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for Newsletter Editors and Club Officers

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ON THE SAFE SIDE

Get "Cawtt" Up in Safety

by Jim Rice

I like to have a plan for an airplane for an event. That keeps me focused on the mission of completing and test flying the airplane in time to fly it at the scheduled event. If that is your style, you know that the closer the event comes the faster you work, the later at night you work, and maybe the more careless you become. I try to keep a notepad by the bench so that as I think of things I really need to do before I complete the airplane, I can write them down. For example, if I have test fitted the engine and mount so that I can cut out the cowl but I haven't tightened the engine mount bolts or the bolts attaching the engine to the mount, I write it on my list so that I will remember to check that before I take it flying. Maybe I hook up controls but don't have loctite on the machine screws holding the metal servo arms to servos that have metal output gears; I write it on the list so that I won't lose a control surface on a later flight. Keep a notepad near your work site so that while you are daydreaming at work (you all do that) you can write yourself reminders to take home and put on your list.

I have a checklist to go through before every takeoff. If you get in a habit like that, you can head off problems on the takeoff/flight. Since I was a soldier for 26 years, I am accustomed to acronyms so my checklist is C.A.W.T.T. I tell my students "Don't get *cawtt* taking off without using your checklist. Go through the checklist *before* you take the main runway!"

Controls: Check control direction and all switch positions. With computer radios, you can have the wrong airplane or you may have changed something you didn't want to while changing a mix or throw between flights. Check for high/low rates, mix switches, or trim positions.

Antenna: I don't like to work on, start, or tune the engine with the antenna out so I keep it collapsed until I am ready to take the runway and I am safely behind the airplane and propeller. Make sure the antenna is completely pulled out and screwed in tightly.

Wind: Check the wind direction so you know in which direction to take off. If there is no wind, take up the same pattern other pilots in the air are using. Note the wind check is after the antenna-up check so that you can use the antenna flag as your wind sock.

Time: Start your timer or check your watch so that you will know when to land.

Traffic: Clear yourself to taxi with other pilots. We don't have air traffic controllers so you have to do it yourself. Ask loudly enough for all other pilots to hear if you can come out. Do not take the runway

please see **Safety** on page 2

TIPS FOR CLUBS

From the Fort Worth Thunderbirds Radio Control Association Inc., Fort Worth, Texas

How Much Land is Really Needed?

When a club needs to find a new RC flying site, the logical question must arise as to how much space is really needed. Negotiations with site owners will usually require this kind of information. Having been through this process with our own club, here are some approximate numbers to help you determine the space required. In every case, it can be argued that much more land is required or that much less land can suffice, but here is a place to start.

Assume that your RC flying site will have a runway of 400 feet in length and 50 feet wide. A club will normally mow about 400 feet or more on each end for approach and departure clearance. To lay out a comfortable spectators area with a shelter, parking lot, a flightline and pilots positions, the runway and some mowed area on the other side of the runway, all laid out in accordance with recommended AMA safety standards, will require a total field width of roughly 600 feet. While a smaller field width might be possible, be careful to maintain an adequate and safe separation of spectators from flight operations and pilots from the active runway.

Using these dimensions, a total of 16.52 acres is required for ground operations. In addition, an overfly area of 40 to 60 acres will be used by average fliers. ✈

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From the Wellsville Area Small Plane Society, Wellsville, New York

Autogyro Aerodynamics

by Ken Gough

After reading many explanations of how autogyros fly, I have come to the conclusion that the discussion can get too technical too quickly. Let's start with a simple analogy.

Some kinds of maple seeds have a wing with an airfoil. It spins as it falls, and the upward force on the blade slows the fall. The force that keeps an autogyro airborne is the same that acts on the maple seed. Now if you attached a thread to the seed and pulled in horizontally as it fell and spun, it would fly! Well, maybe it would need a tail and a more efficient blade, but you get the point. The arc of the rotor would angle back a bit, and the resulting upward force would be greater than the gravitational force.

