AMA Chapter 534,
Medford, Oregon

The Rogue Eagle

March 2002

Carburetor Adjusting 101

Here's a scenario: Pilot takes off, plane's engine sounds great. After several minutes of flying, the engine seems to lose power, sounds kinda "thin", pilot keeps flying. Engine continues to sag, now full throttle is very weak, pilot now understands that maybe this isn't gonna clear up. Engine dies (what a shock!); pilot calls for deadstick landing, overshoots, tears off landing gear, etc. Never seen this at your field, right?

Here's the way that I set mixture on non-airbleed carbed engines (90% of the engines out there fit this category, but the theory is similar for air-bleed carbs). First of all, understand that the high-speed needle has its main effect from 3/4 to full throttle, and the low speed needle controls everything from idle up to 3/4 throttle. It thus makes sense to me to spend the biggest majority of my tuning time adjusting the needle that controls the largest portion of engine running, right? Also, remember that there is a proper air to fuel ratio (mixture) that allows the engine to run properly. Too much fuel is rich, and too little fuel is lean. We "richen" the mixture by adding more fuel (turning the needle out, or counter-clockwise), and we "lean the mixture out" by decreasing the fuel (turning the needle valve in, or clockwise).

I start the engine give it full throttle, and lean it to its highest rpm (peak), then richen it by maybe a quarter turn. Then with the glow plug igniter still attached, I slowly close the throttle to an idle rpm. At the lowest rpm that the engine will still reliably run, I then remove the glow igniter. If the engine dies immediately, I know it's too rich, and I then lean out the LOW SPEED NEEDLE by 1/8th of a turn (don't touch the high speed needle). Start the engine again, (and this is important) give FULL throttle briefly to clear out excess fuel, then slowly close the throttle again. Remove the glow igniter, and this time it may run a little longer before it dies, so lean the low speed another 1/8th turn. Re-fire the engine, give a burst of full throttle to clear it out, and slowly close the throttle again. Remove the glow igniter and now notice that the rpm DROPPED a bit when you removed the glow igniter, but the engine kept running. We're getting there. It's still too rich, and you'll prove that by opening the throttle and hearing the engine "blubber" then die. That's because excess fuel has collected in the crankcase during the rich idle, and when you opened the throttle, the excess was pulled into the cylinder, making it WAY too rich. Supposed you were on a landing approach, and decided to go around, you throttle up but the engine "blubbers" and then dies (another thing we haven't seen, right?). Yep, the LOW SPEED needle was still too rich, allowing excess fuel to collect in the crankcase, just WAITING on you to try to go around so it could "LOAD UP", blubber, and die!

Keep leaning the low speed needle down until it idles well, but now, when you open the throttle, it HESITATES instead of BLUBBERS. When this happens, you've leaned it down too far, so richen it up 1/16th of a turn and try again. You know you've got the LOW SPEED needle right when you can fire it up, remove the glow igniter, and the rpm doesn't change AT ALL, and you can open the throttle up, and it doesn't blubber or hesitate, it just runs!

The final thing you do is re-adjust the HIGH SPEED NEEDLE, leaning it to its highest rpm (peak) and then richening it up maybe 1/8th turn to give it a slightly rich mixture. We also know that the fuel mixture will change in flight when you point the nose up (harder for fuel to travel uphill) and also as the fuel level in the tank changes. In both cases, a leaner mixture results, so we actually need to set the mixture a bit farther on the rich side to account for this. While the engine is running at full throttle, CAREFULLY pick the model up and raise the nose to at least a 45-degree angle while listening to the engine. If the engine sags a bit, then you'll need to richen up the high-speed needle 1/16th turn. Try it again, and when you can point the nose up and the engine doesn't sag, but maybe shows a slight GAIN in rpm, you know you've got it right.

Now the engine will be happy, and chances are will reward you with reliable running. If you've got one of the few engines with an air bleed adjustment for low speed adjustment, the theory is the same, just refer to your manual to see how to richen and lean the low speed mixture.

Igore Stravinsky got this off one of the RC forums

Beginner Aerobatics

by Paul Kramer

Sooner or later, after you learn to fly an RC aircraft, every model airplane pilot will want to learn some aerobatics. There are some excellent reference sources which will explain the maneuvers that are required. The Goldberg *Wring it Out* videos are excellent. The first volume covers what you need to know about what different types of airplanes will do and how to set them up. Then some basic maneuvers are illustrated: takeoffs, landings, and procedure turns. Some aerobatics, including basic loops, axial rolls, inverted flight, split-s, Immelman turn, and the stall turn, are covered. All of these maneuvers are the basis of further aerobatics. Another good source of information is *Radio Control Aerobatics for Everyone* written by Dave Patrick. This book is full of great information about how to set up your airplane, what is involved in the maneuvers, and an excellent reference guide showing recognized AMA Patterns.

