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

AMA Executive Director Departs

The Academy of Model Aeronautics' Executive Council (EC), the governing body of the organization, and its Executive Director, Don Koranda, have reached a mutual decision not to renew Koranda's contract. This decision was made at the EC's quarterly meeting on October 15, 2005. It is effective immediately.

Longtime AMA employee Joyce Hager has been appointed staff director and will oversee the day-to-day operations until an interim executive director has been named.

"Joyce is an accomplished executive who is well-prepared to fill the association's immediate staff leadership needs while a replacement executive director is sought," said AMA president Dave Brown. "We are very fortunate that she is willing to assume this position."

The EC has appointed a three-person search committee charged with locating qualified candidates and making a recommendation to the council. Committee members include the chairman, Richard Hanson (District X), and members Andy Argenio (District I), and Dave Mathewson (District II). Joyce Hager will function as a staff liaison to the committee.

The committee's search may take as long as one year. "Reaching consensus on the expectations of an executive director and finding the right person is much more important than filling that permanent position quickly," Brown said.

Koranda's departure follows 10 months at the helm of the 165,000-member association. "I knew the risks when I accepted this position and have absolutely no regrets," Koranda said recently in a E-mail to staff and the EC. "I also have no doubt about the direction in which AMA needs to go to meet its full potential. In my view, we accomplished a lot in 10 months."

"We will miss the vision Don brought to AMA, and we will do our best to continue many of the programs Don initiated during his tenure," Brown said.

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President to President

Just Elected Club President: Now What?

by Dave Brown, AMA President

That feeling in the pit of your stomach is normal. Welcome to the group. Everyone goes through those moments of anxiety wondering what you are doing here, and it never changes. If you are later voted into another position, those feelings of anxiety will return but not for long.

For most of us, being elected to office is an opportunity to show people that we can do *something* to make life better for other aeromodelers. We really want to do that but ...

Now that we are in a position to make changes, the reality sets in that we cannot accomplish anything alone. In most clubs or other organizations—including AMA by the way—the "power" of the presidency is actually quite limited. In order to accomplish much, it is necessary to create a consensus among the board members or the group of officers. In some instances, it is necessary to get a vote from the entire club—or at least those who show up at the meetings—in order to do anything.

All you need to do is convince them. That is easier said than done sometimes, but if you recognize that your success depends on that, it is easier to get things done.

Every club has its movers and shakers, and I doubt if your club is any different. There always seems to be a few people in the club to whom the members look for guidance and the secret is to get them involved in the process. If you get an idea, give them a call. Ask what they think. Let them feel like they are a part of the process.

If they resist your idea, then see if you can work out a compromise which will get their support. In the end, if you can't convince those people, then you do not have much chance with the rest of the membership.

Most good ideas are developed over time as opposed to being instantly complete. Discussion with that "brain trust" is what matures an idea into a proposal and then into a plan. The fact is that a lot of those "brilliant flashes" in the eyes of the club went through this process, before it hit the club floor.

Don't be afraid to call a club member who is not generally one of those movers and shakers if that person has a specific interest in the subject at hand or can bring some expertise to the table. It's amazing how much more support you will get from the membership when you let them feel as if they are a part of the process rather than a hurdle to overcome.

Everyone comes to office in an aeromodeling organization wanting to accomplish things. Those who can convince the majority of members that they are acting in their best interest and involving them in the process, can accomplish much more than those who try to accomplish much through "revolution."

Oh, by the way ... if you ran for office thinking that it would increase your time for flying, you probably need to rethink that. I have said many times that the longer you are around this sport, the more the attraction becomes the people rather than the model airplanes. Serving as an officer is a way to prove that.

Modelers are the greatest people on earth—even when they are arguing with you! ♦

On the Safe Side

Flying with a Purpose Can Increase Safety

by Jack Frost, Education Coordinator

Does your club hold a training night on a regular basis to help new club members learn to fly? What kind of training is accomplished during these sessions?

Many clubs hold training sessions at regular intervals during the flying season, and most training seems to consist of getting into the air and back on the ground with a flyable aircraft. I've seen takeoffs, circles, horizontal eights, loops, rolls, and landings practiced.

Is this really enough? I know that some clubs must do this, but I have never personally seen any club provide a ground school before a newbie was allowed to put his or her airplane in the air. I've seldom seen flight emergencies such as out-of-trim airplanes, failed servos, or even engine-out emergencies taught or practiced. I've seldom seen anyone practicing crosswind take-offs and landings, yet students are signed off as solo pilots without this training.

CONTACT US

If you have questions about this topic, please contact

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I have seen newly soloed pilots crash aircraft unnecessarily because of fairly routine problems. I have even seen airplanes crashed in low crosswind situations because the pilots were never trained to fly in the wind.

Some might say that it is too hard to learn all of these things; this hobby is supposed to be fun, not work. I can understand that, but I also feel that learning to be a proficient and safe pilot doesn't have to be work. It *can* be fun.

