

Flying Lines

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Longer lines for Mouse II

Class II Mouse Race is one of the most exhilarating of all control-line competition events, and is getting more so. With a rotational speed as fast as Rat Race, yet negligible pull, so that any average person (with quick reflexes) can pilot, Mouse II has always been a blast. A decent Cox Tee Dee on a properly built plane gives a pilot a grip on the tail of an 80-mph tiger. In traffic, on 42-foot lines, it's model flying mania!

However, there's a new breed of .049 engines that have taken Mouse II to a new level. The Cyclon engines are the cream of a hearty crop, capable of driving the itty bitty racers in the 100-mph range. It makes a fun event more fun, but the rotation was getting to be a bit out of hand.

As a result, the National Control-Line Racing Association has proposed an emergency safety proposal which has passed the first step of the Academy of Model Aeronautics process. The proposal has been approved for immediate enforcement, with a vote on permanent implementation to come before the Control-Line Contest Board late this year.

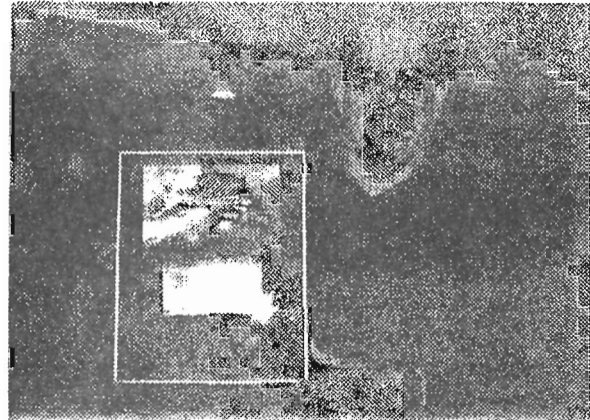
For the time being, the rule is in effect. So, if you plan to fly Mouse II this year, you need to know this:

- Lines (.010") are lengthened to 47 feet, 6 inches.

- The races have been adjusted accordingly: Heats will be 70 laps with one pit stop, features 140 laps with three pit stops.

- To further ease the pilots' chore, the pitting circle (the outer of the two inner circles) will now be at 9 feet, 10 inches (which corresponds with the FAI Team Race pitting circle) instead of the old 15 feet.

This rule change will be in force at this year's spring contests. What the heck. It was time to re-



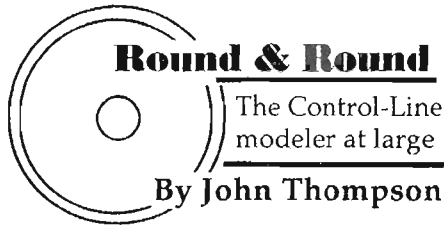
Paul Walker was given the President's Award at the 2001 Seattle Skyraiders banquet, for his B-17 stunter. And the Raiders wished longtime member Joe Dill a happy 60th. Howard Rush photos



place those old lines anyway!

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Modeling thought for the month:

"Once a job is fouled up, anything done to improve it only makes it worse."

— Finagle's Fourth Law

Shaft runs, shop follies

It was a brilliant, windless, not-too-cold January day. The frost on the lawn kept the less hardy fliers home, but there I was, out there with my pal Mr. Stooze and the venerable Cierra (600 flights and counting), boring some approximately stunt-pattern-shaped holes in the Oregon sky. Ain't life grand!

Basking in the joy of the day, I didn't pay much attention to the little breeze that began coming up between flights, and didn't bother to move the stooze location, which, when the wind arrived, was a tailwind on takeoff. True to its lifelong characteristic, Cierra let a puff of wind get under its tail on launch, while the pilot was paying too much attention to the stooze wire and not enough to line tension, etc. What sometimes amounts to a little prop shave on takeoff was a little worse this time — the plane nosed over and ground the prop right to the hub, and the reliable old O.S. .35 just kept on chugging, at a little higher rpm.

Have you ever noticed how hard it is to break the rules you've followed all your life? One rule is, never let go of the handle when the plane is not being held by someone. So there I stood with a puzzled look on my face. There's nobody around to grab the plane. How am I going to get it shut off? Can't put down the handle, in case it sets back on its wheels and takes off! Finally, the brilliant idea came to me to take the handle with me to the plane, whereupon I shut it off.

