

**From: National Control Line Racing Association  
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**TO**

## **SPECIAL: SCALE RACE ISSUE**

### **INSIDE:**

**District Reports  
Contest results  
Suppliers/Equipment  
Updated Contest Calendar**

**Torque Roll Issue #134  
October 2017**



**Number 69 “Knotty Girl” awaiting the start.  
See inside for more “Goodyear” related articles and  
information.**

## **PRESIDENT- Bill Bischoff**

### **PRESIDENT'S REPORT**

Welcome to the Goodyear issue. We've got tips and construction tricks, and even free plans for your consideration. With new kits to choose from, a new source of Magnum engines, and interest and participation increasing around the country, CL racing is receiving a real shot in the arm. If you don't have one yet, why not build a Sportsman Goodyear for next season? If it's not flown in your area, you'd better build two!

Things are a bit quiet after the NATS. I'm happy to report that our members in Houston and the southeast seem to have escaped the brunt of the recent hurricanes. Perhaps the most noteworthy thing happening recently is the announcement of the 2018 NATS dates. At this point, the CL events are scheduled for the week of July 8-14. The 2018 World Champ's in France begin July 13. There may be a possibility of getting the CL week moved earlier, though, so send your AMA District VP a note asking them to bring it up at the next Executive Council meeting.

### **HOBBY PRODUCT NEWS** (as mentioned above)

There is a new source for the Magnum XLS 15A engine for Sportsman Goodyear. *mikegoes flying.com* is selling the engine for \$54.99 plus \$10.00 shipping. They are also carrying parts. Thanks to Charlie Johnson for bringing this to my attention.

Pat King of *pdkllc.com* has added more race planes to his line of kits. Recent additions include three new Sportsman Goodyears, the Nemesis, the low wing Cosmic Wind and the modified shoulder wing Minnow. The Cosmic Wind features dihedral, enhancing its scale appearance and getting the lines up to the proper vertical location for best flight characteristics. Pat also now has the Streaker Mouse racer, as well as his earlier offerings, the Mockingbird Super Slow Rat, a Sportsman Goodyear Polecat, and Riley Wooten's Quickie Rat and Quickie Rat II.

Brodak is working on a kit of my BooRay Sportsman Goodyear, featuring their pre-airfoiled wing. The wood selection and laser cutting on the pre-production sample they sent me were first rate. At this point I don't know what hardware will be included, but it looks like we won't have to wait too much longer to find out.

### **IN THE NEXT ISSUE**

The December issue of Torque Roll will be dedicated to slow rat and super slow rat. I will discuss the hardware and systems necessary to get the PDK Mockingbird kit into racing trim, prop selection, tank design, and of course there will be contributions from you, too. Watch your email box. After that, we haven't selected topics or themes, so please speak up. What do you want to see in upcoming issue of Torque Roll?

## **SOUTH CENTRAL - Bill Bischoff**

### **2017 FALL FINALE**

Boy, howdy, it was a hum-dinger! We welcomed back the Les Paul team from Canada and Charlie Johnson from California, as well as first-timers Bob Oge from the Chicago area and former Californian Jed Kusik, now of the Austin area. It was good to see "up"Chuck and "ground"Chuck Barnes after the recent hurricanes and floods. Then there were the local "usual suspects"...meh.

This year, we added AMA Goodyear and Clown racing. I was very

pleased to see five entries in Clown. We should have even more next time, as Biscuits and Gravy are both working on new airplanes. I'm not sure how many of them I can fly at one time, though. As there were lots of events to get through in two days, we elected to only fly the 7 1/2 minute races. We flew roundish robin, with four of the contestants getting a three up and a two up. The Barnes team took the bullet and flew both races three up. Bill Lee's clown was fast as usual, but uncharacteristically cantankerous in the pits, leaving him short of his record 150 laps.

Quickie Rat bore a resemblance to last year's event, with both Canadians getting in the final. Once again, I flew for Les in the final, and Mike Greb pitted for Paul. Bob Oge squeezed in between Les and Paul to take second.

After a lunch break, super slow rat was next. Bill Lee graciously volunteered to withdraw to make the heat pairings come out better. We flew two back to back 100's and took everyone's single best time to determine the winners. The Les Paul team took third place with a Bischoff rent-a-racer, Bob Oge took second with a Bischoff buy-a-racer, and Bill Bischoff took first with a Bischoff build-a-racer.

Sportsman Goodyear was supposed to be Saturday's last event, but since it was already late afternoon, we elected to postpone it until Sunday morning. All eleven racers entered, making Sportsman Goodyear our most-entered event. We flew 80 lap heats, and took the best three to a 160 lap final. Les Akre's Norvel powered Stinger was wearing a slightly smaller venturi than last year, trading some airspeed for extra mileage. I am glad to see that the Norvel has proven to be a viable alternative to the commonly used ASP/Magnum. It's not so fast that you will need one to win, nor is it so slow that you couldn't win with one. That tells me the current rules are doing the job as intended. Ok, where were we? The final was Lee/Greb/Gibeault.

Paul was flying another Bischoff rent-a-racer, and proceeded to beat me with it. Bill Lee used to routinely beat me with this same airplane, so I guess I'm used to it by now. Bill Lee took the win with his own airplane, followed by Paul in second. A prop change relegated Mike Greb to third.

AMA Goodyear was next. Since Sportsman Goodyear was supposed to be on Saturday, contestants would have had Saturday night to reconfigure their airplanes for the AMA event if necessary. As it was, Bill Lee and Mike Greb decided to withdraw rather than hurriedly change over their airplanes. It became a battle of attrition and plug changes for the three remaining entrants. Les Akre's Moki powered Ohm Special on suction was the tortoise that beat the two hares. Bob Oge's Rossi powered Li'l Quickie lost or broke most of its engine mounting bolts, and retired after 67 laps. It was Bill Bischoff's race to win. He had a solo race, with good airspeed and good pitstops, but a blown plug on his last pitstop snatched defeat from the jaws of victory. Oh well, such is racing.

Mouse had ten entries. Again, we flew heats and one final. Bob Oge's new mouse would be charitably described as somewhere between "tricky to fly" and "hateful", but "up"Chuck Barnes managed to avoid mayhem until they retired at 43 laps. It was Bill Lee's turn to helplessly stand by and watch as his mouse sped away in reverse. The airplane was undamaged, and none of the pilots got their feet wrapped up, but the lines were ruined along with Bill's chance for victory. The final saw three good, albeit uneventful, performances.

Fox Goldberg was the last event. Only two teams had the mettle for this last battle royale. In the end, the victor was vibration. Both teams had their engines vibrate loose! The Oge/Johnson team stuck it out for 102 laps, while the Barnes team retired after 45 laps.

In the Thank You department, Thank you to all the contestants, who

came from both near and far. It was a pleasure to have each and every one of you here with us. Y'all come back, ya hear?. Thanks to the selfless timers Sandra Lee, Phil Dunlap, Mike Scott, Tom Hamblet and Charles Barnes. Thanks to Bill Lee and Mike Greb for running races while I was flying. My apologies if I missed anyone. If anyone has a comment or suggestion how we can make this contest even better next time, please contact me.  
Bill Bischoff, CD

**CLOWN RACE 7 1/2 min.**

1)Les Akre	137 laps
2)Barnes team	128 laps
3)Bill Lee	127 laps
4)Jed Kusik	121 laps
5)Charlie Johnson	110 laps

**QUICKIE RAT**

**70 laps**

**140 laps**

1)Les Akre	3:04.76	6:21.20
2)Bob Oge	3:06.88	6:30.22
3)Paul Gibeault	3:04.18	7:08.30
4)Bill Lee	3:15.80	
5)Bill Bischoff	3:18.05	
6)Barnes team	3:25.22	
7)Mike Greb	3:35.44	
8)Barnes team	3:36.20	
9)Jed Kusik	51 laps	

**SUPER SLOW RAT**

**100 laps**

1)Bill Bischoff	5:28.84
2)Bob Oge	5:42.03
3)Les Akre	5:54.49
4)Mike Greb	6:04.91
5)Barnes team	6:06.10
6)Barnes team	7:45.22

**SPORT GOODYEAR**

**80 laps**

**160 laps**

1)Bill Lee	4:11.40	8:36.04
2)Paul Gibeault	4:08.27	8:47.62
3)Mike Greb	4:07.64	9:24.69
4)Bob Oge	4:16.32	
5)Bill Bischoff	4:16.85	
6)Barnes team	4:23.62	
7)Patrick Hempel	4:29.30	
8)Barnes team	4:32.12	
9)Les Akre	4:33.40	
10)Jed Kusik	4:39.93	
11)Charlie Johnson	5:08.27	

**AMA GOODYEAR**

**140 laps**

1)Les Akre	7:05.86
2)Bill Bischoff	7:14.59
3)Bob Oge	67 laps

**MOUSE**

**50 laps**

**100 laps**

1)Patrick Hempel	2:29.27	5:01.24
2)Les Akre	2:33.67	5:08.02
3)Barnes team	2:36.88	5:20.45
4)Paul Gibeault	2:46.77	
5)Jed Kusik	2:55.52	
6)Mike Greb	2:57.30	
7)Charlie Johnson	3:07.52	
8)Bob Oge	3:22.39	
9)Barnes team	43 laps	
10)Bill Lee	36 laps	

**GOLDBERG**

**140 laps**

1)Bob Oge	102 laps
2)Barnes team	45 laps

## Letter From Tim Stone

Hi Bill,

I wanted to say hi & thank everyone at the Dallas contest that took the time to send me a card.  
It is nice to be remembered, especially when you are still alive!