I know that not everyone is into competition, but we can all still learn things from competitors. Watch the way a competitor practices. I don't care if it is RC Pattern, or CL Stunt, they all have one thing in common: purposeful flight. They fly with specific goals in mind. They practice until they have mastered those goals. Should we be any less demanding of ourselves as instructors or students?

The next time you observe your club training night, ask yourself what is really being taught and what is really being learned. Are the students being trained to the best of your club's ability? Are the students developing the skills necessary to become proficient and safe pilots? And when they get their solo sign-off, will they be assets or liabilities to the club and to themselves? ♦

Tips for Clubs

Keeping Your Flying Site and Safety

by Jay Mealy, AMA Programs Director

Much has been written about safety. As it relates to model aircraft activities, safety is a word that is used in almost every paragraph written or conversation spoken. It is a must-use word in our area of interest—if for no other reason than it sounds good.

But what does safety really mean when it comes to keeping a flying field?

In the *Webster's New World Dictionary,* safety is defined as "the quality or condition of being safe; freedom from danger, injury, or damage; security." Good definition. It sounds right, and pretty much describes the condition we would expect to find at a safe flying field.

However, is that the only definition of safety? Hasn't Mr. Webster pretty much nailed it? Doesn't that say it all? The answer is no!

Let's set up a scenario. Say there are five other people at your flying field, and if you ask each one of them what his or her definition of safety is you would get five different answers. So now Mr. Webster has five other definitions to compete with plus yours which makes six. What I'm getting at is that there are probably as many definitions for safety as there are people.

You may say, "Maybe we can't define safety, but we all know what it is." or "You have to be safe so you can enjoy your hobby without getting hurt," or even "You must be safe so others are not fearful of not enjoying their flying activities because of your unsafe behavior or vise versa."

What we are really bringing to light is that safety is nebulous. It's a tough concept to get your arms around and even tougher to appreciate, comprehend, and most importantly to put into action.

For the time being; however, let's assume that everyone has a good grasp of what safety is all about and return to our original question of what safety means when it comes to keeping a flying site.

There are two problems clubs are faced with: external problems and internal problems. External problems are those involving neighbors, community, or any entity outside the club that may pose a problem that the club cannot control. On the other hand, internal problems are those such as "How do we get more members to the meetings," or "What is the best way to keep the gophers off the runway?"

When a call comes into the AMA Headquarters from a club with an internal problem, the number one item of discussion is safety. Maybe there's a member who never quite got the hang of making right turns so he flies behind the flightline and over the pits. Or perhaps there's a show boater who ignores the field rules to selfishly fulfill some personal need for attention. We all could add to this list and we have all experienced this type of behavior.

The clubs that recognize this behavior as inappropriate and call for assistance are the clubs that survive. We can provide recommendations about how to correct such problems and provide examples of what other club have done in similar situations. The clubs that allow this type of behavior to continue unchecked are possibly setting a course for extinction.

The majority of modelers operates in a safe manner and is uncomfortable with the unsafe actions of others. If the club as a whole is not doing anything to end unsafe actions, then the members will begin to compensate for their discomfort in their own ways.

Unsafe flight operations are like a rust spot on your car. If you don't take steps to eliminate the rust it will eventually consume your entire car or at least make it unusable. The same thing can happen to a club and its flying site.

It begins subtly. The number of active fliers at the field on any given day starts to decrease, fewer members show up at club meetings, and less people participate in club functions. Members may start participating at other club sites or just decide to back off flying their models for awhile. Whatever their cure, they are going to pursue it because they are not having good, safe fun at their own flying site.

The negative results of unsafe flying practices can take many forms but the end results are the same: loss of a club, loss of a flying site, or heaven forbid, something much worse. For these reasons it is imperative for clubs—and all members—to take a strong position when it comes to safety at the club field. Don't allow people to do dumb things in the air, on the flightline, in the pits, or anywhere else.

Clubs that operate safely have more fun, make more friends within the club and within their communities, and virtually guarantee their longevity and success.

If you would like to be part of the Flying Site Assistance column in *Model Aviation,* please feel free to share any success stories—or not-so-successful stories—with Joe Beshar and Wes De Cou. Often the successes and/or mistakes of others can be learning experiences for us all. ♦

We would like to hear from you!

Change is good, but it could be better. If you have a question, comment, or suggestion, please contact us.

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Building a Vacuum Press System

Ken Myers, editor

There are many ways to make a vacuum press. This article doesn't cover how to cut foam or how to bag wings. (There many Web sites/articles that cover this.) This project is fun if you're a builder, so go for it.

A vacuum press is a must for making wings and other parts for model airplanes. If you are a builder and wish to advance your skills, a vacuum press is the way to go.

I have built several vacuum presses. I usually start by using the absolute cheapest parts, and spend the rest of the time working my way out of the mess I have created. The learning curve in life is brutal, but maybe I can save you some pain.

Our perception of what is a fair price seems to depend on rather strange parameters. I'll pay $100 for a 3-oz brushless motor without blinking, but I'll try to save a few lousy dollars in the strangest ways on most of my projects. Sometimes I win, sometimes I lose. This time I won (it took me four tries).