After a pilot learns to take off, fly a simple oval pattern, and land in a confident manner, then probably the first real aerobatics maneuver that a beginner will perform is the inside loop. I cannot think of any model aircraft that will not perform this maneuver. From straight and level flight at a couple of hundred feet in altitude with full throttle, a loop can be done by simply holding the elevator in the up position until the aircraft completes the loop. It is probably advisable to reduce throttle after the aircraft passes through the top of the loop to reduce the force on the wing. Throttle can then be reapplied as the aircraft reaches the bottom of the loop and continues on in level flight.

While the loop may seem like a simple maneuver, it takes practice to make loops nice and uniform, as well as placing them exactly in a line so that you perform a loop rather than a spiral. After you practice doing one, try two in a row and then three. Each successive loop will require some little adjustments to keep the plane on course. Who said this was an easy maneuver anyway!

Another important area of aerobatics is what I like to think of as “Turn Around” maneuvers. Every time I fly, I like to have some “constructive routine” in mind. This is to practice a specific idea during a flight, rather than just “drone” around the sky. In learning aerobatics, I have found that it is not advisable to decide to try a new maneuver on the spur of the moment while I happen to have my plane in the air. In my own case, I have found that I am much better off to completely think through a new maneuver, and perhaps even dry-fly it on the ground before I ever get an airplane in the air.

First, I think every flier should build a pocket-sized airplane, paper airplane, or some type of small model that you can hold in your hand and “fly” through the maneuver. A small round dowel with a couple of pieces of balsa for the wing, horizontal stabilizer and rudder stab will suffice. I like the round dowel, because I can twist it between my thumb and forefinger to simulate a roll.

While this may seem like child’s play, believe me, it helps the pilot visualize what the airplane is going to do and how it will look. I even have taken a notebook and written down the control inputs I am going to use to get the airplane into each stage of the maneuver. I am sure that some of the old-time pilots out there are laughing but I have seen some pretty good pilots use this technique to “fly” through their routines before they get in the air.

Seems to me that one of the most important things about flying a model airplane, or any airplane for that matter, is to make the plane go where you want it to go. Establish a line and make the plane fly it. Might sound easy but try it sometime. Draw an imaginary string down the middle of the runway a couple of hundred feet high and try flying back and forth on it. I can spend an entire flight just practicing this type of pattern and feel that it makes me a better pilot because I am in control, not the airplane. This type of practice is probably just as important for the beginning pilot as spending a couple of flights just making takeoffs and landings. Practice makes perfect!

If you try to fly on the string, back and forth across the field, the first problem that arises is turning around. Here is where the “first” maneuvers come into play. For the beginning pilot, probably the simplest and most effective method is the “procedure turn.” (*Check Level I requirements for how a procedure turn is made. Ed*.). By flying this pattern, it is possible to fly back and forth along a straight line.

Another turn around maneuver that I like is called the “Immelman Turn.” It is a fun maneuver and like the procedure turn, can be done by most all types of aircraft including trainers. This is the first combination of a loop and a roll that many beginners try, including myself. As I previously mentioned, about the first acrobatic maneuver that every beginning pilot learns is the inside loop. The Immelman Turn then is simply half of the inside loop with a half roll at the top. I like to roll to the right when I get to the top of the loop. That way, engine torque will help. I have done this maneuver with every aircraft I have ever flown. The best part of this maneuver for the beginner, is that the half loop causes the airplane to reach a higher altitude which gives a beginner time to make corrections if needed. Just remember to be sure to complete the half roll so that you reach normal flight attitude. Most aerobatic airplanes need no rudder input to complete the maneuver. Makes a nice way to turn around and gain altitude at the same time.

from The Transmitter
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An Introduction to "Black Magic"..... Better Known as Carbon Fiber

As most of you know, carbon fiber reinforcements have become standard in the FAI events. The techniques used by the FAI fliers can be used to great advantage in most other classes of models.

Let's look at how CF is used to best advantage. Carbon Fiber has great strength-to-weight ratio. It is especially strong in tension. CF comes in many forms; some include unidirectional fabric of various thicknesses, fiberglass-like cloth, tow (loose carbon fibers), unidirectional sheet using epoxy and CF to form sheets of various thicknesses and widths, and rod of a variety of diameters.