It looks like you had a good turnout. Nice to see that there is a growing interest in racing in your region.  
I know that you & your crew are largely responsible for this, with your promoting Sport Goodyear as you have.  
Bob Oge showed me the Margaret June you built for him; its' very nice.

My health is stable. I do home peritoneal dialysis, and I'm hooked up to the machine for 12 hours a day, 7 days a week.  
I am on the waiting list at 2 hospitals, and I need a donor kidney quickly, as calcification is setting in that will prevent a transplant in the very near future. 2 hospitals have already dropped me from their list due to this. The wait for an anonymous donor might be 2 to 5 years. Life expectancy while on dialysis is statistically 5-10 years.

I have hope that some day I might return to racing. Some of my fondest memories have come from this hobby. I have been competing (not too successfully!) at indoor free flight recently. Its' a way different thing and a way different kind of participant that is really good at it.  
It is, however something that disabled people can compete at, unlike racing.

So, say hi & thanks to everybody for dropping me a letter, it means a lot to me.

Tim Stone

## SOUTHWEST - Ron Duly

### Racing results for Wayne Trivin Memorial Speed and Racing Sept. 9-10/2017

Another great racing day in So Cal. Sport Goodyear is becoming the most popular event here. We accommodate the existing SCAR planes and the new Dallas-rule planes by flying them together. Both are on 52' lines and speeds are about the same.  
As a point of information, we use two watches for the "Dallas" planes to record 80 and 100 lap times. This lets us compare our times to other area's times. There were seven Goodyear planes on the line but only six flew. This made for even races. The team of Bill Cave/ Doug Mayer flew a SCAR-legal plane as did Mike Callas/ Dave Hull. In between them was a Dallas-rule plane by Johnson/Duly. In the coulda/shoulda department, the Lil Quickie/Magnum of Johnson/Duly flew without the help of a functioning shut-off. This made for slow pits.surprise, the engine just quit.....! The writer didn't write down the plane/engine combinations for most entries. Oops!

### SCAR Goodyear – 100 lap times

**Cave/Mayer 5:32.50 Final Outrageous/Moki Johnson/Duly 5:56.62 Final Smith kit Lil Quickie/Magnum**

Callas/Hull 7:39.93 Final  
 Mayer/Cave 5:44.92 Heat  
 Hull/Wright 5:51.47 Heat  
 Wright/Callas 11:06.76 Heat

Duly/Johnson DNF Lil Rebel/Magnum

This next event is almost too embarrassing to report. Almost! Who would ever believe that a FOX could beat an OS or Enya or Brodak. Believe it - It did! Boo hoo!!!! I am sure it was just as Duke built it years ago. Look out eBay – I'll buy all of them until I get a good one. Maybe not.

#### Super Slow Rat

Mayer/Cave	6:06.30	FOX!!!!!!!!!!!!?????
Cave/Mayer	6:29.10	Persson Spl/OS 25FP
Duly/Johnson	7:26.99	Mockingbird/Enya
Callas/Hull	8:29.15	Superfly/Brodak
Hull/Callas	28 laps	Shyfox/OS25FP

#### Quickie Rat

TQ could have been a lot of fun with four teams. With the double entry of Cave/Mayer and Mayer/Cave both making the Final, they dropped one entry. The Johnson/Duly plane never made it to the line so Hull/Callas took on the Cave/Mayer team in the Final race of the day. At the countdown, it was Cave/Mayer off with one flip of the prop. Bill repeated this process at each pit. Poor Mike Callas flipped the prop...and flipped the prop...and flipped the prop....and, well you know....it never started until the Cave/Mayer had completed their 140 laps.

Cave/Mayer 7:09.59 Final  
 Hull/Callas DNS Final That stands for "Did Not Start"  
 Mayer/Cave 3:50.7 Heat Johnson/Duly  
 DNGOOTT Did Not Get out of The Truck.

So ended a fine day at the races.

## Goodyear Racing

By Bob Heywood

### 70 Years and Counting...

The first Goodyear Trophy Race was run over Labor Day weekend, 1947, as part of the Cleveland National Air Races. The class was created by the Professional Racing Pilots' Association as an affordable way to grow participation in Air Racing. The effort was an immediate success.

The rules allowed for individual creativity but kept things within a rigid set of guidelines for safety considerations and provide for even, affordable competition.

The originators of what was officially labeled as the 190 Cubic Inch Class Racing Airplane probably could not have created something any more suited to model airplane racing.

Almost as soon as the full sized Goodyear racers began to appear the modelling community took notice. Magazine cover artwork began to show the little racers in action and scale designs were featured construction articles.

Noted modeler and artist Cal Smith was especially enthusiastic about the racers and published a number of scale designs at the end of the 1940's and through the 1950's.



We have Cal to thank for originating the Goodyear class of C/L team racing. He published the first designs and drafted a proposal for the first rules package for Goodyear Racing in the July 1961 issue of *American Modeler*. The reasoning behind model Goodyear racing was exactly the same as with the full sized racing – provide for even, affordable competition. And, as with the full size racers, the class was an immediate success.

Today, the full sized racing is known as International Formula 1. The rules are not so much different than in 1947 and the class continues to provide exciting racing on an affordable budget, at least in relative terms.

Escalating engine development and the associated costs have taken the luster away from the original model Goodyear class. We now have Sportsman Goodyear, which is actually right in line with the big guys in providing close, competitive racing while keeping costs in line.

Thanks to Bill Bischoff I had the opportunity to race in Sportsman Goodyear at this year's NATS. The experience was fantastic.

### Finding More Speed...

During the recent Reno Air Races, a common topic posted on the IF1 teams Facebook pages was the search for more speed.

I had been racing Goodyear around the Midwest since the class first originated and did OK. But, only OK. Around 1970, I decided to build a new Swee Pea II and wanted to get as much out of the plane as possible.





**Bob Heywood's "Swea Pea" Sport Goodyear Model.**

I noticed that a lot of the racers tended to fly nose out around the circle and decided to push the envelope by moving the leadouts a fair amount forward from what was considered normal, at least from my experience. I guess I got a little carried away because the first flight was a disaster. All I remember was seeing the plane on its inboard wheel turning right toward me. Crash!

After a rebuild, with the leadouts moved back a bit we tried again. The inboard wheel again. Crash 2! One more fix and a little further back on the leadouts. Finally, it took off.

When I finally got the leadouts right the plane was FAST. Power was an ST G15, the standard of the day. It unloaded so hard that the needle needed to be almost too rich to run on the ground. The plane got one more rebuild with a new, slicker wing.

With the plane sorted out we enjoyed a dominant season on the Midwest race circuit. Much to my pleasure, I outran John Ballard on more than one occasion. It was great!

Fortunately, these days it's not necessary to crash your way to success. Take advantage of the Line Rake analytical tool available on the NCLRA web site.

"Fly low...Fly fast..."

Bob Heywood

## **KNOTTY GIRL**

**Bill Bischoff**

Along with this issue, the PDF of the Knotty Girl Sportsman Goodyear is posted on nclra.org. I want to begin by thanking Doug Mayer for his fine work in converting my pencil drawings and hodgepodge of notes into a complete set of plans. Doug shares my affinity for Goodyear, and has several free plans and outlines available as well.

The full-scale Knotty Girl first appeared in 2009, and has undergone a host of cosmetic and aerodynamic changes over the years. The plans depict the plane as it flew in the 2014 season. The basic fuselage "bones" are from a Cassutt, and the wing is from the well known "Li'l Quickie". I'm not sure if the color scheme deliberately borrows from the GMC van on the A-Team TV show, or if it is just a coincidence.