I started with a hand vacuum pump, progressed to a venturi/air compressor system, then to a compressor out of a defunct refrigerator, and finally to this system.

The hand pump didn't move enough air. The venturi method was wearing out my air compressor, pleasing the utility company, and making a lot of noise. The refrigerator compressor only moved .5 CFM, and the exhaust spewed oil into the air.

My final vacuum press described here is patterned off industrial-type systems. It works without the problems my other version had and it's a real pleasure to use. Commercial systems such as the ones Vacupress or CST make start out at $300 and go to several thousand, so the $150 or less you may spend is a good deal.

The Basics

Air is sucked out of a plastic bag, and the resulting atmospheric pressure squeezes the parts together with tremendous and uniform pressure. This pressure is adjustable from 3 inches to more than 25 inches Hg. Foam will flatten at anything more than 8 inches. I set my system for 6 inches for this application and at roughly 20-21 inches Hg for woodworking. This system can produce more than 1800 pounds per square foot of pressure.

Components

A good pump is the heart of this system. I found a 1/4 hp surplus pump at Surplus Center. It pumps roughly 3-4 CFM. These surplus pumps came from Storage Technology and appear to be in good shape. Surplus Center has a good guarantee and will pay for shipping both ways if you get a defective pump.

The down side of this pump is that it uses a 240-volt motor. If you don't have 240-volt in your shop you may have to use your clothes dryer outlet or find another pump.

You can buy used vacuum pumps on eBay at good prices, but I'm afraid of them. Vacuum pumps are used for biological experiments and with toxic chemicals sometimes. Do I need to explain where the Hulk came from?

My pump made noise like a small air compressor so I screwed a muffler on the exhaust. The compressor runs very little while working, so the noise is not really a problem for most people. I just don't like noise (that's why I fly electric). Some pumps are totally silent, for example a refrigerator compressor, but I found they don't pump much air.

I have a very large shop, 2,400 square feet, so I needed a portable system. I bought a small folding table, installed wheels, and added a shelf and the vacuum components. I use the top of the table as a worktable, but I wanted it to be perfectly flat. So, I covered the medium-density fiberboard with Formica on both sides. I used the vacuum press (of course) to install the Formica. Trust me on there—forever! If you don't have the room for a roll-around, you can simply make a small wood tray to carry the press around. It's not very heavy, 40 lbs. maybe, without the reservoir. None of the layout or plumbing is critical so do what ever looks good to you.

Parts List

Vacuum pump
Vacuum gauge
Vacuum switch
Filter
Check valve (goes between pump and manifold.)
Ball valve

Miscellaneous Parts:

1/8-inch rubber vacuum hose; 5-7 foot long (used as vacuum hose from manifold to storage tank)

Line cord for pump and 240-volt plug

On/off switch for pump, 240-volt and electrical housing box

1/8 inch hose barbs and T's as needed; 1/8-inch pipe as needed

Teflon tape

Muffler for pump

Reservoir (12-gallon compressed air tank)

Reservoir Storage Tank: The idea behind this is to provide a large vacuum supply so the pump doesn't cycle on and off rapidly. It also is used to help evacuate the bag. The air is pumped out of the large reservoir, and then closed off with a valve. When the wing is installed in the bag, the valve is opened with the pump running and this evacuates the bag quickly. A bigger reservoir is better in this case.

Disclaimer

The author has no affiliation with any of the manufacturers mentioned in this article. You are on your own as far as any additional advice. Check out www.joewoodworker.com for his version of a press.

A small-capacity reservoir doesn't provide enough spare vacuum to work very well for big bags. The wings we make, however, don't require much pump down. The large bags I use on furniture require a huge pump down.

I used a 12-gallon portable air tank for a reservoir. You really don't need a reservoir with the pump I called out, but it looks so cool. The tank does take out many of the surges and slows down the pump cycling. It can be added later if you decide you need it.

Vacuum Switch: This regulates the pressure. It turns the pump on and off as needed. A small screw setting allows you a wide range of pressure. Air Logic model V-5100 is the one I use. The price is roughly $25.

The pressure swing is roughly 2-inches with the single switch. If you want less swing than this you will have to use two switches. One switch is used to control the high pressure, and the other to control the low pressure. This particular model is very popular and seems to be the one everyone else uses. I only use one switch, and haven't found the wide swing to be a problem.

The switch is rated 15A by the company. The pump only pulls 1.6A so there is no need to rig a control relay. Break one side of the 240 volt line, and wire it to the switch contacts with push on connectors. I mounted the switch inside a plastic electric box.

Vacuum Gage: This shows you how much vacuum you have in the bag. Without it you cannot set the vacuum. It can be ordered from the same company that carries the vacuum pump.

Miscellaneous Parts: I purchased the rubber vacuum hose and a few other parts at the local auto-supply store. Most of the rest is standard plumbing hardware available at various home-improvement stores.