Some typical applications include; wing and stab trailing edges, rudder spars, "taco shells" for D-box constriction, tail boom stiffening, propeller blades and field repairs, to name a few.

A single piece of CF bending in the flat direction adds no strength, but, a single piece on edge has possibilities. If you glue a single strip on the front edge of a trailing edge, then sandwich it in place with a thin strip of balsa, the trailing edge will remain straight forever. I see hand launch gliders with a strip of CF across the middle of the wing, assuming it will make the wing much stronger. Wrong! It only holds the pieces together when it crashes. If a second piece was placed on the bottom of the wing, opposite from the top piece, the wing would become exceedingly strong. The basic strength of CF is in tension.

A very good glue joint between CF and balsa is important if the advantages are to be realized. CF strips of any width may have residue of release agent, or wax, left over from manufacture. This needs to be cleaned off before any glue is used. I generally pull the CF strip between a folded piece of 320-400 grit sandpaper until any gloss is removed, then wipe the strip down with rubbing alcohol before gluing. A slow curing epoxy is best for gluing strips to the top and bottom of spars, and should be done before the wing is built. Remember, if it ain't straight when the glue dries, it won't ever be straight.

I make up spars using an aluminum angle longer than the spar will be. A piece of Saran Wrap is folded 90 degrees and put between the spar and the aluminum. A very thin film of epoxy is applied to the two spar caps. These are then placed on the top and bottom of the balsa spar. This assembly is then placed in the aluminum angle. Clothespins are then used to grip the aluminum, and slide up against the spar from both the top and side to hold everything straight while the glue cures. A scrap of overhead lighting track aluminum has a very sharp angle and so is ideal for making spars. The thickness of the CF used for making spars varies with the size of the model and the loads involved. For a Wakefield wing, I use .014 for the top cap and .007 for the bottom. This would probably be okay for an A Gas model. Much thicker is used on A/2 Nordic models due to the large tow and launch loads.

Increased bending loads can cause the balsa to CF glue joint to fail, therefore, most modelers wrap the finished spar with a spiral wrap of Kevlar thread with 1/4" to 3/8" spacing. Alternate the direction of the wrap about every eight inches. This keeps the wrap from twisting the spar. If the spar is being used inside the rear of a D-box structure, no gluing of the thread is needed, except for gluing the ends of the thread. However, for an open spar, a thin film of epoxy should be applied to the top and bottom to keep the thread in place.

Continued at Carbon Fiber, next page

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2002 Events List

Puallup Trade Show
February 2nd & 3rd

Wet and Windy Fly-Fun
March 24th

Spring Fun-Fly Contest
April 7th

Grants Pass Swap Meet
April 21st

Float Fly at Lake Selmac
May 4th and 5th

Builders Contest
May 18th

Ashland EAA Demonstration
May 19th

Lee Renaud Memorial Contest
June 1st

Plat-I Float Fly
June 15th and 16th

Military Fly-In Contest
June 22nd

Big Bird Fly-In
July 6th and 7th

Selmac Float Fly
July 20th and 21st

Kids Day at Hawthorne Park
August 3rd

Media Day
August 8th

Rogue-Eagles 2002 Airshow
August 10th and 11th

Fall Fun-Fly
October 12th

Rogue Eagles R/C Club,
P.O. Box 8332
Medford, OR 97504

Stamp

To:

NEXT MEETING **is Tuesday March 12 at the Lions Sight and Hearing Center, 228 N Holly, Medford, OR. Membership renewals will continue; bring your $25 membership fee and 2002 AMA card. Also bring your show and tell projects.**

Notice - Folks, if you renew your membership by mail, we've got to have some proof that your AMA membership is current. Please send a copy of your 2002 AMA card along with your $25 renewal fee. Of course, we'd like you to attend the monthly meetings and update your membership at the same time.

Editor

Carbon Fiber

Scraps of CF sheet are great for field repairs. For example, a broken balsa propeller can be quickly repaired by using a couple of 1/8" wide scraps of .007 CF stock about 1" long. Hold the prop pieces together and tack with cyano. Use a knife or razor blade to make a couple of slits across the break. Insert the CF scraps and glue with cyano. The number of uses is limited only by your imagination.

from the Florida Modelers Association Newsletter
Rex Hinson, Editor
via *The Bat Sheet*
Washington State

Curing Prop Slippage - In the case where you have a single bolt hub, prop slippage can be a problem. A simple cure for this is to use sticky-back sandpaper, any grit, and stick it to one of the contact surfaces.

from http://www.gsal.org
via DCRC Newsletter, Andy Kane, editor
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