Even that was a comical enough moment. First I picked the plane up and tipped it nose-down. But with a full tank, it didn't quit. So, I had to reach around and pinch the fuel line, which I did very carefully so as to avoid the prop.

What's hilarious about this picture?

In both cases — at the handle and holding the

plane, I failed to consider one obvious fact: *There was no prop!* The plane couldn't have gone anywhere, and couldn't have cut my sensitive little fingers, even if I had dropped the handle and stuck my hand right through the place where the prop should be.

Of course, the whole episode took only a few seconds, but the picture of it in my mind afterward had me sitting there on the tailgate laughing at myself (alternating that with hurling insults at Mr. Stooze, who has been known to play tricks on launch before, even though he can't really be blamed for this one).

The post-mortem indicated some vibration damage — the radial motor mount was loosened up a little and a new fatigue crack showed up in the wing sheeting, but a minor repair will put the scruffy old bird in the air for another 600 flights.

Practice makes, uh, imperfect

We all know about practicing our flying, right? Doesn't matter what kind of competition you do, you have to fly the planes: Hundreds of stunt patterns to get every little aspect just right; hours of combat plane flying so you can be precise without looking at the plane; hundreds of pit stops so your racing team wastes no motion; hundreds of carrier landings so you can hit the deck under pressure; hundreds of times taking your speed plane apart and putting it back together so you can do that all day instead of flying (just kidding!).

But what about practice building and (gasp) finishing planes? Nope, we build each plane with the intent of making it the best ever. With stunters, each one is new and, supposedly, ultimate. Too much work in a plane to practice and not have it count.

Well, once in a while an unusual opportunity presents itself. I found myself in this situation recently, and tried to make good use of it.

I came into possession of a mostly built stunt plane with a rather checkered history. It had been originally started with the intent that it be a top-notch competitive stunter, but along the way (in going through two owners), it suffered a horrendous workshop accident. I don't know the whole story, but something had fallen on it and broken the plane smack in two — a jagged break across the fuselage and both wing panels. Surprisingly, it had gone back together pretty well, but there was a scar that would be hard to hide and it

became an attic dweller until I rescued it.

Here was the opportunity. This plane was *probably* never going to be a truly competitive stunt plane — but it *might* fly pretty well, certainly well enough to hone my flying skills with. Certainly well enough to work hard on hitting those bottoms with not much to lose! And, maybe I could use the project to learn something about the one thing that has always been elusive for me: Finishing.

So, I did the best I could covering up the scars. It was not perfect; you can still see them. Maybe Windy could have hid them, not me. But then I got to work trying different things. I used Brodak dope, and just started playing. Every wing panel has some different technique. This kind of sandpaper and that. This kind of spray pattern and that. This much thinner and more, or less. Sure, it's full of mistakes, miscalculations, and the evidence of somebody not quite sure what he was doing. But every panel and every coat and every "ugh, that's a mess!" was a learning experience.

The result was a plane that will look mediocre at a distance (an improvement for me!), and will look a little less beautiful as you get closer. By the time they get up within bifocal range, judges (if I ever enter it in competition) will have tears of laughter running down their faces.

But for me, the plane represents a real education in some of the coarser points of finishing. I hope to make use of what I learned in the next plane I try to paint.

Of course, I've said that before. What the heck, even if the planes don't come out so good, they do make pretty good fodder for newsletter columns. I'll never give up!

Speaking of columns ...

Things have definitely been looking up recently for *Flying Lines* readers and ye olde editor. We've had lots of excellent contributions of columns and single articles, and more on the way.

Besides providing excellent insight and information, the columns save time for your editor, releasing him from the yoke tied to the computer and letting him into the workshop.

A couple of items recently have really stood out for me and deserve special mention.

Ron Howell's piece last month about the value of teaming up with a father or son for racing really struck home. We've seen the Howell team, the Ryan team, the Cleaver team, all showing

how family relationships can profit by the cooperation needed in a racing team. It's not just limited to racing — we've seen it in combat and other events as well. In combat, some of the teams are in their third generation; father-son combinations are legendary: Stroms, Clevelands, Rudners, Willcoxes, Meares, Jaders, Flukers, and the list goes on.