Bags: There are many articles on vinyl bags and valves. You can buy or make them, but I don't think something this heavy is needed. I use 2 mil sheet poly that I simply cut to fit around the part and make it roughly 8 inches oversize. I seal the edges of the poly sheet together with plumbers caulk. A 1/8 inch brass tube is laid on top of the caulk, and more caulk added on top. The plastic is then pressed into the caulk. When you pull a vacuum the bag self seals. I had a lot of trouble getting a good seal when using small pumps. The big pump seals the bag very quickly.

Mechanical assembly

I made a PVC manifold with a built in vacuum gauge to manage all of the hoses.

1) manifold line to vacuum switch
2) manifold line to pump
3) manifold line to storage tank "T." (Important: Use a large enough line here to prevent rapid cycling.)
4) "T" mounted to storage tank with shut-off valve; line from the valve goes to bag. ♦

Color Theory for Models: Choosing the Right Color

by Dr. Robert Suding

All RC fliers have gotten that "I can't tell which way it's going" feeling when learning to fly RC. Several simple color trimming steps can help you fly your airplane better, whether you are a beginner or top dog in Pattern.

Most airplanes, especially ARFs, are covered or painted to look good in the store. But in the air it's a different story. The situation is very simple—if you can't see it, you can't fly it.

To successfully fly an RC aircraft, the pilot must have good orientation and distance perception. The eyes estimate aircraft orientation based on the perceived position of the model's outer edges, and the relationship of these outer edges to the edges of any discernible trim markings on the airplane's wings or fuselage. Distance perception, in turn, depends on a combination of one's perception of the aircraft's outside edges and its estimated orientation.

After you have located your airplane and estimated how far away it is, you must immediately recognize several attitude orientations:

Is it flying toward me or away from me?

Is it upright or inverted?

Are the wings flat, vertical, or tipped?

Is it flying horizontal, upward, or downward?

Is it flying parallel to the runway or vectored?

Is it flying perfectly vertical or skewed sideways or fore/aft?

The following suggestions will help you with distance and attitude perception. Visual acuity and contrast perception diminish with age, but by using correct color concepts, even senior fliers will find that visual orientation of their aircraft can be consistently and reliably achieved.

Solid-Colored Aircraft

RC airplanes are flown in all kinds of weather and background conditions. A solid-colored aircraft will sooner or later fly into a condition where it blends into the background. This will result in a complete loss of location and orientation since no edges can be perceived. The absolute worst, in my opinion, is a silver Mustang in a heavily overcast sky. Yellow Cubs are tough to see when back lit by the sun. I had a dark green airplane that would disappear when I landed with a background of green trees. Red Stiks and dark blue airplanes go invisible in late evening and storm conditions. A solid-colored airplane is easier to cover, but it won't do you any favors up in the sky.

Wing and Horizontal Stabilizer Shades

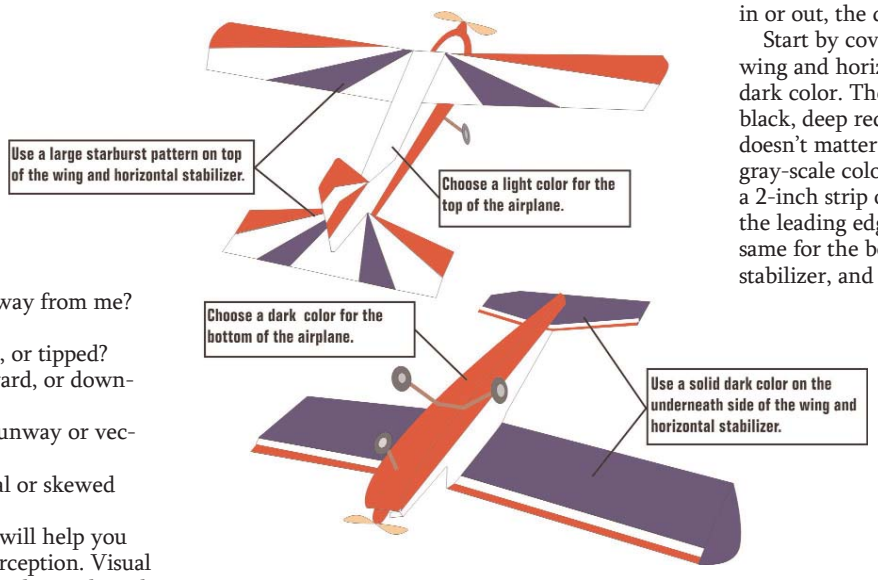
The top of the wing and horizontal stabilizer is normally lit by sunlight. The bottom of the wing and horizontal stabilizer is shadowed. Coloring the top lighter and the bottom darker keeps this same relationship even in changing lighting conditions.

ARFs are classic blunders in coloring. Either they have identical top and bottom wing colors, or they put some token color on the top of the wings and leave them white underneath. They look good in the store, but don't help the beginner at all.

I always recommend that beginners cover the bottom of the wing and the bottom of the horizontal stabilizer with dark-blue contact paper before flight.