Hopefully, from this explanation, you can see the differences between an autogyro and a helicopter. Most importantly, an autogyro rotor is not powered. It is simply freewheeling in the wind. The plane of the blades is titled back opposite the direction of travel, not forward like a helicopter. And the blades have a negative angle of attack. This makes sense because if they had a positive angle of attack they would spin backward when the wind hits from underneath.

Most autogyro blades have a special hinge to keep them at the proper angle of attack.

The hinge line is at an angle to the blade, so when the blade tilts up, the angle of attack decreases (leading edge is lower.) And if the blade tilts down, the angle would increase, but a stopper blocks the downward bend. You don't want the blades dropping and hitting the airplane. Hinging the blades also helps to decrease unwanted roll forces caused by the differences between advancing and retreating aerodynamics. ✈

From the Windom Eagles, Windom. Minnesota

A photographer for a national magazine was assigned to take pictures of a great forest fire. He was advised that a small airplane would be waiting to fly him over the fire.

The photographer arrived at the airstrip just an hour before sundown. Sure enough a small Cessna airplane was waiting.

He jumped in with his equipment and shouted, "Let's go!"

The tense man sitting in the pilot's seat swung the airplane into the wind and soon they were in the air, though flying erratically.

"Fly over the north side of the fire," said the photographer, "and make several low-level passes."

"Why?" asked the nervous pilot.

"Because I'm going to take pictures," yelled the photographer.

After a long pause, the pilot replied, "You mean, you're not my instructor?"

CAWTT continued from page 1

until all pilots at flight stations—or their spotters—clear you. So many times I hear people yell "coming out" then they add power and run out on the runway. Not only might that startle other pilots, distracting their attention from their own airplane but, maybe your airplane will die or flip over on the runway creating a hazard for others who might be at the end of their fuel. Besides, it is more courteous to ask. After you are cleared by the others, quickly take the runway and get in the air. They didn't clear you to sit in the middle of the runway and do more checks. That is why I say to go through the checklist before you take the runway.

If you get in the habit of doing a checklist like this before every single takeoff, not just the first one of the day, you will be safer. When I teach a new student, I draw his or her attention to a good pilot as he is preparing to take off. Hopefully, he or she will methodically go through a checklist and reinforce your teaching. But if not, point out the things you think were left out and the reasons they should be done.

I tell everyone there are 1,000 things that can kill a model airplane and I have 750 of them covered. Every time you have an accident or see and accident do a post mortem to see if you can isolate the problem so it won't attack another airplane in the future. ✈

From the Flying Aces Newsletter

Just What Was a 10¢ Kit?

Economical would be the first thing to mention in answer to the question above. The 10¢ kit became popular in times when a thin dime was not easy to come by in a society recovering from the Great Depression. But, this is not what concerns us as model builders today. Today, the Comet Kid has wrinkles and gray hair. One of a vanishing breed that would like to relate the endearing and enduring charm those unsophisticated kits infected many of us with.

10¢ kits were mostly renditions of contemporary full-scale airplanes, or war planes from the Great War of 1914-1918, with a few historically significant types included. More than half were American civil airplanes. Of course, no kit company would omit at least one stick model and sport model from its line.

Were they accurate scale models? Well, let's say they were identifiable to one degree or another. Most seem to have been drawn from photographs of their full-scale counterpart. Even those, which upon first impression seemed quite accurate, were not. If one took the primary dimensions of the full-scale airplane and converted them to model size, this became evident.

For example, models by Comet simply had longer than scale wingspans. Why? Perhaps to meet the advertisement ballyhoo and still be able to fit the rest of the drawing on the desired plan-size paper. For scale fidelity, none came close to the line of Cleveland Kits, the cost of which usually reserved them as birthday or holiday gifts to the boy modeler. (There were very few girls who found interest in the hobby then.)

Economy was not limited to the purchaser. One of the chief characteristics of the 10¢ kit model was sparse structure, wing rib spacing especially. The less structure, the less wood cost to the manufacturer. Being able to cover a complete model with the tissue provided in the kit took nothing short of wizardry. Placing the wing and tail on the tissue sheet in any manner regardless of grain direction, one then saved each and every scrap in hopes of being able to cover the entire fuselage with what remained.