But teamwork is not just a benefit to families — it's also a great builder of friendships. The 22 years that Mike Hazel and I have spent as the Nitroholics Racing team has created an indelible friendship that probably could not have been built any other way. There's a true pleasure in the building of a symbiotic relationship with another person that results in two minds working almost as one. You can see that with any good racing team. Each has their own set of signals, but the level of communication is obvious if you look closely. Watch Mike and me, or Todd and Mac Ryan, during a race, and you'll see volumes communicated with a glance, the point of a finger or the wave of a hand.

It can work in virtually any competition category, even those not thought of as team events: Watch the Royers in aerobatics, Potter/Parker in carrier, and others. It works in team building sessions as well. Somehow, two or three guys seem to be able to build more combat planes working together than they can singly.

Ron Howell had it right. If you can find a flier to team up with, you can do far more than double your flying pleasure. It can make your life better off the circle, too.

There's somebody out there looking for a flying/building partner. Look around!

Also worthy of note recently was Todd Ryan's racing column last month. There's no mystery about why Todd has become one of the nation's top competitors. Read his column in Issue No. 169 for some true insights that could apply to all competition categories. Winning doesn't come easy. It takes hard work. Find a winner, and you'll find a hard worker.

Speaking of hard workers, our other columnists are really generating some excellent stuff for future issues. Stay tuned for more great tips from Mel Lyne, Chris Cox, Paul Gibeault, Fred Cronewett, Bill Darkow, Mark Hansen — and more!

Send comments, questions and topics for discussion to John Thompson, 2456 Quince St., Eugene, OR 97404. E-mail JohnT4051@aol.com. World Wide Web: <http://members.aol.com/JohnT4051/NorthwestCL.html>.

Where the action is!

Coming events in Northwest Control-Line model aviation

March 10

Navy Carrier meet, Richmond, B.C. Contact Mike Conner at (604) 465-7277, e-mail conrat@intergate.bc.ca.

April 7

Nostalgia Diesel Combat, 176th Street and 8th Avenue, Surrey, B.C. Contact Mel Lyne at mlyne@alpha.sea-to-sky.net.

April 7-8

Spring Racing Tune-Up and beginners' racing seminar, Bill Riegel Field, Salem, Ore. Saturday: If enough interested people register in advance, there will be a how-to seminar conducted for novice racers, and beginners' racing events. Sunday: Open competition in Class I and II Mouse Race, Northwest Sport Race, Northwest Super Sport Race, Flying Clown Race. For info, contact CD Mike Hazel, (503) 364-8593, e-mail ZZCLSpeed@aol.com. To register for the seminar, write *Flying Lines* or e-mail JohnT4051@aol.com.

April 21-22

Jim Walker Memorial CL Contest, Delta Park, Portland, Ore. Saturday: Class I/II, .15 and Profile Carrier, Old-Time and Classic Stunt. Sunday: 80mph Combat, Precision Aerobatics. For info, contact Gary Harris, (503) 324-3450, e-mail SlowCombat@aol.com.

May 6

Carrier and Old-Time Stunt, Richmond, B.C. Contact Mel Lyne at mlyne@alpha.sea-to-sky.net. For carrier contact Mike Conner at (604) 465-7277, e-mail conrat@intergate.bc.ca. For stunt, contact Chris Cox, (604) 596-7635, e-mail ccox1@telus.net.

May 12

Nostalgia Diesel Combat, 176th Street and 8th Avenue, Surrey, B.C. Contact Mel Lyne at mlyne@alpha.sea-to-sky.net.

May 25-27

30th Annual Northwest Control-Line Regionals, Roseburg Regional Airport and Douglas County Fairgrounds, Roseburg, Ore. All AMA and Northwest CL events. 30th anniversary banquet. For info, contact Craig Bartlett, (541) 745-2025, e-mail scraigbart@yahoo.com.

June 23-24

Bladder Grabber triple-elimination fast combat tournament, Harvey Field, Snohomish, Wash. Contact Jeff Rein, 14326 102nd Ave. N.E., Bothell, WA 98011.

June 24

Racing contest for .15 Sport, Northwest Sport and Clown Race, Richmond, B.C. Contact Mike Conner at (604) 465-7277, e-mail conrat@intergate.bc.ca.