When flying at a distance of 500 feet or more (depending on the size of the model and lighting conditions) you can't see colors, because the cones of your eyes that perceive color are 2,000 times less sensitive than the rods, which perceive illumination.

Actual Patters to Use in Coloring Your Airplane:



In these circumstances, your gray-scale vision (your perception of lightness and darkness in a black-and-white image) provides your orientation and depth perception, not color. Any series of adjacent colors on your aircraft that are intended to facilitate orientation should therefore be gray-scale opposites. For example, a series of bands consisting of red, yellow, blue, and then white is desirable. Don't assume a series of "color opposites" such as red, green, blue and black will be effective. These all have the same dark gray-scale shade and will show an equal tendency to disappear in a deep blue or heavily overcast sky.

If you use the wrong series of color bands, you won't know how far away your aircraft is, and you won't even know which way it's heading to bring it pack. Also, don't rely on intricate patterns. They blend together to form edgeless fuzz approximately 100 feet away. You can test potential color schemes for gray-scale perceptibility by video taping and playing back alternative color schemes on a black-and-white television or on a color television with the color control turned down.

Actual Patterns to Use

The best color scheme for beginners that I have found is a combination of large starburst patterns on top of the wing and horizontal stabilizer, and a solid dark color underneath the wing and horizontal stabilizer.

Beginners consistently become perceptually disorientated when flying at a distance, especially when the airplane flies at a 45° angle away or toward the pilot, since the aircraft silhouette is identical. With the starburst pattern, all the beginner has to do is slightly roll the wings towards him, and the starburst pattern becomes an arrowhead, pointing in or out, the direction of flight.

Start by covering the bottom of the wing and horizontal stabilizer with any dark color. The exact color could be black, deep red, dark blue, or green, it doesn't matter; they will be the same gray-scale color at a distance. Then put a 2-inch strip of some light color along the leading edge of the bottom. Do the same for the bottom of the horizontal stabilizer, and make the light strip roughly 1 inch wide.

The base color of the top of the wing must be a very light color such as white, yellow, or some other very light color The starburst pattern starts out at the center of the wing, from $^3/_8$ inch under the wing's leading edge to roughly 1 inch back from the leading edge at the top. Then it is a large "pie slice" to the wing tip, where it extends from $^3/_8$ inch under the wing leading edge to the trailing edge on the top. A second pie slice of a different dark color extends from the center of the wing to points one third and two thirds out on the wing. Both sides of the wing are colored like this as is the top of the horizontal stabilizer.

Landing Considerations

Landing requires keeping your wings flat and knowing where you are in the landing approach. You are generally close to the airplane during the later stages of the landing approach, so your color perception is improved, but the wings will be edge-on to your line of sight. The leading edges should be very prominent against any background such as blue sky, white clouds, dark overcast, distant mountains, or green trees. All of these items have spectral lines toward the higher frequency blue or green region, so a very simple solution would be to have a low frequen-

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from the Roxbury Area Model Airplane Club, Roxbury NJ

Do You Remember: The Benefits of a Logbook

by David Nuetzel, *RCAM president*

I started a log, which started the whole world crying! A joke, right? No, not a joke. I hope the Bee Gees don't mind me misusing a line from one of their songs, but my memory of the past is in constant flux if I don't write it down. The memory of crashing an airplane could very well become a "halfway decent save" a couple of years down the road. History has a way of always changing. There is no stopping that.

As long as people are willing to study it, it will keep changing. Some day that long sought after, critical piece of evidence will surface that proves either the Australians or Lieutenant Brown shot down the Red Baron. Until then, you can take your pick. With each different viewpoint taken, George Washington's historic image can go from semi-god to great leader, but would his image have been diminished if his personal letters to Martha were not destroyed?

The term historiography is not in my 20-year-old dictionary, so my unofficial definition of the word is that it is the study of historical viewpoints that make up history. History is therefore made of viewpoints that are voiced and heard or read by the historian.

Who is to say that there wasn't an irritated farmer near the western front taking pot shots at the red triplane and exclaimed, "I got him." His story will never muddy the history of the death of the Red Baron because he only told the story to his wife, and she didn't believe him anyway.

Accurate history is very hard to come by. The most accurate history is recorded immediately after the event and includes as many view points as possible (or at least the viewpoint that has the greatest following). Then we record the history of that event to give praise to the good and study the bad or to learn from our mistakes.

We all make mistakes and would probably rather forget them. The downside is that we will most likely repeat those mistakes if we don't deal with them.

The most costly mistakes are those we deal with the quickly. A series of little mistakes that lead to a bigger mistake is much harder to correct or learn from because the first couple of mistakes become insignificant in our memory and forgotten. We find ourselves thinking, "If only I had recorded these events with their minor problems, I could figure this out."

Logbooks or journals are not for everyone. It would be another obstructive task during the flying day (like cleaning the airplane). Then there is the problem of forgetting to write in your logbook/journal. Here's a tip to help you keep from forgetting: If you rubber band your wing on, put one of the cleaner bands on your wrist when you disassemble the airplane at the end of the day. Don't take the band off until you have written in your logbook.

