gentle with the controls to avoid over correcting. Once you have mastered, reverse the direction of the figure eight and start again (right turns on your right side, left turns on your left side).

Always remember the importance of setting headings. As you practice landings (and even after you have performed your first solo), whenever you are having problems setting up your headings, go back and practice figure eights. →

RC Helicopter Safety: Not Just for the Novice Pilot

Bill Zydycryn

Learning to fly and build RC helicopters is very rewarding. Today more people are getting into the hobby either as first time helicopter pilots or fixed-wing pilots who have shown an interest in learning to fly RC helicopters. RC helicopters, electric or nitro need to be given the proper respect to keep your flying experience safe for you, the flightline, and observers at the field. Remember RC helicopters are not toys. You can get severely injured if you get careless!

So let's discuss safety. It begins at the building stage of your helicopter kit. Most kits today contain written instructions with illustrations for each component in the building sequence. Some assemblies may require Loctite to keep them from vibrating loose. Make sure you do not overlook this important step. Cleaning the cap head screws with alcohol before assembly removes the oil residue from the screws and helps the Loctite bond more effectively.

Generally speaking, blue Loctite is recommended throughout the building

process. Red Loctite should only be used for permanent bonding. If the instructions call for using nyloc nuts, you don't need Loctite. Also substitute CA instead of Loctite when inserting cap head screws, set screws, or ball links into plastic. Loctite tends to make the plastic brittle.

Servo wiring: Keep your servo wiring as neat as possible, check your servo wire clearances around bellcranks, control rod linkages, etc. Avoid routing servo wires close to anything that is going to generate a lot of heat. Also, carbon fiber frames look cool but be careful how you run your wires through the side frame holes. The edges are sharp and can cut your wiring. Use plastic spiral wire wrap or tape for added protection. When you have multiple servo wires to bundle, use soft Velcro straps—avoid plastic tie wraps. Over time the vibration can create chafing on the servo wires directly beneath the tie wrap.

Gyros: If you are running a gyro or 3G flybar-less module, secure it (if you can) with a Velcro strap or a plastic tie wrap just in case the double-sided tape fails.

Receivers: Add a bead of clear silicone sealant across the top and bottom of all the servo wires that plug into the receiver. The silicone will help prevent any servo wire from backing out because of vibration.

Servo arms: If you are using metal gear servos, place a very small amount of Loctite on the machined screw that holds the servo arm onto the servo. You don't want these screws backing out from vibration.

Flight controls: Once all your electronics are installed, check the movement of your swash plate, throttle, ailerons, elevator, pitch, and tail rotor. Make sure they are moving in the right direction in response to your stick commands.

Final build double check: Start at the top, front, or tail of the helicopter. Thoroughly check all Phillip head screws, set screws, ball links, cap head screws,

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Clubs: Are You Ready for 2011?

Ilona Maine, Safety & Member Benefits Director

By now all currently chartered clubs should have received a 2011 Safety Code poster. These were mailed mid-December to the designated contact we have on file for each club. If you are a club contact and have not received your poster, please contact us at clubs@modelaircraft.org.

We are currently getting the club charter renewal paperwork ready and your club should receive the information within the next few weeks. Although your current club charter does not expire until March 31, 2011, we strongly encourage you to complete the charter renewal and return it to us as soon as possible. This will assist tremendously in processing your renewal, as well as printing and mailing all club documents in a timely manner. And it will ensure that we can send updated flying site insurance certificates back to you before the current one expires!

Many new programs and initiatives are cropping up at AMA these days, and your feedback and participation are critical. Please note that AMA uses an e-mail service provider (Exact Target) for most of its direct e-mail communications to members and clubs. These e-mails are related to official AMA business only. It is very important that we have your current e-mail address on file to ensure that you will receive all pertinent information. You can update your e-mail address by accessing your web profile at www.modelaircraft.org and signing into your account.

If you have previously selected to unsubscribe from one of our Exact Target e-mails, you may have accidentally selected to unsubscribe from all our e-mails thereby preventing you from receiving important, timely information. Please consider updating your subscription status by contacting marketing@modelaircraft.org.

Please note that while we generally will send all club correspondence (i.e. Safety Code posters, club charter renewals) to the club contact, occasionally we will include various other club officers in our correspondence to share information that is important to the clubs.