Structurally, the model is built just like the Margaret June, featured in the June 2015 issue of Model Aviation. By the way, do you realize that there is more to the article than appears in the print magazine? If you haven't seen it, please look it up on modelaviation.com. The construction article is quite comprehensive, and even two years later I don't know that I have anything new to add.

Again, big thanks to Doug Mayer. As they say on the A-Team, "I love it when a *plan* comes together."

## **Goodyear Model Construction**

**By Douglas Mayer**

### **History & a Little bit about me:**

My very first control line mode airplane was a 1/2A shoestring built from scratch. One of the modelers in my neighborhood had plans, and taught me how to build my plane. The construction of that airplane was very simple, but it taught me how to build something from a set of plans and a stack of balsa wood. Over the years, I built many planes from scratch, and many planes from kits, but building from scratch has always been a source of pride for me. I was into airplanes until I was about 16 years old, and then I discovered skateboards, girls and beer. My last planes probably flew shortly thereafter and I spent the next 15 years skateboarding & carousing.

Fast forward about 20 years. I pursued a career in architecture, and I credit a lot of that to my early days of designing and building things, model airplanes and skateboard halfpipes to name a few.... I started modeling again in my mid 30's and I'm still at it in my mid 50's. I wrote a previous article for the NCLRA about documenting full size scale aircraft and drawing my own 3-view drawings. My subject was the race plane #12 Outrageous, owned at the time by Scotty Crandelmire. At that time, Scotty told me that there were no 3-views of his aircraft, and he let me measure every last inch of his plane and takes 100's of photos at an air show at Nellis Air Force Base in Nevada. I don't know if that article is archived or not, but the point is that I developed a process where I could take any published 3-view drawing (or create my own) and create a scale model drawing in AutoCAD. I currently have a dozen airplanes drawn to scale for Goodyear racing. I took many ideas from other kits and airplanes, but have developed a few of my own techniques for construction. I have applied these techniques to multiple classes, and currently fly all of my own designs in Sport Goodyear, AMA Goodyear, Mouse, Fox/SSR & Quickie rat.

### **FREE PLANS**

I sold many plans for my airplanes over the years, but a few years ago, I started to watch our sport starting to fade. I realized two things. First, there wasn't much of a market for selling plans. Secondly, I already did all the work and it seemed a good idea to just give my plans away for FREE and give people a resource for building their own airplanes. It still takes a lot of hard work and dedication to get your plane in the air from a pile of scratch wood and a set of plans, so I said, "What the hell!, FREE PLANS!!, come and get them!!!" This is my contribution to the sport and hobby that I love. If you are interested in FREE plans, my contact info is at the end of this article. Additionally, the plans for Knotty Girl are available on the NCLRA website for download under the "Plans" section.

### **Designs**

When I first went to NATS in 1999 and saw 20 little Quickies all lined up, I was appalled! "We need variety," I said! I have since outlined, or drawn or detailed almost a dozen Goodyear planes to date. All of them are currently in a different level of detail. I have also done a few special requests for friends. I drew Knotty Girl for Bill Bischoff, using his design techniques. I also drew Judy

and Ginny for my racing partner Jim Holland, who put his own twist on construction for British Racing rules. So what makes a good design? It depends. Different people prefer building things a different way, and there is no right or wrong. A lot of time, we improvise things as we go. Several factors are important however, and must be achieved for a good racing plane. Strength, lightweight, streamlining, durability & reliability. Most of these features should be inherent in the design of the model, but they are all dependent on the builder for proper execution and a successful racing plane.

#### **Bill Bischoff / Knotty Girl**

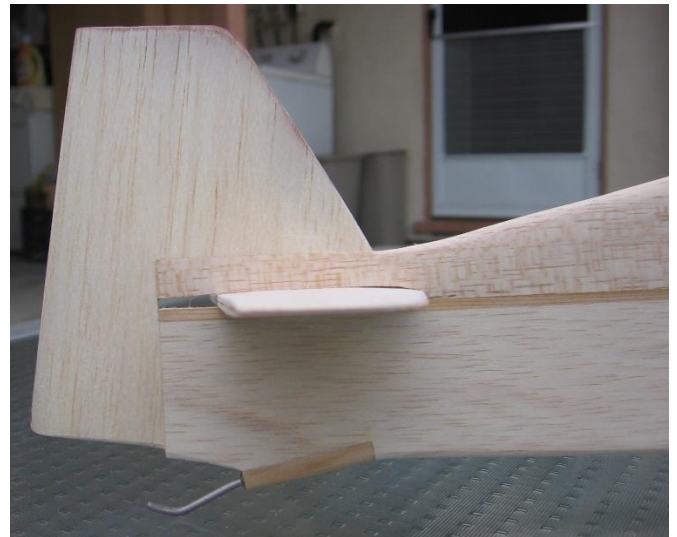
Bill has been designing and building planes for a long time. He wrote a fantastic article for AMA Model Aviation, June 2015 for Margaret June. You can find this article on the AMA website at [www.modelaviation.com/margaretjune](http://www.modelaviation.com/margaretjune). I recommend if you are interested in building race planes that you download this article and read it. You can always learn something from other people's experience. After his successful publication of Margaret June, Bill approached me and said he wanted me to draw a new subject for him. The plane is called Knotty Girl, and the drawings use the same techniques that Bill used on Margaret June. We went back and forth a few times, and I have tailored the drawings to Bill's preferred materials and techniques for construction. The plans are available for download from the NCLRA website; refer to the "Plans" section. If you are building this airplane, you can refer to the Margaret June construction article found on the AMA website.

#### **Douglas Maver / Outrageous**

My latest model that I have completed is Outrageous. This model employs all of my current building techniques. I will provide a new drawing of Outrageous or Judy Wagner's "Solution" with my building techniques to the NCLRA for download in the next several weeks. I need to finish the text in AutoCAD before I formally publish these plans.



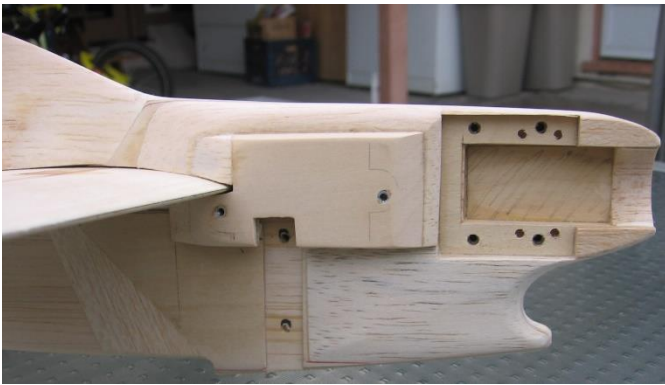
**Wing:** I make all of my wings 3/8" thick. I built a model with a 1/4" thick wing once and it was a mistake. It was way too flexible and not enough airfoil. I would not recommend it. I taper the wing from fuselage root to wing tip, and the airfoil section gets thinner and thinner as the wing progresses to the tips. I make a lead out guide from a piece of bent piano wire, and install it in the wood before I glass the wing. I also embed a lead wingtip weight before I glass the wing.



**Stabilizer/Elevator:** I have tried all kinds of hinges, but have settled on this method for all my racing planes. I laminate the elevator & stabilizer with a 1/32" plywood core, and 3/32" balsa tops and 1/16" bottom skins and use CA hinges. Do not cut out the elevator or stab outlines until last. Follow this sequence: Before laminating, cut holes in the plywood cores for CA hinges. Cut the hinge holes in the stab ply and the elevator ply, and make sure everything lines up. Also, cut your connecting wire slots. With oversize square blanks, laminate your balsa stab skins to the plywood with medium CA or thinned titebond. Be sure when laminating, not to fill your hinge cavities with a bunch of glue. You may want to clean out the holes with some paper card stock to make sure you don't gunk up your holes. Build the elevator the same way. Round or taper the leading edge of the elevator so it will pivot once you install the hinges. The trailing edge of the stab can remain square if you wish. Drill 1/16" or 5/64" holes in the wire slots for the connecting wire. Dry fit the CA hinges, and connect the stab to the elevator. Make sure everything lines up, and the parts hinge freely. Once everything is satisfactory, take some blue painter's tape, and tape the pieces together. Now you can cut the outline of the stab & elevator, and sand your parts to shape. You may want to keep the elevator in one big piece for sanding to shape. After shaping, you can cut the elevator into 2 pieces and include the installation of the connecting wire that connects the 2 halves of the elevator during this process. Take your parts apart and set aside for final assembly. The stab and elevator will be very strong with the plywood core, so I don't bother with any fiberglass. After final assembly of the airplane, I add a small piece of 1/32" plywood on top of the connecting wire to reinforce the area, and to give the control horn a solid substrate to screw thru.