July 7

Nostalgia Diesel Combat, 176th Street and 8th Avenue, Surrey, B.C. Contact Mel Lyne at mlyne@alpha.sea-to-sky.net.

July 21-22

Central Oregon Lawn Darts Stunt Contest Field of Dreams, Redmond, Ore. Contact Nils Norling, (541) 546-9132, e-mail hogrider@palmain.com.

July 28-29

PAC Classic, Richmond, B.C. Saturday: Northwest Sport Race, Clown Race and Carrier. Sunday: Old-Time Stunt, Precision Aerobatics.

August 11-12

Can-Am Speed Championship, Upper Coquitlam River Park, B.C. For info, contact Marty Higgs, (604) 729-5286.

August 25-26

Fifth Annual WOLF Summer Meet, Bill Riegel Field, Salem, Ore. Racing, combat and precision aerobatics events to be announced. Contact CD Mike Hazel, (503) 364-8593, e-mail ZZCLSpeed@aol.com.

September 1

Bruce & Gerry's 2nd Annual 1/2A Stunt Contest, Richmond, B.C. Contact Bruce Duncan, (604) 513-9450, a.b.duncan@home.com

September 22

Nostalgia Diesel Combat, 176th Street and 8th Avenue, Surrey, B.C. Contact Mel Lyne at mlyne@alpha.sea-to-sky.net.

September 29-30

WOLF Speed Meet, Bill Riegel Field, Salem, Ore. Contact CD Mike Hazel, (503) 364-8593, e-mail ZZCLSpeed@aol.com.

October 13

Really Racing, Bill Riegel Field, Salem, Ore. Class I and II Mouse Race, Northwest Sport Race, Northwest Super Sport Race, Clown Race, AMA Goodyear, .21 Rat Race, Slow Rat. Contact CD Mike Hazel, (503) 364-8593, e-mail ZZCLSpeed@aol.com.

October 14

Fall Follies, Bill Riegel Field, Salem, Ore. Precision Aerobatics in four PAMPA classes. Contact CD Mike Hazel, (503) 364-8593, e-mail ZZCLSpeed@aol.com.

The Flying Flea Market

Classified advertisements — FREE for *FL* subscribers

FOR SALE: 2 Ea. Nelson 15 ABC FIRE, Exc., just back from Henry Nelson (new bearings, etc.) Used for FF and combat, U.S. \$135 or both for \$260; 1 Ea. Nelson 15 ABC FIRE longstack, C/W spinner, exc., low time used for GY, U.S. \$130; 1 Ea. NIB Irvine .15 MK 2 GY/FF Version, P/L chromed & fitted by Dye, fitted Nelson head, large venturi & pressure backplate, U.S. \$150; 1 Ea. NIB Irvine .15 MK 2 or speed, C/W spinner, P/L chromed and fitted by Dye, 4.9mm pipe stinger, U.S. \$185; also many excellent Irvine .15 parts for sale: heads, shims, spinners, P/L, venturis. Write for details & prices. 1 Ea original version Cyclon .15S FAI piped speed engine, Mint cond. in orig. handmade wood box W/ plexiglass top, C/W factory pan, prop, spinner, shutoff, tank & spare parts, also C/W Doc package for collectors, U.S. \$200; 1 ea. NIB Russian Cyclon .40 ABC pylon (RIRE) C/W, gorgeous 2-1/4-inch spinner, minipipe, head wrench, U.S. \$275, Paul Gibeault, 7838-120A St., Apt. 111, Surrey, B.C. V3W-5B6. Phone: (604) 99-8301. E-mail: salor@home.com.

FOR SALE: All props and plugs 25% off; Eugene Toy & Hobby, 32 E. 11th Ave., Eugene, OR 97401. (541) 344-2117, www.eugenetoyandhobby.com.

WANTED: K&B 4.9 engines and parts. Also early version of Veco Tom Tom kit. Craig Bartlett, (541) 745-2025.

AEROBATICS INTEREST GROUP: Right now — as in **TODAY** — is the very best time to join PAMPA! Your \$25.00 will see a full year's worth of the world's best CL-specific magazine (at 100-plus pages we no longer call it a newsletter!) dropped in your mailbox. Send check or money order to: Shareen Fancher, 158 Flying Cloud Isle, Foster City, CA 94404.