We have received some inquiries pertaining to the changes of the 2011 Safety Code (www.modelaircraft.org/files/105.pdf). The following is a synopsis of the changes incorporated in the new code.

Due to the restructuring of the code, the bold typing was removed. We felt it would be easier to read and familiarize yourself with all of the "new" code, instead of drawing more attention to specific areas. We will clearly indicate any changes made in the future.

The differences between the 2010 and 2011 codes are fairly minimal. General items 1.(b) and 2.(d) were added. General item 2.(g) was modified to add new provisions (as outlined in document #555).

A statement similar to general item 2.(j) used to be in the code several years ago. At one point in time it was removed, and the turbine regulations merely added to the listing of "Specialized Documents." We felt it was important to add this back into the

code to make sure it would be easy for turbine enthusiasts to see that there were special requirements for this specific aspect of the hobby.

RC item 1 was slightly modified (it used to only say unprotected people) to clarify the intent a bit better.

If you have any questions on the changes to the Safety Code for 2011, please contact the Safety & Member Benefits Department at safety@modelaircraft.org. →

President to President

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exactly what will be in the proposed rule makes this a difficult challenge. And we're still working through some issues today that may be satisfactorily resolved before the NPRM is released.

The February 2011 issue of *Model Aviation* magazine will contain an interview with FAA Associate Administrator for Aviation Safety, Peggy Gilligan, detailing why the FAA feels its needs to create new rules for model aviation and the direction the process is taking. Representatives from the UAPO will attend the AMA Expo in January and participate in a roundtable discussion, open to the membership that will provide additional insight into the regulatory process. The roundtable will be taped and posted on the AMA Web site.

Now is the time for modelers to become more familiar with this regulatory process, and to prepare for action in case the need arises in the coming months. Within the next few weeks a section will be added to the AMA Web site for Academy members and all who are concerned about the future of aeromodeling. It can be found at www.modelaircraft.org/gov. The site will feature background information about this topic, the latest developments, and how to communicate with your federal representatives.

As club officers and Leader Members you can help now by making your club members and modeling friends aware of the regulatory effort and the possible need for us all to get involved in the not too distant future.

Model aviation has an impeccable safety record spanning more than seven decades. Overly onerous regulation not only is unnecessary, it has the potential to harm the recreational activity that we all enjoy.

See you next time ... →

Tips & Tricks

Sanding Tool

While repairing a couple nonremovable wing struts in the connection joint at the fuselage (Fokker D-VIII), I used a small amount of spot putty to correct some gaps in the wood strut. When next to the fuselage, it gets quite tight limiting the sanding process.

I attached a small piece of self-stick sandpaper to one of my wife's best butter knives to reach into this tight spot. After all, nothing is too good for modeling use. Works great.

Also can be used to reach into the fuse or wing if needed to sand. Use a round item such as a pen or pencil for a radius.

—Mike DaBiere, *Front Line Flyers, York, Maine*

Importance of Balancing Lithium Polymer Batteries

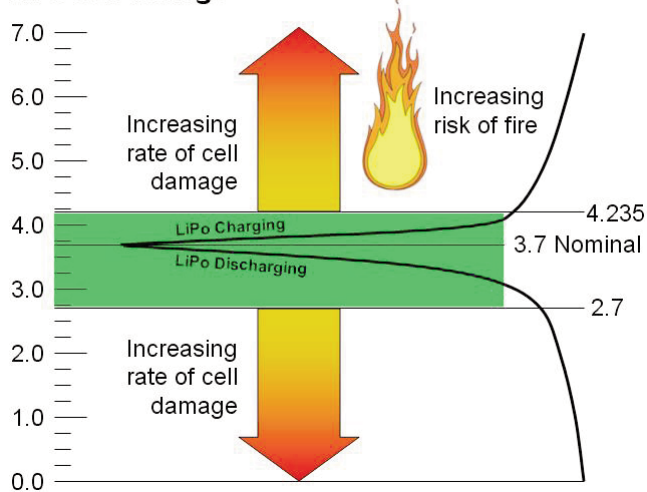
Dave Buxton

The primary reason for this article is to explain the importance of using a balancer for Lithium-polymer (Li-Poly) battery charging every single time you charge your Li-Poly batteries. Balancing will greatly reduce the risk of your batteries going bad prematurely.