**Fuselage:** It is very important for your fuselage to be strong, or you will suffer stress fractures behind the wing and in front of the stab from your pitman whiplashing the plane during pit stops from grabbing the wing. There are several solutions, which should not be overlooked, or you may even break your fuselage in half! If you look at Bill's Knotty Girl or Margaret June, you will note that his fuselage is 3/8" thick, AND he employs two spruce longerons thru the length of the fuselage. I tried for years to use a 1/4" thick fuselage with varying success until recently. I still use a spruce longeron running thru my fuselage, and a 1/4" thickness, but now I employ a big strip of 6 oz. carbon cloth along the length of the fuselage during my final fiberglassing work. Refer to my "Working with composites" article for more information. This yields the strongest damn fuselage I have ever made or seen, so I'm employing it on all my airplanes. For my





fin/rudder assembly, I use a 1/32" plywood core similar to my stab, but I use 1/8" balsa skins. I laminate the entire assembly and glue to the fuselage before I cut out the final outline. When you sand and taper the fin, you can shape the airfoil shape all the way to the 1/32" plywood core around the edges. The fin and rudder will be fiberglassed with the fuselage, more on that later. On the business end, I prefer to install a removable aluminum motor plate. This will allow you to use different engines with different mounting hole patterns by simply swapping out the plates that are made for each motor. You must plan ahead and make sure the motor plate mounting screws are well out of the way of any motor mounting screws that you may use. You will also want to make sure the cavity in the nose for the engine case is large enough to accept different engine blocks. This is easy to accomplish if you make a nice round and bulbous check cowl (which I learned from my friend Mike MacCarthy.) One of the features you will always see on my plans is the scale air scoop under the nose. Every racing plane has one, and it's a part of the scale outline, so I always draw it on my plans and build it on my planes. In fact, I use a piece of hardwood, and this serves as the lower landing gear mount, and the air scoop protects your fuselage if you ever have a mishap with the nose and the pavement. This proved very useful when my son dumped one of my planes on the ground. The prop shattered and the motor bearings were screwed up, but the airplane escaped mostly unscathed. The air scoop was scraped up, but the rest of the plane was in great shape. As far as landing gear, I use titanium gear that I got many years ago from Glen Lee. You can also use aluminum, and wheels are a matter of choice or availability. For tanks, I have always had access to tanks, or you can contact Bill Bischoff, and he will make a tank for you for a nominal fee.....(easier than making your own if you're lazy or not experienced).

**Finishing and final assembly:** I paint all of my wood parts with a coat of dope and sand everything smooth with 400-grit wet/dry paper. This is important to fill the wood grain, so your wood does not soak up a lot of epoxy from fiberglassing or painting. You can dope twice if you feel the wood grain has not filled in. It will save you weight in the end.

**Epoxy and fiberglass:** refer to my "working with composites for more info. I do not have vacuum bag equipment, so my glasswork is a low-tech approach similar to fiberglassing a surfboard. One of the most important things to consider when using this approach is taping the bottom side of the work with blue painter's tape. This is because the epoxy will ooze over the edge, and get big globs of epoxy on the bottom edge of your work. If you tape ahead of time, you can just peel off the blobs of epoxy that oozes around. This is what the surfboard guys do.

**Fuselage:** Build a jig to hold the fuselage up off the table. Fill the wing hole and stabilizer hole with blue tape as well, because if you

get epoxy in your wing slot or stabilizer slot, you will be screwed! You will have to glass the fuselage one side at a time with this method. I lay up the 6oz carbon cloth and wet roll it into place with my foam roller until it is 100% saturated to the wood. Immediately next, I lay my 2oz fiberglass cloth on top of the carbon and wet roll it until everything is saturated. I make sure the glass is fully saturated around all the edges, and let the fiberglass hang wild. I wait several hours for the epoxy to set up, and then I trim the glass around the edges with a straight razor. I like to do this when the epoxy is stiff and still a bit gummy, because it is harder to cut when its 100% cured. Let the fuselage sit for a day to cure. Flip it over, remove the tape, and prep the other side. Repeat the above process. Once the fuselage is glassed on both sides and cured, I sand everything to clean up the edges, the glass fuzzys, and all the weird stuff. You can sand into the glass a little bit too smooth things out, but don't go crazy. If you are going to paint, use one coat of primer paint, and sand your work when you are done. Final coat of paint should ALWAYS BE EPOXY PAINT! Do not skimp or substitute here. A good epoxy paint job will last for many years. The other option to painting your work is to add a coat of finished epoxy on top of your sanded fiberglass work. My Outrageous has an orange dye epoxy finish on the fuselage, which shows off the wood construction and the 6oz carbon cloth (which is intended to be part of the graphics scheme). The wing and stab/elevator and racing number on the rudder is white epoxy paint. The sequence of construction is important to think about. I did all the glass and epoxy work and epoxy finish work on my fuselage prior to installing the wing and stab. After installing the wing, I glassed it using the same technique as above, but did not use any carbon cloth on the wing. After finishing the fiberglass work, I taped off the entire fuselage, and spray primer painted, and spray finish painted the wing and stab last.

**Final assembly:** there are so many options for tanks, shut off's, bell cranks, pushrods, wires and motors and landing gear that I'm not even going to try to cover this stuff. I would say that most of this is personal preference. If you need help, or have any questions about this article, you can contact me. Also, ask someone in your club for help, or contact me or Bill Bischoff and we'll be happy to help with advice.

[douglasmayer@gmail.com](mailto:douglasmayer@gmail.com) or mobile 310-463-0525.

**On a final Note, my good friend and racing partner of many years, Jim Holland moved to England last year. He built two nice looking airplanes from my plans for British racing Rules. (Judy Wagner Solution and Ginny) He provided this narrative and a few pictures, so I thought I would share:**

Hi Doug,

Thanks for the e-mail. Please feel free to use the photos I sent you. I will try to answer your questions as fully as possible.

#### **1. Single Side Elevator**

Most Goodyear models on this side of the Atlantic use single sided elevators. I slightly enlarged the Ginny elevator from that shown on your plan so it has a root chord of around 1 and 1/8 inches. The Judy Wagner elevator is (I believe) as per plan, except it is single sided. The rule of thumb I use for this stuff is a minimum of 1 inch root chord and a minimum of 3/4" tip chord. I haven't flown the models yet, but I am confident the elevators will be fine!

#### **2. Carbon Pushrod**

3mm carbon tube. Works great. I think that Deerfly of yours was the last plane I built before switching to carbon.

#### **3. Shutoffs**

The shutoff on the Judy Wagner is soldered onto the fuel tank - it includes the fuel feed pipe to the engine and uses a plunger to block the fuel flow when tripped. The ones I use are made by Ed Needham ([the-needhams01@sky.com](mailto:the-needhams01@sky.com)). I spoke to him a few minutes ago and he will sell them to U.S. Racers. Expect to pay around \$30 plus shipping for one. The cutoff on the Ginny is a Rothwell unit (from Steve Rothwell in Australia) and is mounted on the engine plate. It is very nicely made. Anyone wanting one would need to contact Steve Rothwell directly.

#### **4. Wings**

Both models use wings built the same way and feature an internal bellcrank and line connections. (Ed. Note – hidden control similar to AMA Scale race) The front 3" of the 3/8" wing is laminated from 1/8" balsa with the bellcrank mount let into the bottom and the middle lamination being cut for the bellcrank and leadouts. A 1/8" x 3/8" (two piece) spruce spar is built into the middle lamination and runs from the bellcrank mounts on the bottom lamination through to each wing tip (actually within about an inch of the tip for the inboard wing. I route the spruce to fit around the leadouts/flying wire). The leading edge is 3/8" square spruce on both models. The trailing edge is .038" carbon rod. The rod is CA'd to the balsa after grooving its desired location using a ball point pen.

#### **5. Glass**

Everything is glassed using ZPoxxy Finishing Resin (That's what it says on the box). I highly recommend this product. I used about 2 ounce cloth on the wings and around 1 ounce cloth on the fuselages and tails. Clear coat is a gas resistant English product out of a spray can. Can't say I am too impressed with the fuel proofers I have found so far in this country and am looking for something better.

#### **6 Stab**

Both stabs are laminates of 3/32" balsa with a 1/32" ply core. Hinge slots are done the same way you do them.