FOR SALE: Vintage original model airplane plans circa: 30's to 70's. Rubber-FF-UC-RC-CO2-Jetex. Send #10 SASE for list to: Jerry Campbell, 2355 SE 43rd, Portland, OR 97215-3713, phone 503-233-2194.

WANTED: Collectible quality CL speed kits. Mike Hazel, (503) 364-8593.

J & J SALES now has three sizes of "UKEY-SPORT" CL ARFs in its new line. A new 300-sq.-in. suitable for .15 size engines. The very popular 420-sq.-in. for up to .35 engines (over 300 of this popular plane sold in past two years!) A new 500+-sq.-in. for up to .40 engines. This version has nearly full-length doublers. Give us a call at (509) 337-6489 or e-mail: ukeyman@altavista.net. Price: \$50 for the .15 size, \$60 for the .35 size, \$70 for the .40 size. All planes shipped POSTAGE-FREE.

NEEDED: Seattle area fliers are training several enthusiastic new combat fliers, and they need used fast combat engines to help get them started. If you have usable Fox Combat Special MK II, IV, VI or VII engines, or Stels combat engines you'll part with, contact Tom Strom at TStrom@aol.com, phone (206) 246-4258.

COMBAT INTEREST GROUP: Miniature Aircraft Combat Association offers national newsletter with technical articles, organizes national events, keeps national combat standings, and much more. Send \$15 dues to MACA, c/o Gene Berry, 4610 89th St., Lubbock, TX 79424.

NAVY CARRIER INTEREST GROUP: Navy Carrier Society offers newsletter with technical articles, organizes national events, keeps national standings and more. Contact NCS, c/o Bill Bischoff, 2609 Harris, Garland, TX 75041. Online: President Bill Calkins at clflyer@tbcnet.com.

RACING INTEREST GROUP: National Control Line Racing Association offers newsletter with technical articles, organizes national events, keeps national standings and more. Contact NCLRA, c/o Dave McDonald, P.O. Box 384, Daleville, IN 47334. Online: <http://members.aol.com/DMcD143>

YOUR AD HERE: Remember, classified ads are free to *Flying Lines* subscribers. Send yours in today for publication in the next edition.

The Real Thing

Scale building and flying, by Fred Cronenwett

Throttle Control and Test Flying

While most control-line models have a fixed venturi with a needle valve, which means the engine runs at a set RPM until the model runs out of gas, other CL models have throttle control. I fly models that have a carburetor so that I can adjust the RPM of the engine during flight. Throttle control on a scale model is expected if you are going to do well. While it is possible to enter a scale contest with a model that does not have throttle control your odds of placing well are not good.

Throttle is mainly used on scale, carrier and sport models. If you fly combat, speed, racing or stunt you probably never really thought about it at all. The next time you have a whim to build a different kind of model consider putting in throttle control for a change of pace. You will find that it opens up a whole new range of challenges and fun.

Normal operation

Throttle control changes how you fly and what you can do with the model. Instead of starting the engine and hanging on with the engine at full bore we can reduce the RPM to an idle before takeoff. I normally warm up the engine in the pit area checking for proper operation at full throttle and at idle. Once I get into the circle I set the throttle at 1/3 to 1/2 power and start the engine. When I am ready to take off I will reduce the RPM to an idle and then start my takeoff roll.

I never fly at full throttle with my larger models; the line tension and speed would not be safe or practical. Grant Hiestand and I have flown very large CL scale models in excess of 17 lbs. After flying one of these monsters you are very glad you have throttle control. The line tension is a function of how fast you fly. I normally fly at 1/2 power that results in a nice cruise speed with the engine humming along at a modest RPM.

Now that we have throttle control, this

means that we can land with the engine running instead of landing dead-stick. Every model will land differently. My A-20 Havoc which I fly in Profile Scale competition has a pair of OS-20FP's for power with Single Channel electronics controlling the throttle. This model has tricycle landing gear and must land nose-high or it will bounce. The two main wheels must land first with the nose wheel touching the ground after the mains have touched. In fact the landings with this model are planned three laps in advance. The throttle is reduced slowly, as the speed reduces, up elevator is cranked in raising the nose. As I slow down even further, even more up elevator is cranked in resulting in a slow flying model with the nose pointed up (approx. 5 degrees) even though the model is descending. Once the nose is high enough and the descent rate is correct, I let the model settle in on the mains. Obtaining the combination of nose high, speed and descent rate is tricky and takes practice. Once the mains touch, the throttle is pulled back to full idle and full down elevator is applied. The full down elevator keeps the nose from bouncing too much. During takeoff with this model I apply full down elevator until I have enough flying speed at which point I apply up elevator and climb out. The full down elevator during the start of the takeoff run keeps the nose wheel from bouncing.