Common pins, not provided in the kit, were often called out to serve as wheel axles and motor pegs. "Stiff paper" was not provided either. "Make windows from candy wrapper" was another way of keeping cost down. There were no plastics other than cellophane, celluloid, and Bakelite, so propellers were usually machine-cut balsa blanks. Some companies used sheet balsa blades from the print wood. Guillow hardwood wheels looked more like wooden buttons than wheels. Maybe Paul K. Guillow, former naval aviator, hit on a bargain carload of them.

Ease of production was also a consideration. One company defined the color scheme of its model thus: "cover wings and tail one color, and the fuselage and rudder the other," eliminating the need to package specific colored tissue. When Comet designed its 10¢ ROG model, the Phantom Flash, it was done so the kit parts would not differ from the

please see 10¢ Kit on page 5

From the Burlington County R/C Club, New Jersey

Thinking Outside of the (Tool) Box

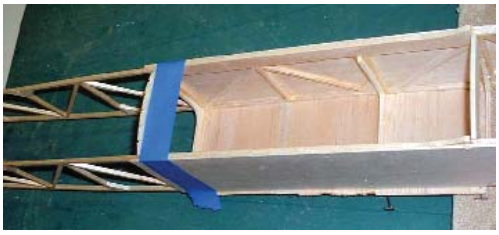
by Bill Bowne

Some of my most useful modeling tools aren't usually found in your average toolbox, nor are they usually found hanging in an RC Hobby Shop. Better yet, they often don't cost as much as specialized hobby equipment. Interested? Let's take a look at some of them.

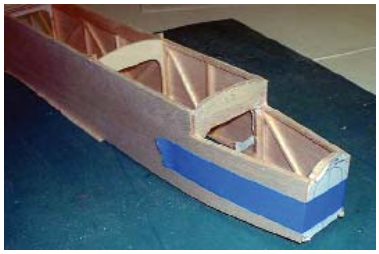
Probably the cheapest and most versatile tool I have in my workbench drawer is plain old ½-inch masking tape. Yep, masking tape. Probably the only thing I don't use is for is paint masking!

In the following pictures, you'll see a blue masking tape. There isn't anything magical about blue masking tape. The only reason I picked up a roll of blue tape is because I knew the regular color tape doesn't show up well against balsa when photographed.

One big use for masking tape is as a clamp. Here I've clamped the sides of a fuselage together with a strip of tape. The bottom is pinned, so I didn't need the tape there, but I did need to keep the top sides together.



In the next shot, I've clamped together the nose parts. It may take a few more pieces than you see here to keep stuff together.

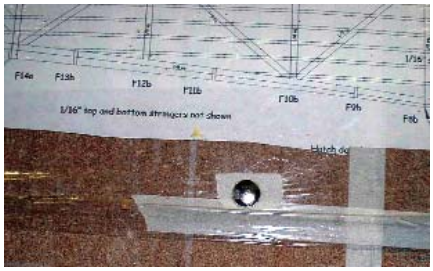


Another use for masking tape is to prevent damage to soft parts when sanding. In the following picture I've used masking tape to protect the balsa-wing sheeting while I was sanding the wingtip blocks.

And while it isn't quite paint masking, you can use masking tape to control the spread of excess epoxy when applying wing center-section tape.

One word of warning, though. If you use alcohol to thin your epoxy, as I do, it will probably leak under the tape. The good part is that it also soaks into the wood better, so it's less likely to show.

There are many more uses for masking tape. For example, I use small strips of masking tape to reinforce the plastic sandwich wrap I use to cover my plans. That way, the thumbtacks won't tear through the sandwich wrap.



Of course there are other uses, like emergency Band-Aids, but we won't discuss that …

What if you have something the adhesive in masking tape will damage? That's the problem I faced when I had to repair the wings on my GWS Tiger Moth biplane.

The Tiger Moth is made of thin foam with an integral outer colored layer. The masking tape adhesive will pull the covering film right off. So, I turned the tape over so that the non-adhesive side was against the Moth's foam wing and stuck the tape to itself to fasten it. No damage!

One more regular use for masking tape, although it isn't exactly for building.