#### **7. Ginny Rudder**

This may be a long answer. The Ginny rudder is a laminate of a 1/32 ply core reinforced with 18 thou preimpregnated carbon sheet on both sides (you can buy this sheet on eBay). The unit is then skinned with 3/32" balsa and sanded to shape - It is also glassed as an integral part of the fuselage. Not separately. An important point to make here relates to fuselage construction. Both fuselages were built quite differently from the usual American method. Both aircraft fuselages feature two strips of 1/8" x 3/8" spruce in them. If you visualize the side view of a Goodyear fuselage, these strips are located immediately above and below the bottom and top engine bearers (the bearers are cut away at the back so as to key onto them), so there is approximately a 1" strip of 3/8" of balsa sandwiched between these spruce strips and the engine bearers (this number will vary based on the width of your selected engine's crankcase).

The rest of the fuselage is then glued onto this balsa/spruce/hardwood laminate, so the fuselage is essentially three main pieces (top, bottom, and laminated middle) for both aircraft.

For the Ginny, the bottom of the rudder was extended about 1/4" below the fuselage joint shown on the plan. A locating groove for the entire rudder unit was cut into the top spruce fuselage strip, so the rudder would plug into the fuselage, going through the spruce and 1/8" into the balsa below it. I considered this absolutely essential in order to address the durability issues inherent with the T Tail design. The thing is that the fuselages are strong, but allow for a little bit of flex. Landing speeds for these planes in the U.K. are often quite high, so the idea is to build a durable fuselage that will take the shock loads dished out.

#### **8. Graphics**

The numbers were printed by Inkjet onto that transfer paper sold by Bel Inc. of Miami, Florida. After the ink is dry, spray the sheet with a suitable aerosol clearcoat, let it dry (again) and then apply as per a usual waterslide transfer.

Best Wishes,  
Jim Holland



**The "Ginny" and "Wagner Solution" of Jim Holland, built to the U.K. Goodyear Rules. See text for construction details.**



# Working with Epoxy Composites

By Doug Mayer

This article goes hand in hand with my Goodyear construction article. I started kiteboarding in 2000, and by 2004, I had all but quit racing model airplanes. During this time, I built four kite surfboards using a variety of foams, fabrics, bonding & filling agents, dyes and epoxy. This article gives a general overview of working with composites.

**RESOURCES** – Before getting started, you should explore your yellow pages to find out where to purchase material. I recommend going to a local retailer if possible. A good Plastics store sells cloth, resin, tools, etc. West Marine or another marine store sells a full variety of resins and tools (no cloth). Aircraft Spruce sells a full variety of foams, cloths, resins & tools. I prefer all of these venues over the hobby shop because I have been dealing in bulk items, and the hobby shops are typically geared towards smaller quantities, and usually cost a bit more than the other outlets.

**RESINS** – The most important component of a good fiberglass job is the bonding resins that you choose to use. On my first couple of airplanes before my kiteboarding experience, I used polyester resin and 2 oz. glass. I believe the resin was manufactured (packaged) by Sig. I suspect that the stuff had sat in a hobby shop for a number of years, and I never got a good cure to the finished product. It remained tacky and sticky forever and required a ton of sanding to cure the problem. I suspect that the catalyst was no good, or the shelf life was expired. Polyester resin is easily available and it's the same stuff that surfboards are made from. In my opinion, it's a bit more brittle and less durable than epoxy. I believe it is more subject to cracking. Fast forward a few years, now, all I use is West System Marine Grade Epoxy. (It is not a name brand of West Marine). West System has one Resin named 105. This resin works with all of their catalysts. They have several different catalysts. Each one is faster or slower, and the fast one has a short pot life. (pot life is the amount of time in the mixing tub before the epoxy becomes un-workable). The Fast hardener is called 205 and the slow hardener is called 206, both of these hardeners have an amber hue. This is OK, but if you want a totally clear finish, you won't get it with the 205 or 206. They also make a special hardener called 207, which they call a "Special Clear hardener". This is my preferred hardener because it is clear and has the same cure speed as the "slow 206". I have used the fast 205, but it will get hot and start to cure quickly like a 5 minute epoxy. This is probably not very desirable when you are trying to glass your plane. Last and probably the most important is the mini-pumps. West System makes a set of mini-pumps that can be screwed directly onto the metal lid of the containers. This is especially important because all of the resins and hardeners are mixed in different volumes, and the mini-pumps automatically account for these volumes in a 1:1 ratio. (6 pumps of resin = 6 pumps of hardener). After using the mini-pumps, I just leave them permanently installed on the jars. I would recommend you purchase the pumps if you are going to use the West System epoxy. **WARNING:** Do not over-mix your epoxy, or mix too rigorously because you can create many little bubbles. This warning will be on the product packaging as well. **NOTE:** West Systems epoxies are sold in different volume sizes for large projects. You can buy the smallest volumes of 105, 205, 206 & 207 and it will be plenty for many airplane projects. The mini-pumps can fit to any size can that they sell. You just have to adjust the straw on the bottom of the pumps for the size of can that you are using – it's a breeze.



**FINISHING** – The greatest advantage of working with epoxy is that the finished epoxy dries hard and glossy, it is extremely durable and fuel-proof, and does not require any sanding or painting. **NOTE:** I usually apply the glass with one coat of epoxy and let it dry. I completely sand this layer, before applying my finish coat of epoxy. Because the finished epoxy is your finished coat, (it substitutes



painting if you wish) there are many different things you can experiment with for your final colors or graphics. The plastics stores sell little bottles of dyes in a rainbow selection of colors. I have used turquoise and orange and both gave a nice color to my work. Dyes will not give you an opaque color, rather, you will end up with a transparent color, and you will see the finished materials underneath.

My Outrageous is a good example; the fuselage is covered in fiberglass with an orange dyed epoxy. I have also laminated a 6 oz. strip of carbon fiber cloth on the fuselage sides (more on that later) and you can see all the different materials. The balsa, plywood, and carbon strip, all encased in transparent orange epoxy. Another additive that you can use is graphite powder from West system. It appears to have the consistency of baby powder. When mixed with your epoxy, your finished product will be JET Black epoxy. This finish is opaque, so if you want a black plane, this will work well. West also sells some white fillers and additives that you can mix in if you want a white finish. I have never used any white fillers myself.

**CLOTH** – The best way to cut all cloth is with a good set of sharp shears (Scissors). I own a good pair of Fiscars shears that I bought at JoAnne fabrics, and I only use these shears for cutting fabrics, nothing else. I have tried to cut my 6 oz. carbon cloth with a straight edge razor blade and a straight edge (with limited success) because the threads may pull and separate. This may be OK for general layout work, but scissors are definitely your best bet.

**2 oz. Fiberglass Cloth** is the all-time best cloth for model airplanes in my opinion. The 3/4 oz. stuff is just too flimsy, and does not provide enough structural strength. On surfboards, we use 4 oz. and 6 oz. cloth, and multiple layers of glass, but for airplanes, all you really need is a good batch of 2 oz. cloth.



**Kevlar/Carbon Hybrid** – I used Kevlar cloth on one of my surfboards because the cloth had a cool looking black and red weave. I knew that my finished board would have the look of the fabric, so aesthetics was the driving motivation. I had no idea what I was in for. Kevlar simply does not cut. It is absolutely miserable stuff to work with, and would not advise it to anyone unless you're up for the challenge. It does cut somehow of course, but it will require you to buy a set of specialized hardened shears meant for cutting Kevlar. Wish I had known this before I started that project. I must say however, that surfboard was the strongest and lightest board that I ever made.....hmmmmmm, do you need a bulletproof airplane? I still have some of that stuff, maybe on my next wing?

**Carbon cloth** – I love carbon cloth. I have used it on every one of my surfboards because it is structurally superior to anything else. For my surfboards, I lay up the carbon cloth, and then lay up another layer of 4 oz. fiberglass on top to encase and protect the carbon. Every one of my boards can take a ton of punishment, and none have ever failed. I usually use 6 oz. carbon because it is relatively inexpensive (it is really called 5.7 oz. or 5.8 oz.). Purchase plain weave, not twill, which has a 45-degree angle look to it. The plain weave is normal one up and one down weave, and it is what you see on car hoods or other items with carbon fiber cloth. Unfortunately, the 6oz stuff is pretty stiff which makes it hard to use on model airplane contours. One of my newest techniques is to lay up a big strip of 6 oz. cloth along the sides of the fuselages, with a layer of 2 oz. glass on top. This will make your fuselage so damn strong. I no

longer get stress fractures in front of the stabilizer or behind the wing, and ALL of my new planes incorporate this method. The cloth must extend well past the wing and stabilizer in order to get the full benefit of the carbon. I have used it on Goodyear models and my Super Slow Rat to date. In the case of my Outrageous mentioned above, I actually intended the carbon cloth to be part of the graphics of the finished airplane. I have considered using 2 oz. carbon on one of my wings, but the cost of the 2 oz. cloth is extreme. It runs 3-4 times as much as the 6 oz. stuff and 10 times as much as fiberglass, so I have never bought the stuff. As a general note, many of the carbon stores on the internet are expensive. Compare to your local plastics store, or Aircraft Spruce online.