Let's start with an illustration for those who may be electronically challenged:

- Imagine two 5-gallon buckets. One has been used for mixing paint and has several layers of it coating the inside.
- The bucket with reduced capacity (painter's bucket) will fill faster and will empty faster if the flow rate for each is the same.
- Normal aging and cell damage are like adding layers of paint. The cell with less capacity will charge or discharge faster than the other cells in the pack.
- Brand new battery packs can have cells that are poorly matched.
- Cell balancing is like drilling a hole in the bottom of the painter's bucket so it will fill no faster than the clean new bucket. We can put our finger over the hole as necessary to keep the two buckets in balance as we fill them.
- Using a Li-Poly balancer does not scrape the paint out of the painter's bucket.

LiPo Cell Voltage



Li-Poly chemistry accumulates a charge over a fairly narrow voltage range with rapidly diminishing capacity exhibited above and below this range. This explains why the voltage rises or falls more rapidly above or below this chemistry range. Operating outside this range of voltages will at best accelerate the aging process and can result in serious cell damage and even smoke and flame. A battery that could have lasted three years might fade away in less than a week if one cell has a significantly reduced cell capacity relative to its mates.

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RC Helicopter Safety

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etc. Retighten and Loctite anything you missed during the initial building phase. Check your receiver, gyro, speed controllers, governors, batteries/li-polys, and muffler to ensure everything is secure. Fit your canopy and make sure it does not interfere with any control rods, bellcranks, or servo wires, etc. When you think you have completed your model following the manufactures instructions and it's your first build, don't run out to the flying field or your backyard to attempt to hover or fly it. Have an experienced helicopter pilot check it out. It could save you money in repair costs, but more importantly it avoids potential injury to yourself and others.

Fail safe: Most of the popular helicopter and airplane transmitters today have a "FAIL SAFE" program built into the radio. The fail safe is designed to return your throttle to the idle position if you lose the signal to the receiver. But keep in mind you must manually activate this program and set an idle for each model you have stored in your radio!

Before you head to the field, make sure your onboard Nicad's or Li-Polys are fully charged as well as your radio. If you are thinking about flying that old helicopter that has been sitting around for a while, check it for loose/cracked ball links, servo arms, and linkages. Replace with new ones. Clean your blades and look for any stress cracks, chips, or ripped covering, etc. Do not fly until the damaged blade or blades are replaced and rebalanced.

At the field: Prior to starting your helicopter in the pits, users of non-2.4GHz transmitters should put up a frequency pin and make sure your channel is clear before you turn on your transmitter. Do a range check. I repeat do a range check! Keep everything not needed to start your model a safe distance away. Avoid loose clothing. Take a look at your radio; make sure all switches are in the correct position for starting. Make sure you have selected the correct model you are about to start.

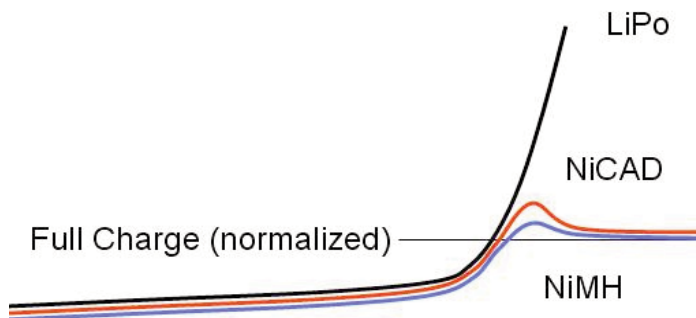
Starting the engine: Check to make sure your throttle stick is all the way down. Use your throttle trim to start your engine. Hold one blade grip firmly while you engage the starter and spin up the engine. Once you have a reliable idle you can head for the flightline, by either holding the throttle stick down with your thumb or engage the throttle hold switch on the transmitter (preferred method). The throttle hold switch is a flight mode that must be programmed by you (usually based on a % that corresponds to a specific engine idle setting for that model). The safety benefit of this feature is, should you accidentally bump your throttle stick to high throttle, your engine will remain at idle with no clutch engagement to the main shaft and rotor blades.