I like to use it to temporarily tape stuff together so I can see how things fit, how they look, and so forth. No, I don't use it to hold the stuff together so I can "fly" the model while making airplane noises.

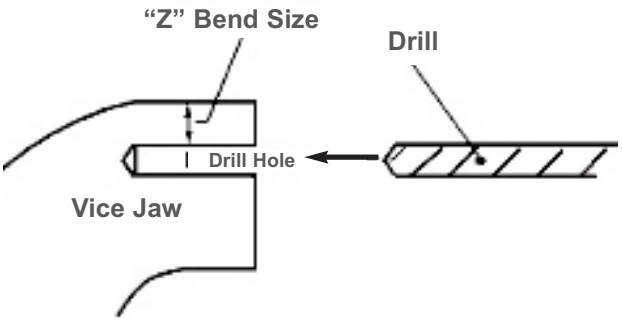
At least not very often … ✈

From the Eagles' Nest, Saint Clair County, Michigan

The Perfect "Z" Bend

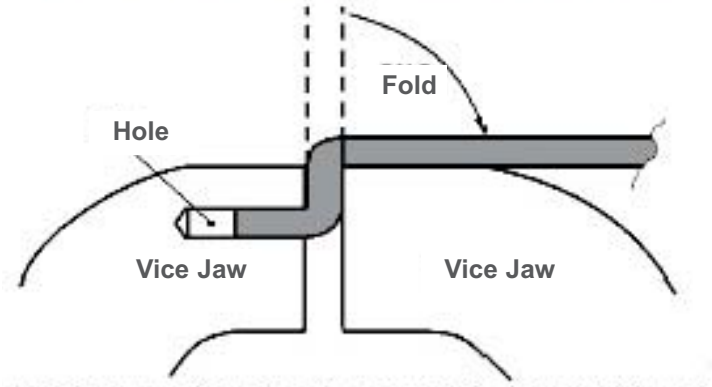
by Ed Olszewski

We all know a "Z" bend is the best way to connect a control rod to a servo horn. But often, bend results vary from good and tight, to a snakelike curve. A perfect "Z" bend can be made with your bench vice, with only one minor modification. Drill a hole in the vice jaw slightly larger than the rod you are using, down from the top of the vice the length you want the "Z" bend to be. The "Z" bend tool is complete. You are now the envy of every modeler you know. ✈

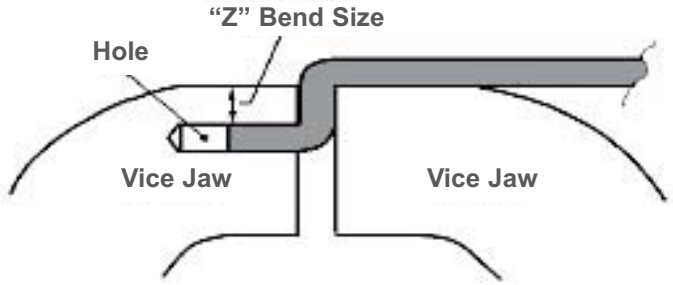


Modify Vice by Drilling Hole

First: open the vice as far as possible and slide the rod into the hole, then bend it upward to form the first bend.



Next: close the vice to complete the first bend. Then: bend the rod down over the vice jaw to form the second bend.



Finally: tap with a hammer to set the top bend.

Tips & Tricks

Good Cleaner

Here is a concoction I came up with. In an empty spray bottle, add a tablespoon of dish washing detergent, then fill the bottle halfway with regular rubbing alcohol, and top off with hot water. I have found this to work really well for cleaning the oil off of the wings and fuselage after a days worth of flying. Strong cleaner but will not hurt the covering or take the colors off.

New Life To Old Wire Landing Gear

Did you ever have a problem where your wire landing gear seems to get weaker and weaker? A possible solution is to remove the gear from the airframe and remove all the hardware from the gear wire (i.e. the wheels, collars, pants, etc). Preheat your kitchen oven to 450°F. Place the wire on a cookie sheet in the oven for one hour. Turn off the oven and toss the wire into cold water to cool it off quickly. What you have just done is to re-temper the music wire and you should have put new life into that old gear. Note that soldered joints should not be harmed as solder doesn't melt until about 700°F.