**Texillum** – What?? Texillum is aluminum-coated fiberglass. When you glass your board, you will end up with a metallic silver surfboard. I must say, it looks pretty damn cool. I had some leftover texillum, and was planning to use it on one of my wings, but it was too stiff and hard to work with, so I scrapped that idea. The stuff is heavy, and does not add any structural integrity, so it is merely used for aesthetics.

**TOOLS** – Having the right tools can really help make your glassing work easier. FIRST of all, use rubber [surgical] gloves!! Buy a box of 100 if you do not already have them in your shop. I buy them in bulk at Costco, or you can get them at any of the other stores that I mentioned. Cleanup all your tools with Acetone, paper towels and gloves and wear glasses! You do not want to splash acetone in your eyes. I usually buy some mixing cups or tubs from the store for mixing my epoxy, you could use a plastic salsa container or cottage cheese container, but the bottoms usually are not flat. A good mixing tub will have a flat bottom which makes mixing better. This is important for getting a good mix, especially when adding dyes or other additives. If you are inclined, you can wipe them out with your gloves and paper towels a couple of times, but they are cheap, so after a project I toss them out. Mixing sticks, they sell little plastic ones that look like a tongue depressor with a square end. I prefer to use these plastic ones, and I just wipe them clean and re-use them all the time. You could use wooden popsicle sticks if you want, but without a square end, it will not mix as well. As mentioned earlier, buy the mini-pumps if you are using epoxy. It makes mixing up a batch of epoxy a breeze with no waste and no mess. After using your pumps a few times, you will know exactly how much resin to mix up for a project. You will be glad you bought the pumps! Application: I usually just pour the epoxy directly on my work from the mixing tub. You can spread the epoxy on the wood with cheap throwaway





## PERFORMANCE TIPS FOR YOUR ASP/MAGNUM POWERED SPORTSMAN GOODYEAR

Bill Bischoff

This is NOT an article about being sneaky and cheating, so if you're disappointed, read no further. But if you want to be sure you are getting all the potential out of your model within the limits of the rules, please read on. I will assume you have a straight, mechanically sound airplane, and an engine that is not damaged or totally worn out.

First, learn to set the needle valve for best airspeed. We're not looking for a two-four break here, so don't be afraid to lean it out. There will be several indicators of a good needle setting. How many laps you get per tank is a baseline indicator. If you can't get at least 50 laps per tank, you are either too rich, your tank is too small, or you are losing fuel by siphoning or a leak. Also, pay attention to what your engine does in the last few laps before the fuel runs out. If you hear a pronounced increase in RPM, you are too rich. If the engine runs until it quits without an increasing or decreasing RPM, you are near the sweet spot. If the last few laps cause the engine to sag or slow down, you are too lean. Remember that you have a shutoff. If your engine starts to sound labored, shut it off! Once you are close, get some 8 lap times, and make fine needle adjustments per the stopwatch.

Satisfied with the results? Good, now try a different prop and do it again. We have found that the APC 6.5x5.0 and 6.5x5.5 props are decidedly the fastest, so try these first. Which of these is better may even vary from day to day with temperature and atmospheric conditions. And who knows, there may be something better that we haven't tried yet. If you find a "magic" prop, don't keep it a secret. Share the love.

Feeling adventurous? There may be some performance gain in removing one or both head shims. Tach the engine with zero, one, and two shims, this should tell you what you want to know. Whatever configuration records the highest RPM, should be test flown to confirm your results.

OK, good prop, good needle setting, now try some different glow plugs. If you are running an idle bar plug, get rid of it! Idle bar plugs rob you of 300-500 RPM. Use a standard long plug. If you have a tach, use it when you test out different plugs, and you may as well fly the fast ones first. As you fly with the different plugs, make note of the airspeed, but also note the starting qualities. Remember, a small increase in airspeed is easily negated by a few extra flips of the prop.

## SPINNER NUTS FOR THE MAGNUM / ASP 15

A spinner nut on a racing plane can serve several purposes. It protects the crank threads from damage if the model ends up on its nose, it keeps the end of the shaft from spearing the pit man's hand, and it improves the appearance (and possibly the aerodynamics?).

The Magnum/ ASP 15 has a 5mm x .8mm shaft thread. These three spinner nuts are all good choices. From left to right they are OS, Mecoa, and Tru-Turn. The OS is labelled for the 10

paintbrushes, a plastic squeegee, or foam rollers. Once I wet out the glass, I roll it smooth and uniform with a 3" foam roller. Say goodbye to that roller, you will never save it. If you are going to add graphite powder or other powder based additives, I use a kitchen screen sieve, and gently shake the powder to a uniform thickness, laying on top of the epoxy in the tub. Blend in a little bit at a time. You will find that dyes require a lot of dye to get color, and powders do not require much at all. Just mix in a little bit at a time. You do not need to go overboard.

**FOAM** – I really do not intend to get into foam too much, because we all use balsa, but for some reference here goes. Both of these foams are available at Aircraft Spruce. Divinycell foam is blue, flexible, and does not sand well. It is not difficult to sand, but has a weird plastic consistency. The problem with Divinycell is that it absorbs the resin like a big sponge and yields a very heavy finished product – not good for airplanes. Last-A-Foam is yellow, brittle and crumbly. It sands super easy, you could airfoil a wing in a few minutes. This foam is not strong at all, but when combined with an epoxy and carbon skin, it will be very strong. Basically, the foam does nothing but give the epoxy carbon skins a substrate to perform their job. This is a great foam to use because it does not absorb as much resin as the Divinycell foam, so it yields a nice strong and light finished product. I have considered making a wing from this stuff, but just have not gotten around to it. This foam comes in different thickness sheets. For my surfboards, I was using multiple layers of 1/4" sandwiched together and clamped on a rocker table to achieve the curvature of the board with a compound concave bottom. To sandwich the layers of foam, I used a batch of epoxy mixed with micro balloons. This mix was spread all across the foam with a plastic squeegee and was used as an adhesive. It worked quite well, and kept the weight down from using pure 100% epoxy.

**GLASSING** – My Goodyear article will actually get into more detail about my techniques for applying epoxy glass on my wings and fuselage.

### **SOURCES:**

Aircraftspruce.com  
Westsystem.com  
Westmarine.com

**CLOSING** – If you have any questions or want some advice, please feel free to contact me, [douglas.mayer@gmail.com](mailto:douglas.mayer@gmail.com) or mobile 310-463-0525.



FP/FSR and 15LA. The OS part # is 20824005. It is available from Tower Hobbies for \$6.99. The Mecoa in the middle is called 1/2" hex bullet spinner nut. It is part # 924-206, and is available from mecoa.com for \$3.99. The Tru Turn on the right is called "C" style, 5/8" dia. The part # is TTN-0625-C058, and it is available from tru-turn.com for \$8.95.



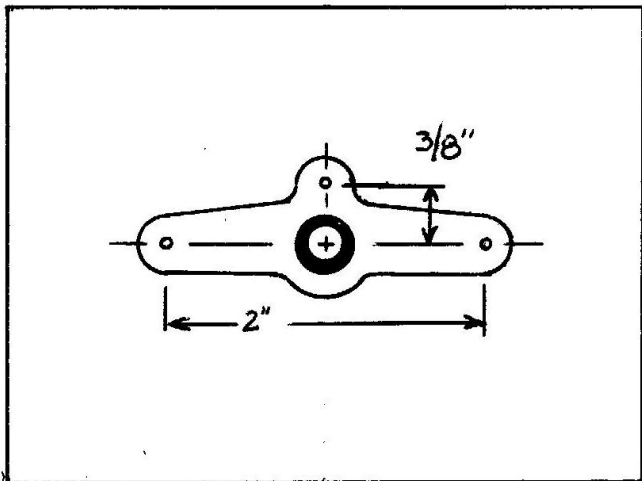
I have used all three of these, and I currently prefer the Mecoa, simply because it uses a standard 4 way wrench for installation. I use it in conjunction with the standard prop washer. They are also the least expensive, as long as you buy some other stuff to help offset the shipping. Did I mention that Mecoa is also the distributor of K&B glow plugs?

## MAKING A TWO INCH BELLCRANK

Can't seem to find a decent 2" metal bellcrank for your new Goodyear? No sweat! You can make one. All you need is a Brodak BB-379 bellcrank, a drill, and a moto tool.