Getting ready to hover/fly: Keep a safe distance (25-30 feet) between you and the helicopter. Do not spool up your model at your feet. Avoid hovering at eye level for obvious safety reasons.

Other safety considerations: Do not fly alone. Keep a small first aid kit in your flight box. Never hold the helicopter by the skids with the blades spinning. Most of all use common sense! →

Batteries continued from page 6

Nicad and NiMH cells self limit at full-charge voltage. At that point they start getting hot, which is why it is very important that Nicad and NiMH chargers detect full charge and switch to a trickle charge rate. Li-Poly cell voltage is not self limiting, which is why you should never use a Nicad style trickle charger. Diagram 2 normalizes the three charging curves so that their respective full-charge voltages appear to be the same.



You may be a newcomer to RC flying of indoor or park flyer airplanes on a very limited budget. This article need not scare you out of the hobby or into purchasing an expensive charging system. The smaller, simpler Li-Poly chargers do not charge batteries all the way to the top, allowing some margin for a cell being out of balance. At least do the following if you don't use a balancer:

- Make sure the charger is charging to an adequately conservative voltage that is less than 4.2 times the cell count.
- Check the cell count each time you use the charger. Wrong cell count is one of the leading reasons for smoke and fire,

which has lead to car fires and houses burning down.

- Once in awhile, at full charge, use a volt meter to confirm that none of the cells are being charged to more than 4.2 volts. If a trend is developing in that direction then its time purchase a balancer.

If the above is stretching it a bit, then you should at least add an external balancer (e.g. Blinky Balancer).

Consider the following limitations of an external balancer:

- May not be aggressive enough, especially for larger batteries or any battery with cells more seriously out of balance (Blinky balancing cost me an expensive battery).
- An integrated balancer can easily produce an alarm if you dial in the wrong cell count. An external balancer won't do that.
- A charger with an integrated balancer will slow down or even stop the charging process whenever the balancer is not keeping up.

If your flying practice sounds anything like the following, then you should (must) use a charger with an integrated balancing system:

- High battery stress style of flying (e.g. lots of full throttle, hot weather, flying until the battery fades, outdoor helicopters).
- Cell counts greater than three.
- Cell capacity greater than 2100 mAh for which you should at least use a Blinky external balancer.

Some chargers have an external balancer that communicates with the charger. This can be as effective as having the balancer built into the charger. →

Club Corner continued from page 1

I both came up with boxes of 10 so we had (have) plenty for experimentation.

“Now this thing was obviously a barn find, the seller being more familiar with Farmall tractor parts and at \$25 “buy it now” and very reasonable shipping I couldn't resist. It came in looking and feeling rough but a few cycles of contact cleaner and K&B Knockerloose got it spinning smooth and freely.

“The first few cylinders of gas gave somewhat fitful operation, yet several points became immediately apparent. First that something the size of the first digit of your Hawaiian Peace Sign finger can swing a propeller hard enough to bite you ... Ow! And second, that the exhaust from this type of system can generate point frostbite on the fingertips holding it ... Double Ow! Brrrrr!

“By about the sixth or seventh cylinder we were well lubricated and so was the little motor and it began running continuously through the whole cylinder without restarts ... maybe 60 seconds of quite entertaining propeller swooshing and the designated motor holders moaning about the icy, frosty thing gripped firmly in their numbing fingers.

“I bet some 50 or 60 years ago, some lucky kid got a small

Christmas present and likely pooped his little britches with joy and delight when he opened the box and saw this miniature jewel all bright and shiny, freshly store bought, ready to break the surly bonds in the stick, dope, and tissue model airplane that he had yet to build.” →



Frank Dilatush, John Welch, Phil Trowe, Dick Conn, Burt Payne, Mike Brink, and Ray Woodhouse enjoy life with their CO₂ aircraft.

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.

ABOUT THE *AMA INSIDER*:

The Academy of Model Aeronautics' *AMA INSIDER* is published electronically on a bimonthly basis for members of the Academy of Model Aeronautics. Its purpose is to create a network of information exchange between the Academy of Model Aeronautics-chartered clubs as well as the Academy of Model Aeronautics officials and chartered clubs.

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