Mixing Epoxy

When mixing epoxy use an old coffee can lid, after the epoxy hardens just flex the lid and the epoxy will pop off.

For New Pilots

Here's a flying tip for new pilots:

Something to pay attention to when learning to fly is control reversal. Control reversal is when the inputs on the transmitter sticks must be reversed when your airplane is flying toward you, rather than away from you. When flying away from you, there is no problem; just move the stick in the direction you want to turn. Many new pilots become disoriented when their airplane is approaching them. To help with this, move the stick in toward the low wingtip. This will level the wing when your airplane is coming toward you, avoiding a sharp bank and possibly a crash.

Example: Say your airplane is coming toward you, and the right wingtip is low, as if banked to the right. Move the stick to your left, toward the low wingtip. This will bring the airplane's right wingtip up, and level the wing. I also recommend getting Real Flight G2 if you do not have it. Practice on that before you fly an airplane or helicopter for the first time or if you have been away for an extended period of time. It *will* save you money and heartaches in the future.

—All tips and tricks from Jim's RC.com (http://jimsrc.com/tips.html)

Ten Cent Kit continued from page 2

standard used in the rest of the line. Landing gear legs were sheet balsa rather than wire. Another piece of sheet balsa spanned the gap between the legs and held the usual kit nose plug. The rear hook was a bent pin. In another clever move, the outer and inner face of wheels pants were made of paper cut from the plan.

In order to cut all the strip balsa one size ($^1/_{16}$ sq.,) Comet had you glue two strips if $^1/_{16}$ by $^1/_8$ strips were needed. In order to limit the sheet wood in the kit, some companies had you form strip wood curves by rolling them under a pencil, or in the case of sharper curves, wet and kink the strip wood repeatedly with the fingernail.

Burd kits had the darkest, fuzziest balsa ever seen by anyone! There must have been a carload bargain in this also. Most kits included a hardwood nose plug, while some simply told you to push the propeller shaft through the balsa nose block! Comet instructed you to remove the rubber eraser from a pencil and rotate the ferrule to cut the nose plug hole in the nose block.

One company called for a straightened paper clip to be used as a propeller shaft. The bonus in Comet 10¢ kits was the wire propeller shaft with hook ready bent, which was packaged by sticking it diagonally through the upper left corner of the plan. It was tough for a kid to bend a hook on the end of a piece of wire, especially without a pair of round nose pliers! Glass beads and brass washers to reduce friction were reserved for the more expensive kits regardless of who made them.

Did they fly as designed and built according to plan? Seldom. Most stabilizers were too small. No true view layouts were there to construct any of the landing gear or struts for biplanes and parasols. Consequently, the models sat close to the runway with biplane wing gap that was too little or too great. "Well gee I dunno. That's the way it come out," was the inevitable reply from the builder if questioned on the strange appearance of his model. Incidence, decalage, and down thrust were unknown to us. Sometimes a plan would give instructions about CG location. Most times it was simply, "If model stalls, bend flippers down. If model dives, bend flippers up."

So, why is it we want to build these quaint models of models, for that is what they are. For older Flying Aces Club [members] (FAC), it may be to make the changes allowable and needed to see them fly as they never did in their first childhood. To younger FACs it might be relaxing, for they are not very demanding. After all, they are not supposed to be FAC Scale models with a 16-inch span limit, nor were they intended as such. But, at an altitude of 25 feet or so, the visual effect is about the same.

The desire to have worked as a designer for one of those kit companies denied us by Father Time has brought about the Pseudo Dime Scale modeler who can travel into the past while at his drafting table. Many of these FACs have faithfully made their layouts in the same format as the Comet plans conformed to. Some have picked up on the features mentioned above, as well as the sketch of the broken razor blade to be used in cutting parts. (Back in those days a razor blade could be snapped without bending it.)

The earliest ad the author has found in which 10¢ kits were shown was that of Donald E. Duncan, Inc. of Chicago, Illinois. Although many model companies produced simple unsophisticated kits prior to this, their cost was high by comparison. It was by cutting the contents in the kit that the cost could be reduced.