Make a copy of the pattern below, and glue it to a business card or index card and cut it out. Trace it onto the bellcrank with a fine Sharpie, then trim away most of the fat with a moto tool and a cutoff wheel. Make it all smooth and pretty with a sanding drum, then drill the appropriate holes. There. Done. Nothin' to it. I knew you could do it!

FOR SCALING PURPOSES  
BORDER 4" x 3"



## CONTEST CALENDAR

**NOTE! Confirm all contest details with Contest Director!**

**NCLRA cannot be held responsible for errors or omissions!** This calendar is compiled from data collected at the NCLRA website [nclra.org](http://nclra.org) and other published sources. Members can log in to [NCLRA.org](http://NCLRA.org) and submit contest details.

### NORTHEAST DISTRICT

2017 RACING SCHEDULE

South Jersey Aero Modelers

Contest Site: Mountain View Park, Middlesex, NJ

Come out and enjoy Control Line Racing.

Inquiries...call Phil Valente-610-692-6469

5-Nov

1 OZ GOODYEAR, FOXBERG, CLOWN RACING-SPORTSMAN,

CLOWN SPEED, FOX 35 SPEED, PERKY SPEED

PHIL VALENTE AMA#16155

1523 ULSTER WAY

"WEST CHESTER, PA 19380"

(610) 692-6469

19-Nov

1 OZ GOODYEAR, FOXBERG, CLOWN RACING-SPORTSMAN,

CLOWN SPEED, FOX 35 SPEED, PERKY SPEED

PHIL VALENTE AMA#16155

1523 ULSTER WAY

"WEST CHESTER, PA 19380"

(610) 692-6469

### NORTH CENTRAL DISTRICT

None

### NORTHWEST DISTRICT

None

## MIDWEST DISTRICT

None

## SOUTHEAST DISTRICT

None

## SOUTH CENTRAL DISTRICT

None

## SOUTHWEST DISTRICT

**2017 Whittier Narrows Racing Contest Calendar**  
Whittier Narrows Park, S. El Monte, Ca., **34.042737, -118.070392**

**Oct 21-22**

**Virgil Wilbur Memorial Speed, Combat, and Racing**, sanction #17-284

All speed events including electric, 301-310 & 334,335 + perky & NASS Sport Jet & C Speed.

Combat: 75mph slow, F2D fast

Racing Sunday only: SCAR Goodyear, NCLRA Clown, Super Slow Rat/Fox Race and Quickie Rat

**CD & Speed ED: Howard Doering h.714-638-4937**

**c.714-394-5304**

Racing ED:

Combat ED:

**Dec 2-3**

**TOYS FOR TOTS Speed, Combat and Racing**

All speed events including electric, 301-310 & 334,335 + perky & NASS Sport Jet & C Speed, Torquette Speed, Hollow Log Speed.

Combat: 75mph slow, F2D fast

Racing Sunday only: SCAR Goodyear, NCLRA Clown & Super Slow Rat/Fox Race and Quickie Rat, Musciano Log Racing

Entry fee: 1 new unwrapped toy, approx value \$10-\$20.

**CD & Racing ED: Charlie Johnson**

NOTES:

1. **Contact CD or ED to confirm contest dates before traveling long distances.**
2. All Racing events Sunday only
3. Same four Racing events each contest
4. Clown will be flown on 60\u2019 lines per NCLRA NATS rules
5. Other Racing events may be flown if two entrants show up ready to race
6. Combat and/or Navy Carrier events may be added to some contests.

## NATIONAL RECORDS

SLOW RAT (.25 engine)

Op (70 laps) 3:01.52 Jim Gall/ Les Akre 7/04/11

(140 laps) 6:17.59 Russ Green/ Bill Lee 7/07/09

(no Jr or Sr record)

½ A MOUSE 1

Jr (50 Laps) 2:37.57 Scott Matson 7/15/99

(100 Laps) 5:17.68 Scott Matson 7/17/99

Sr (50 Laps) 2:44.68 Dave Rolley Jr 7/15/99

(100 Laps) 5:20.11 D.J. Parr 7/16/98

Op (50 Laps) 2:12.3 Jim Holland 7/16/04

(100 Laps) 4:22 Ryan & Gibeault 7/15/99

½ A MOUSE 2

Op (70 Laps) 3:01.24 MacCarthy/Kerr 7/11/03

(140 Laps) 6:18.13 Whitney/Hallas 7/10/09

SCALE RACING

Jr (70 Laps) 2:50.65 Bob Fogg III 7/16/91

(140 Laps) 6:08.55 Bob Fogg III 6/23/92

Sr (70 Laps) 3:15.12 Doug Short 7/11/00

(140 Laps) 5:40.05 Bob Fogg III 7/11/95

Op (70 Laps) 2:39.38 Willoughby/Oge 7/15/97

(140 Laps) 5:33.04 Bob Fogg Sr 7/16/91

F2C TEAM RACING

Op (100 Laps) 3:42 Fisher/Wilk 7/13/15

(200 Laps) 6:43.32 Fisher/Wilk 7/16/12

F2CN (NCLRA RULES)

100 Laps 4:14.84 Bill Lee/ Russ Green 7/07/11

200 Laps 8:37:10 Wallick/Brozo 7/15/13

NCLRA 'B' TEAM RACING

Op (35 Laps) 1:24.34 Burke/Duly 7/12/05

(70 Laps) 3:05.73 Green/Lee 7/10/09

(35+70 Laps) 4:33.91 Green/Lee 7/10/09

(140 Laps) 6:08.80 Green/Lee 7/10/09

RAT RACING (.15 RULE)

Op (70 Laps) 2:44.6 Jim Holland 7/15/04

(140 Laps) 5:33.1 Jim Holland 7/15/04

Jr-Sr No record established

NCLRA FOX RACE

Jr (100 Laps) 5:57.11 Scott Matson 7/11/99

Sr (100 Laps) 5:28.09 Scott Matson 7/16/02

Op (100 Laps) 5:32.55 Tim Stone/Bob Oge 7/10/05

NCLRA CLOWN RACE

Op (7 ½ Min.) 150 Laps Bischoff/ Lee 7/15/15

Op (15 Min.) 284 Laps Bischoff/Lee 7/15/15

NCLRA TEXAS QUICKIE RAT

(70 Laps) 2:58:72 Bill Lee/Bill Bischoff 7/18/13

(140 Laps) 6:07.01 John McCollum/Bill Lee 7/14/05

NCLRA SUPER SLOW RAT

(100 Laps) 5:14.30 Bill Lee/Russ Green 7/05/09

**Nelson**

**Competition Engines** 

121 Pebble Creek Ln.  
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(724)538-5282

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**ASP S15A engine \$65.00**

New in bag. (Engines came without boxes)  
Includes stock muffler and carburetor.  
Requires venturi and needle valve assembly.

**ASP/ Magnum 15 VENTURI \$10.00**

1/4" ID, 4mm spraybar, fits 10mm hole

**RSM Supertigre style needle assembly \$10.00**

**aluminum landing gear struts \$12.00**

.090" 2024-T3, drilled & tapped, with screws  
Edges pre-rounded.

**wheels and axles \$6.00**

1 1/4" Williams Bros. wheels, 1/4" axles

**1/4" axles w/o wheels \$2.00**

with hardware- requires 1/4" hole in wheels

**1 oz fuel tank per Margaret June plans \$20.00**

**bellcrank button kit \$2.00**

includes hex buttons, eyelets, screws

**fuel shutoff trigger wire \$1.00**

per Margaret June article

**fuel bottle with fill fitting 8 oz. \$10.00**

**16 oz. \$11.00**

**Deluxe fuel bottle w/spring valve 8 oz. \$14.00**

**16 oz. \$15.00**

**racing handle, 3" spacing \$25.00**

metal frame, wooden grip, stainless cable  
(other spacing available by request)

Shipping \$10.00 for orders with engines / \$7.00 per order  
including fuel tanks or bottles / \$3.00 per order without fuel  
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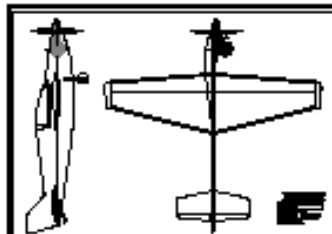


# **MAYER AIRPLANE DESIGN ( MAD! )**

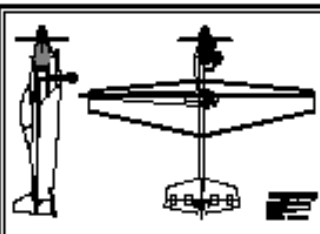
These drawings have been developed over many years, and some drawings have more details than others. I am happy to send multiple .PDF's (some with more notes and details) to be used as a guide for plans with less information. All plans are accurately scaled per AMA rules, and all stabilizers have been increased + 20% to 25% as allowed by the rules. Everything is ready to go.