Models with tail wheels will land differently and it is hard to generalize this type of model. But the Sea Fury that I fly in .36 Profile Carrier is very easy to land. All I have to do is reduce the throttle until the sink rate of the model is ideal. If you simply go from 1/2 power to full idle when you are 20 feet above the hard deck the results will not be good. Reduce the power slowly until the model begins to sink at a rate that is safe and realistic. Let the mains touch and then reduce the power to idle and let the tail wheel settle. Then taxi up to a position close to your parking spot on the circle and shut down the engine.

Test Flying

Since we have control of the engine at all times we can land and shut down the engine at any

time. This is especially helpful when test flying new models. If you were to test fly a new scale model you just don't cram the power to full and apply full up elevator. How will the model react, will it be overpowered, is the CG in the right spot and other questions.

One of the first things I do when I fly a model for the first time is a taxi test, at low power setting. During these two laps I am figuring out if the model is going to turn in on me when I apply more power to take off. Some models that I have flown have required me to step back several steps to keep line tension on takeoff. Since the vast majority of the engines we use turn the propeller counter-clockwise the torque wants to makes the nose of the model turn to the left. This is why pilots of full size Corsairs, Mustangs and Bearcats apply large amounts of right rudder on takeoff roll. Also see if you need to apply some wheel brakes to perform the taxi option. You should be able to come to a complete stop with your engines idling to perform the taxi option properly.

After the taxi test, apply more power, let say about 1/3 throttle. The point here is the get the tail off the ground (assuming you are flying a tail dragger) and roll on the mains without taking off. This part will give you some idea how the effective the elevator will be and how the model will react. If everything is going well by now, then apply more power, just enough to fly 2 or 3 feet above the ground. If the model is stable you will be able to tell at this point. If there is a problem your prized model will only be a couple feet above the hard deck. Then land right away and evaluate how the model flew with that amount of line rake and CG location. Ask yourself, was there enough line tension, was the elevator to sensitive, etc..

After making any required changes, now is the time to really have some fun. Nine times out of 10, I make very few changes at this point. But I was test-flying a friend's Bearcat (Brodak kit) powered with an OS-26 four-stroke engine several years ago. Steve had spent weeks building this model and it could all be over if the test flight did not go well. After getting this model 2 or 3 feet off the ground it became very apparent that the CG was too far back. This model was almost unstable and dangerous to fly. Very small movements of the elevator resulted in drastic up and down movements of the model. The model finally settled down and I barely got it back on the ground safely. In fact I broke off one of the gear doors

during the hard landing. After adding some nose weight the model trimmed out very nicely.

Fred Cronenwett can be contacted by e-mail at clscale@gateway.net, or by writing him at 18375 Ventura Blvd. #173, Tarzana, CA 91356.

2001 NATS Schedule

Thinking about attending a National Championships in Muncie, Ind? If you've never been to a Nats, you'll find it worth a long drive, just to see the top competitors in the nation — and to join in with them. And the AMA's modeling museum alone is worth the trip. It has a lot of fantastic CL flying history preserved.

The CL Nationals events this year will be held July 8-14. The schedule is below. Contact AMA for details.

SUNDAY, July 8

- Racing: NCLRA Fox Race

MONDAY, July 9

- Speed: 1/2 A, 1/2 A Profile Proto
- Racing: Slow Rat
- Combat: AMA Fast

TUESDAY, July 10

- Speed: 21, FAI
- Racing: Scale Race (Goodyear)
- Combat: AMA Fast finals
- Precision Aerobatics

WEDNESDAY, July 11

- Speed: A, B Speed
- Racing: FAI Team, B Team Race
- Combat: 1/2-A
- Precision Aerobatics

THURSDAY, July 12

- Speed: Formula 40, .21 Proto Speed
- Racing: Quickie Rat, .21 Rat
- Combat: FAI, Speed Limit
- Navy Carrier: Profile, Sportsman
- Precision Aerobatics