These early kits contained nearly everything needed to build the model. Some even had the tissue printed with the stripes, lettering, or insignia required. Pins, thread, brass washers, glass beads, formed wire parts, ready-made Paulownia wood propellers, vials of glue and banana oil, rubber etc. Typical of these were Ideal and National, to mention two.

If you decide to join the ranks of pseudo ten cent kit designers, why not take a few minutes to study the plans of the genuine renditions. Look over their shoulder as the designers sat at their drafting boards. Copy their style. You are sure to get more enjoyment out of your own work. Drawing your plan will take on a new meaning that will elevate it from being a task.

When you present your ship and plan to some wrinkled, gray haired CD or judge for a rules compliance check, his smile—or is it a grunt?—of satisfaction will be felt by your inner self as well. Who knows, he might even be the Comet Kid. ✈

From the Central Arizona Modelers Inc., Sedona, Arizona

"WE, OF THE SAFETY COMMITTEE, HAVE FOUND THE PERFECT AIRPLANE TO MATCH YOUR FLYING ABILITY."

From the Flying Cardinals of Northern Kentucky, Inc., Hebron, Kentucky

Trimming an Airplane

The following chart may be used to systematically set up and trim a model for straight flight and aerobatic maneuvers. Please note that for best results, trimming should be done in near-calm conditions. Before you decide to make a change, be sure to try the test several times before making adjustments. If any changes are made, go back through the previous steps and verify that they are not also affected. If they are, make further adjustments as necessary. ✈

To Test for...	Test Procedure	Observations	Adjustments
1. Control neutrals	Fly the model straight and level.	Use the transmitter trims for hands-off straight-and-level flight.	Change the electronic subtrims or adjust clevises to center transmitter trims.
2. Control throws	Fly the model and apply full deflection of each control in turn.	Check the response of each control: —Aileron high rate: 3 rolls in 4 seconds; low rate: 3 rolls in 6 seconds —Elevator high rate: to give a smooth square corner; low rate gives approximately 130 foot diameter loop —Rudder: high rate 30-35° for stall turns; low rate maintains knife-edge	Change ATV (for high rates) to achieve desired responses.
3. Decalage	Power off vertical dive (crosswind if any). Release controls when model is vertical (elevator trim must be neutral).	a) Model continues straight down b) Model starts to pull out (nose up)? c) Model starts to tuck in (nose down)?	a) No adjustment b) Reduce incidence c) Increase incidence
4. Center of gravity	Method 1: roll into near vertically banked turn. Method 2: roll model inverted	1a) Nose drops 1b) Tail drops 2a) Lots of forward stick (down elevator) required to maintain level flight 2b) No forward stick (down elevator) required to maintain level flight, or model climbs	a) Add weight to tail b) Add weight to nose
5. Tip weight (coarse adjustment)	Fly model straight and level upright. Check aileron trim, maintain level wings. Roll model inverted, wings level. Release aileron stick.	a) Model does not drop a wing b) Left wing drops c) Right wing drops	a) No adjustment b) Add weight to right tip c) Add weight to left tip
6. Side thrust and warped wing	Fly model away from you into any wind. Pull it into a vertical climb, watch; for deviations as it slows down.	a) Model continues straight up b) Model veers left c) Model veers right d) Model rolls right	a) No adjustment b) Add right thrust c) Reduce right thrust d) Put trim tab under left wing tip
7. Up/down thrust	Fly the model on normal path into any wind, parallel to strip; at a distance of around 100 meters from you (elevator trim should be neutral as per test 3). Pull it into a vertical climb and neutralize elevator.	a) Model continues to straighten up b) Model pitches up (goes toward top of model). c) Model pitches down (goes toward bottom of model).	a) No adjustment b) Add down thrust c) Reduce down thrust