You can record what you like, but I like to record an overall view of the day. including the field I flew, weather conditions, and what airplane I flew—a couple of sentences about each flight and how long they lasted. The more accurate the information, the more it can help you later on. Knowing how humidity levels effect the mixture setting on your engine from past experience, can allow you to set your mixture properly before you take off.

They can also give you an accurate record of usage. You'll know if an engine has had 1,000 flights or if a flight pack has been fast or field charged more than 100 times. You could keep a record of how your batteries have performed on the cycler in the back of your log book instead of sticking post-it notes all over your workbench.

Information such as this can add a level of safety to your flying. It's also a fun way to look back. Going back in your log and finding a picture that your flying buddy gave you brings a smile to your face instead of wrinkles on your forehead from trying to remember.

Now this is time well spent, and it's not just another task at the end of the flying day. I started my logbook this year, and have recorded the first flight of my Fokker D.VII. Now, I won't have to remember how my inexperience and lethargic left thumb let that airplane wiggle down the runway before it took to the air on its first flight because I wrote it in my logbook. ♦

from the River District RC Eagles, Saint Clair, MI

Which is the Better Radio System: PPM vs PCM

by Ed Olszewski

Aside from all the other choices when selecting an RC radio system, the terms PPM and PCM comes up. PPM or Pulse Position Modulation is standard FM. The next step up is PCM or Pulse Code Modulation which seems to be shrouded in mysticism. In a nutshell, it is not what frequency each is on, but how they use their frequencies.

To demystify PCM somewhat you should understand that there is no range increase with PCM. It is not on some special side band or frequency. It shares the exact same FM frequency everyone else on your channel is using, and is susceptible to the same interference. There is, however, improvement in noise reduction and safe performance while the noise is received.

Noise is the undesirable signals on your frequency. They can be caused by anything from sunspots to another transmitter horning in on your frequency. Today's modern radios operate on a narrow band that eliminates most of the random noise.

Basically, the PCM radio takes your FM signal and "codes" it digitally (the "C" in PCM). Then the PCM receiver "decodes" the signal to utilize it.

Since noise is not a normally recognized code, it is ignored by the PCM receiver, and is not sent as servo instructions. In addition PCM does not transmit position signals for each servo in each transmitter pulse. Rather it transmits movement commands as required, and occasional positions confirmation commands. Short periods of interference will simply leave the servo at its last known position, and not show such radio interference as glitches or fluttering.

If your PCM receiver continuously receives interference past the preset time, it then switches into "failsafe mode," and obeys some preset commands you programmed in the receiver. For example, you may set failsafe to throttle down and move all other surfaces to the neutral position. This is great if you are in level flight, but disastrous if you are exiting a loop. If set to continue the last command, it will often keep your model in the loop. Unfortunately, failsafe settings will put your model in a precarious situation you didn't want it locked into.

A third level of protection may be obtained by using a pilot assist module in combination with preset positions on the failsafe settings. You can help ensure your model will go to level flight at a slow—but safe—airspeed and hopefully safely ride out the interference.

Even though the radio does not glitch, it is not to say the PCM radio was in good contact at all times. If another radio is transmitting on your frequency, it can—and likely will—interfere with your receiver's ability to receive the proper signal from your transmitter. The CB radio enthusiast in the seventies used to call this being "walked on." PCM will help keep your receiver from acting on a bad signal, but there is nothing it can do if a good signal can not be received over the interference.

The logic of PCM is that it is better to momentarily do nothing than act on a bad signal. PCM benefits are purely in precise transmitter/receiver communication. PCM does, unfortunately, have a serious weakness. Even minimal atmospheric or external noise can foul up those wonderful intricate binary num-

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bers beyond any correction. In that case, the receiver is up a creek without a paddle. Think of it as if trying to communicate a grocery list via cell phone in a "one bar" area—some things are not going to make it in the grocery cart. With PCM the main purpose is to hide glitches by not transmitting them to a control surface command. As far as the pilot is concerned, there is only an unnoticeable momentary loss of control. If the radio interference is persistent, the pilot will probably be unaware and may lead to total loss of control sending the airplane either into the wild blue yonder or to the ground.

On the other hand, the simple PPM pulses may be corrupted with some information getting through. When things go bad, the choice is between no control (PCM)—and some control (PPM). Most RC pilots would prefer having some control even if erratic. When a model aircraft is suddenly doing the funky chicken, it is normally a signal to land.

Most radio interferences are normally small glitches and are recoverable, giving the PPM pilot a chance to land and find the cause of the problem.

The bottom line is if you are looking for a bullet-proof radio system to keep your airplane from falling from the sky, it does not exist. A system sporting PCM is an excellent choice for larger acrobatic and 3-D fliers with quick throws, where a small glitch may send it suddenly into the ground. PCM will of course work on smaller, more docile airplanes. These airplanes will benefit less from the added features, and PPM is probably a good bet.