FRIDAY, July 13

- Speed: D, Jet
- Racing: Mouse I, Mouse II
- Combat: Speed Limit finals
- Navy Carrier: Class I, Class II
- Precision Aerobatics

SATURDAY, July 14

- Navy Carrier: Skyray Carrier .15 Carrier, Nostalgia
- Precision Aerobatics (Jr & Sr), and Walker Cup

Combat Cornucopia

Combat news and views by Mel Lyne

Tee Dee Setup for Maximum Power

In the previous column on "Care and Feeding of Combat Tee Dees," I laid down some baseline parameters of 35% nitro fuel with 9% oil added and the Cox Thimble Drome 5x3 soft black nylon prop. I regularly get my Tee Dees to run at around 25,000 rpm on the ground using this combination. One of Gary Harris' Tee Dees was set up and run on the test stand, and it achieved 26,800 rpm on a slightly de-pitched Cox prop. This is exceptional but achievable with a well-fitted motor. All running is done on a bladder.

High or low pressure does not affect performance.

So you have a Tee Dee and you want it to go fast. Here is what you do.

Remove the backplate, the venturi, the glow head, the cylinder, and the piston-rod. Do this carefully, especially the cylinder. I have seen pistons ruined by a careless tool across the exhaust ports. The piston must be fully down if you put the tool across the ports to loosen the cylinder. If your motor has flats on the top fins, it is much safer to put the Cox wrench on here.

First job is to check how loose the piston ball-and-socket joint is at the con rod top end. A smidge of slop is OK. Any more and you need to reset the joint using the Cox tool. Set the piston on some aluminum sheet on flat concrete. The basement floor is good. Set in the tool and tap lightly with a hammer. Rotate the piston 120 degrees and repeat. After each tap, check if the joint has tightened up. Go carefully and increase the tap force until you have tightened the joint. It will now be stiff. Work the joint with your fingers, clean with lacquer thinner, then add oil to it ready to reassemble. Cox has a sketch and instructions that come with the tool. Once the motor is fully broken in it may need one more reset of the ball-socket joint, but only if you can hear it clicking when you flip it over. As long as I have been running my Tee Dees at low compression settings I can only recall once that I reset the joint.

Take the screen out of the aluminum venturi and drill the venturi out to 5/32" dia and smooth the inside with 320 grit emery paper. Use a pin to open the three jet holes. Clean it ready for assembly. I use lacquer thinner for cleaning all engine parts.

Now the piston. It should be bright and shiny with no gray-coloured corroded spots. If you have corrosion spots, this is bad. You must not use any abrasive on the piston. Even steel wool tends to scratch the shiny polished surface enough that it impairs performance. I have never successfully rehabilitated a corroded piston. Here is where your box of Babe Bee parts from garage sales comes in. Yes, the Babe Bee piston and rod are the same as the Tee Dee. And the closeness of fit from engine to engine is quite remarkable. So find a shiny piston and try the fit in your Tee Dee cylinder. It should just bind a touch at TDC.

The cylinder: The real Tee Dee cylinder has two inside transfer ports, each with two distinct domes as you look inside through the exhaust ports. If it doesn't have the double dome at the top of the transfer ports it is actually a dual transfer port Babe Bee called an 020 (pronounced "Oh twenty" by Cox. These run well, but not as fast as the real Tee Dee. The original Cox company used more machining operations on the Tee Dee transfer ports and the result is a better gas flow. For this reason the earlier Tee Dees tend to be faster. If you have a motor with the outside of the cylinder relieved inward below the exhaust ports it is most likely an earlier model. The earlier models also tended to have the number 1, 2, or 4 stamped in the exhaust port area.

Hopefully your cylinder is free of rust spots on the inside. Again, abrasives are not a good idea. If you are using parts from old engines, then most likely they are gummed up with castor. To clean them, soak overnight in lacquer thinners, then scrub with a toothbrush. The finish on the piston and cylinder is polished and any abrasive spoils this finish. No modifications are needed to the cylinder. But you will need copper cylinder shims available from Cox or J & J sales amongst others.