please see **Trimming** on page 7

Trimming continued from page 6

To Test For	Test Procedure	Observations	Adjustments
8. Aileron differential	Method 1: fly model toward you and pull into a vertical climb before it reaches you. Neutralize controls, then half roll the model. Method 2: fly model on normal pass and do three or more rolls. Method 3: fly the model straight and level and gently rock the aileron stick back and forth.	1a) No heading changes. 1b) Heading change opposite to roll command (i.e. heading veers left after right roll). 1c) Heading change in direction of roll command. 2a) Roll axis on model centerline. 2b) Roll axis off to same side of model as roll command (i.e. right roll, roll axis off right wing tip). 2c) Roll axis off to opposite side of model as roll command. 3a) Model flies straight ahead without yawing. 3b) Model yaws away from roll command (i.e. right roll, yaw left). 3c) Model yaws toward roll command (i.e. right roll, yaw right).	a) Differential settings okay. b) Increase differential. c) Decrease differential.
9. Dihedral	Method 1: fly the model on normal pass and roll into knife-edge flight; maintain flight with top rudder (do this test in both left and right knife-edge flight). Method 2: apply rudder in level flight.	a) Model had no tendency to roll. b) Model rolls in direction of applied rudder. c) Model rolls in opposite direction in both tests.	a) Dihedral okay. b1) Reduce dihedral. b2) Use mixed to produce aileron opposing rudder travel (start with 10%). c1) Increase dihedral. c2) Mix ailerons with rudder direction 10%.
10. Elevator alignment (for models with independent elevator halves)	Fly the model as in Test 6 and pull up into an inside loop. Roll inverted and repeat the above by pushing up into an outside loop.	a) No rolling tendency when elevator applied. b) Model rolls in the same direction in both tests—halves misaligned. c) Model rolls in opposite directions in both tests. One elevator half had more throw than the other (model rolls to side with most throw).	a) Elevators are in correct alignment. b) Either raise one half, or lower the other. c) Reduce throw on one side, or increase throw on the other.
11. Pitching in knife-edge flight	Fly the model as in test 9.	a) There is no pitch up or down. b) The nose pitches up (the model climbs laterally). c) Nose pitches down (model dives laterally).	a) No adjustment needed. b) Alternate cures: 1) move CG aft 2) increase incidence 3) droop ailerons 4) mix down elevator with rudder c) Reverse “b” above.

From the Portland Area Sailplane Society, Gresham, Oregon

Avaition History: Charlie Brown's Story

Charlie Brown was a B-17 Flying Fortress pilot with the 379th Bomber Group at Kimbolton, England. His B-17 was called 'Ye Old Pub' and was in a terrible state, having been hit by flak and fighters. The compass was damaged and they were flying deeper over enemy territory instead of heading home to Kimbolton.

After flying over an enemy airfield, a pilot named Franz Steigler was ordered to take off and shoot down the B-17. When he got near the B-17, he could not believe his eyes. In his words, he had never seen an airplane in such a bad state. The tail and rear section were severely damaged and the tail gunner wounded. The top gunner was all over the top of the fuselage. The nose was smashed and there were holes everywhere. Despite having ammunition, Franz flew to the side of the B-17 and looked at Charlie Brown, the pilot. Brown was scared and struggling to control his damaged and blood-stained airplane.

Aware that they had no idea where they were going, Franz waved at Charlie to turn 180°. Franz escorted and guided the stricken airplane to and slightly over the North Sea towards England. He then saluted Charlie Brown and turned away, back to Europe. When Franz landed he told the control operator that the airplane had been shot down over the sea, and never told the truth to anyone. Charlie Brown and the remains of his crew told all at their briefing, but were ordered never to talk about it.

More than 40 years later, Charlie Brown wanted to find the Luftwaffe pilot who saved the crew. After years of research, Franz was found. He has never talked about the incident, not even at post war reunions.

They met in the United States at a 379th Bomber Group reunion, together with 25 people who are alive now—all because Franz never fired his guns that day. Research shows that Charlie Brown lived in Seattle and Franz Steigler had moved to Vancouver, British Columbia, after the war. When they finally met, they discovered they had lived less than 200 miles apart for the past 50 years. ✈

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; and,
- 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 safeguard of modeling activities. The Academy provides leadership, organization, competition, communication, protection, representation, recognition, education and scientific/technical development to modelers.

ABOUT THE *AMA INSIDER:*

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