All .pdf plans are FREE! email me at douglasmayer58@gmail.com, all plans are set to print at 30" x 42" full scale drawings, You will need access to a full size printer, such as kinko's, or your local reprographics shop (blueprinters) – Cheers!

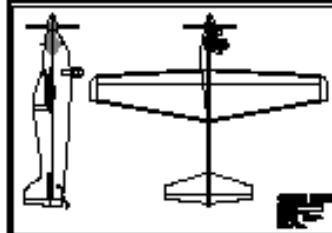
**POLECAT**  
outline only



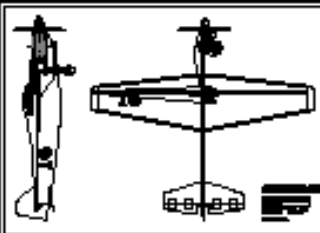
**MISS RENO**  
detailed plan



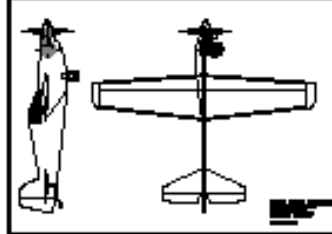
**CHICO PURO**  
outline only



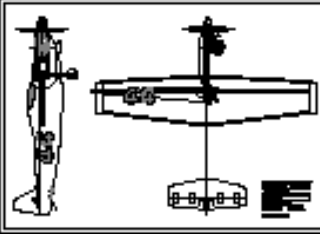
**SHOESTRING**  
detailed plan



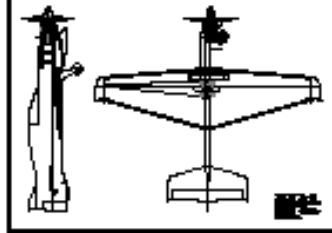
**DICK OHM**  
outline only



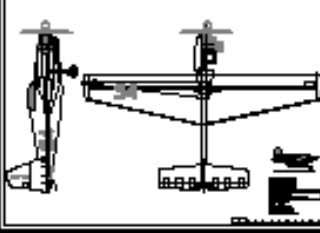
**SOLUTION ( JUDY )**  
detailed plan



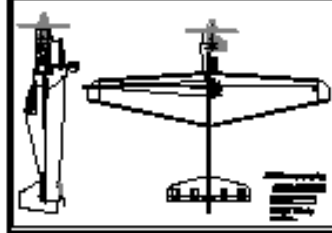
**KELLY FID**  
detailed plan



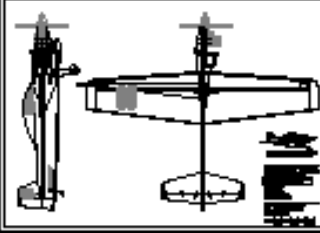
**GINNY**  
Jim Holland  
detailed plan

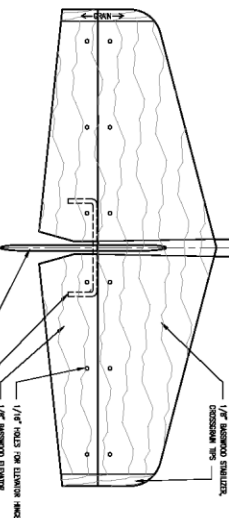
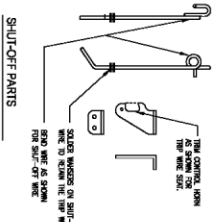
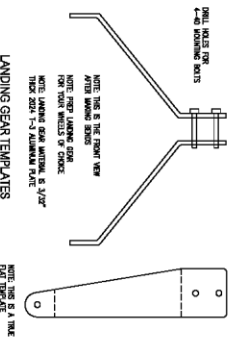
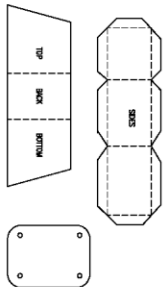
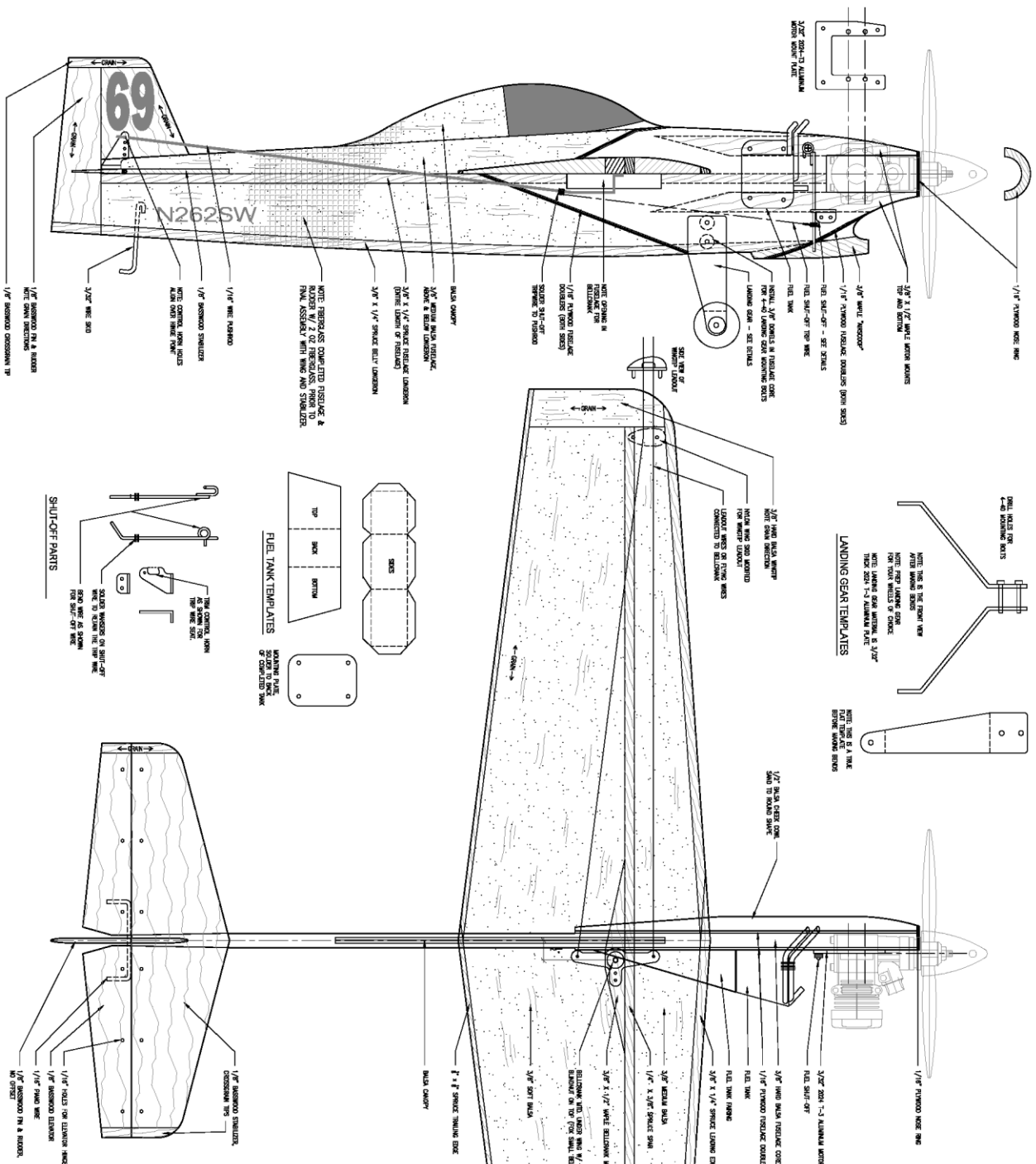


**OUTRAGEOUS**  
detailed plan



**KNOTTY GIRL**  
Bill Bischoff  
detailed plan





# KNOTTY GIRL

RACE # 69 1/2029W - PILOT PHILIP GOFFRTH  
 SPORT SCALE RACER DESIGNED BY BILL BISCHOFF  
 © COPYRIGHT 2017 BY DOUGLAS WAYER  
 FUSELAGE = 22-3/4"  
 WING = 29"  
 STABILIZER = 10-3/8"  
 WING AREA = 148.5 SQ. IN.  
 STABILIZER AREA = 30 SQ. IN.



BLACK FUSELAGE, SILVER METAL CANOPY/TURBIDECK  
 WHITE WINGS, STABILIZER & WHEEL FAIRING - 2015



PRINT PAPER SIZE 9"X 42"

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