Remember there is no substitute for a good battery charge and a range check. If another radio on your frequency is turned on, there is little any radio can do to keep you from being "shot down." ♦

from the National Weather Service Web site

Winter Weather Information for All Season Fliers

Exposure to cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. What constitutes extreme cold varies in different parts of the country. In the South, near freezing temperatures are considered extreme cold. In the North, extreme cold means temperatures well below zero.

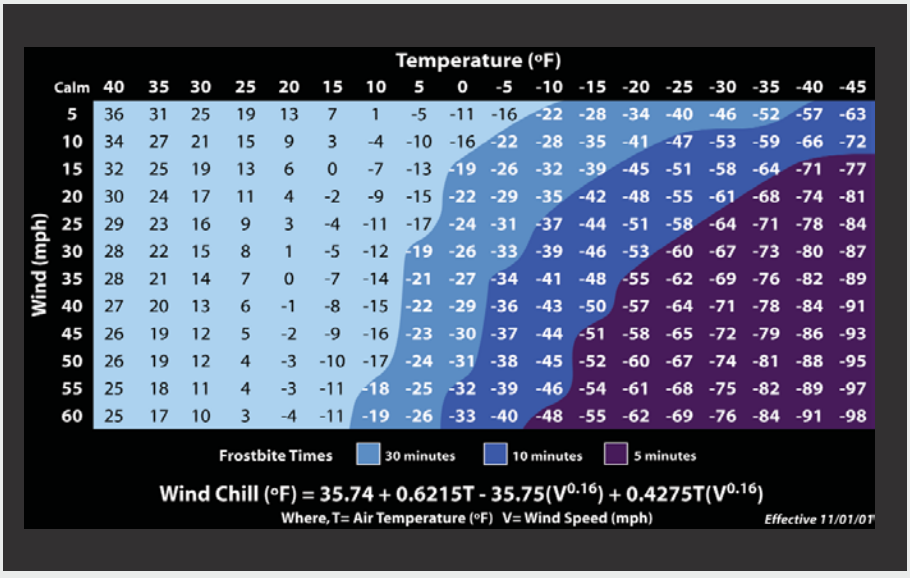
Frostbite is damage to body tissue caused by extreme cold. A wind chill of -20° Fahrenheit (F) will cause frostbite in just 30 minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes or the tip of the nose. If symptoms are detected, get medical help immediately. If you must wait for help, slowly rewarm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.

Hypothermia is a condition brought on when the body temperature drops to less than 95°F. It can kill.

For those who survive, there are likely to be lasting kidney, liver and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion. Take the person's temperature. If below 95°F, seek medical care immediately. If medical care is not available, warm the person slowly, starting with the body core. Warming the arms and legs first drives cold blood toward the heart and can lead to heart failure. If necessary, use your body heat to help. Get the person into dry clothing and wrap him/her in a warm blanket covering the head and neck. Do not give the person alcohol, drugs, coffee or any hot beverage or food. Warm broth is the first food to offer. ♦

WIND CHILL

Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Below is a chart for figuring wind chill.



Know theses Weather Terms

OUTLOOK:
Winter storm conditions are possible in the next 2-5 days. Stay tuned to local media for updates.

WATCH:
Winter storm conditions are possible within the next 36-48 hours. Prepare now!

ADVISORY:
Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If you are cautious, these situations should not be life threatening.

WARNING:
Life-threatening severe winter conditions have begun or will begin within 24 hours. Act now!

Dress for the Weather

Wear loose, lightweight, warm clothes in layers. Trapped air insulates. Remove layers to avoid perspiration and subsequent chill. Outer garments should be tightly woven, water repellent, and hooded. Wear a hat. Half of your body heat loss can be from the head. Cover your mouth to protect your lungs from extreme cold. Mittens, snug at the wrist, are better than gloves. Try to stay dry.

Traveling Tips:

Fully check and winterize your vehicle before the winter season begins.

Keep your gas tank near full to avoid ice in the tank and fuel lines.

Avoid traveling alone.

Let someone know your timetable and primary and alternate routes.

Keep an emergency kit with blankets, non-perishable food, and a first-aid kit in your car.

cy color such as red or orange on your wing and horizontal stabilizer leading edge.

At the field where I fly in Colorado, ARFs with blue wing edges are almost invisible when a low approach from the West dips the airplane visually below the mountains, resulting in very klutzy landings by beginners.

The leading edge red or orange pie slice is wrapped around the leading edge so that it has the maximum area of visibility when edge on. The 2-inch strip of white on the bottom of the wing near the leading edge will become visible during the landing flare, aiding in precision landings.

I prefer a white background on the top of the wing and horizontal stabilizer, with a bright red leading edge pie slice and a metallic blue inner pie slice on trainer airplanes. The same metallic blue under the wing looks nice, but any dark color works fine.

Fuselage and Rudder Coloring

The same coloring rules apply to the fuselage. Keep the top of the fuselage light, and the bottom dark.

The sides of the fuselage should aid you in flying horizontal passes. A solid color fuselage is very difficult to keep straight and level because all of the aircraft reference lines are curved. Light blue-and-white fuselages (a favorite ARF color scheme) blend in with the sky and clouds too well, and will become invisible under some lighting conditions.

Draw a line along the thrust line of your aircraft, roughly splitting the top and bottom of the sides in half. Make the top half of your fuselage sides a light color. Make the bottom half a dark color, usually one of the wing pie slice colors.

Analyze how you fly. Beginners and experts, who fly inverted much of the time, should make the fuselage line color demarcation exactly follow the thrust line. Beginners fly airplanes with lifting, flat-bottom wings, so the aircraft fuselage side flies a straight line.

The expert flies an airplane with symmetrical wings, so he flies at a slightly raised altitude to maintain level flight, whether upright or inverted. Therefore he should also have the fuselage line color demarcation exactly following the thrust line. When doing a horizontal pass, he should maintain an equal rising thrust line sight picture whether upright or inverted.

The interesting situation is the beginning aerobatic pilot. His routines do not include horizontal, inverted passes, but his maneuvers do include many horizontal flight components. He will usually be flying an aircraft with symmetrical airfoil wings, so the aircraft will be moving through the air with a slight upward orientation. He should offset the fuselage side color demarcation upward at the tail of the aircraft by roughly an inch. Now he can practice his horizontal passes by keeping the fuselage side lines parallel with flat ground.

The vertical stabilizer and rudder should have very wide horizontal bands of color. Make the top of the horizontal stabilizer the same color as the wing tips. Then put a light-colored band, and below this a dark-colored band, usually the same color as the inner pie slice on the top of the wing. The base color of the vertical stabilizer and rudder should be the same light color of the wing.

Another variant for the vertical stabilizer and rudder that works well on trainers with very big tails—such as the Kadet series—is a starburst pattern on the top of the wing. This aids the beginner in determining the direction of travel when flying at a distance. The tail's starburst pattern becomes an arrowhead pointing out the direction of flight.

Looping

Consider what the usual looping problem always is for the beginning aerobatic pilot. The pilot does not begin the loop with his wings flat. He usually corkscrews in or out. Proper coloring of his low-wing or mid-wing airplane can be a major help.

Make the wing tips stand out. I usually make the outer 2 inches of each wing and 1 inch of each horizontal stabilizer the same bright red that I color the leading edge. If you follow my advice above on the wing bottom and the fuselage sides, the wing tip can be visually correctly placed for a perfect loop. If the wing tip is too high, resulting in a corkscrew out, the pilot will see the dark wing bottom. If the wing tip is too low, resulting in a corkscrew in, the pilot will find that the wing tip blends too well with the bottom of fuselage side. The correct sight picture will be the wingtip cleanly placed against the upper lightly colored fuselage side. Look at the International Miniature Acrobatic Club or Pattern airplane pictures in RC magazines. They always have a dark color on the top half of the fuselage side into which the wing tip blends, causing looping problems.

Geometric Shapes

Humans can recognize different geometric shapes $^{1}/_{10}$ of a second faster than colors. I use this phenomenon to help me with the vertical rolls performed in advanced aerobatics. Instead of a solid dark color on the bottom of my wing and horizontal stabilizer, I put four large circles on the bottom of the wings and two large circles on the bottom of the horizontal stabilizer. The noticeably faster recognition of the round shape verses the line shape aids me in nailing the vertical rolls.

A number of people at my field have copied my bottom circles without knowing the reason why I use them. The solid colored bottom is preferred unless you are doing vertical rolls.

Sunglasses

Several years ago I flew with some expensive Serengetti Driver sunglasses. These had a red tint to them, I guess to cut down on the ultraviolet region I lost visual perception on a solid dark blue airplane during a landing approach and crashed.

Fortunately they were stolen at a hobby store a week later, and I got some RayBan aviator sunglasses with a blue-gray tint. What a difference!

Red is at the low frequency part of the visual spectrum, and blue is at the high frequency part of the spectrum. Red or yellow-tinted sunglasses reduce all colors to high-contrast shades of gray, making your aircraft in the air appear completely different from the appearance of your aircraft at home or in the pits. Gray, light blue, or light green tinted sunglasses make the airplane in the air look just like the airplane in the pits, and because your vision is extended into the high frequency part of the visible spectrum, you will have twice the visual perception range!

Final Thoughts

Evaluate color schemes for visibility first, beauty second. Dark-colored airplanes are more difficult to see in overcast skies and in the evening.

Scale airplanes are a special problem. Warbirds were colored to avoid detection, just the opposite of RC airplanes. Avoid flying scale-colored airplanes until you a very experienced flier.

Avoid dark colors on the fuselage where your battery and receiver are located. The heat buildup can result in loss of battery capacity and premature radio failure.

Don't fly when someone with a airplane identical to yours is already flying. ARFs and yellow Cubs are particularly susceptible to this problem. Several years ago two fliers were flying with identical ARFs. When one of the models landed, both modelers went out to get the airplane. Much to the entertainment of the folks in the pits, one modeler discovered that his airplane had crashed out in the field five minutes previously because he had lost track of which airplane was his, and he was "flying" the wrong one. ♦

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