You need these shims (use the thinnest needed

to do the job) to get the exhaust ports on the cylinder lined up front and rear as you assemble the engine. This puts the transfer ports at the side where the swirling gas mixture in the case can feed them better.

The last item is a Kustom Kraftsmanship or similar fine thread needle valve assembly to make adjustments more precise. The Tee Dee one works but is a bit coarse for a high pressure bladder.

The crank should rotate very freely in the case. If it doesn't, find out why. First soak the crankcase assembly in lacquer thinner to see if a lump of gummy castor is causing binding. You can use WD-40 for this also. This should free it up. If it still has a "lump" in the crank when it is rotated, machining kerf could be behind the throw. But this is very rare in Cox engines. If after cleaning and checking it still binds, you'll have to take the crank out. Carefully use the Cox wrench to unscrew the front hub and push off the prop driver. Drop out the crank and locate the problem. Again, be very careful with abrasives. The crank bearing surface is very fine. Don't wreck it. If you spot any thin aluminum flashing pieces still attached inside the case, carefully remove them with a sharp #11 X-acto knife. The crank timing and port timing are not touched. Raising the cylinder a couple of thou to get the proper alignment actually raises the port timing, which can help. But use the minimum shims possible since as you go up, the head volume increases, lowering compression.

Assembling the motor:

The crank should be very free. If your motor has had lots of running, check for up and down play at the front end. Put a prop on and see if you can feel any sideways movement. If there is more than a tiny amount, this will seriously limit the rpms and create vibration. If the crank is loose in the case, then the engine has most likely been run hard on low-oil-content fuel. Or it could have ingested dirt.

Assuming the bottom end is good, test fit the cylinder (no piston yet) and add shim(s) to get the exhaust ports exactly front and rear when you tighten it down. Once you have the correct shims (.002", .003", or .005"), oil all the parts with a light oil, ATF, Rislone, even WD-40, and drop in the piston and rod, screw on the cylinder and tighten well. WD-40 is actually a cleaner, not a lubricant. So if you do use it to get your motor feeling nice and free, add some oil drops also. Only use

castor if you plan to run the motor soon after. Old castor oil in your motor makes it gummy. It's a good idea after you use an engine to work a few drops of ATF or similar into it. This keeps it free ready for the next time. If you do get really gummed up with old castor, a few squirts of WD-40 seems to work the best for dissolving it. Put a prop on now and flip it around. It should feel very smooth with a slight binding or drag felt at TDC. A tighter fit will take longer to break-in. If the fit is very tight, like solidly jamming at TDC, you may need to look for another piston and rod. Lapping a tight piston to fit is extremely delicate work in these motors and should be avoided. If you have no other parts to swap, then run the tight motor. With enough running it will eventually get there to the "Magic Fit" and go really fast. But with a very tight engine, you need to frequently check the ball-socket joint. Reset when it gets clicky.

Now put a low compression Babe Bee glow head on with one gasket. Squirt some 35% nitro fuel in the motor, hold the cylinder vertical and flip it over to see how it feels. Use more fuel to wash the oil out of the cylinder. The motor should have good compression. Now install the back-plate and venturi assembly and head for the metal test stand. You will need a tachometer for the following sequence.

If the piston-cylinder is new, start with 25% nitro for the break-in.

Don't forget to add the 9% oil. More if you like. If the motor is well broken in, use 35% nitro plus the 9% oil.

The Tee Dee cylinder has an extremely small amount of taper and the piston should give a seal from the exhaust ports upwards. With this amount of stroke compressing the gasses, starting is very easy if the final squish volume at TDC and the nitro content are set properly. Here is how we do this.

Assuming a well-run motor and a good piston fit: Start the motor on 35% nitro. Run it up to max rpm and Tachometer it. Record the figure. If it is less than 23,000 rpm, de-pitch the Cox nylon black prop by twisting each blade a bit near the hub. Re-tach the motor. The revs should have gone up.

Once you have the engine running in the 23,500 range or higher, you play with the compression a bit to see what makes it go faster or slower. Add one gasket and re-tach. If the revs go up, add another gasket and re-tach. When the revs fall

off you have lowered the compression too far, so remove a gasket to get it back to max revs. As soon as adding a gasket makes it run slower, go the other way. If you get a drop in rpm when you add the second gasket, remove the original copper gasket and then carefully feel the motor as you turn the prop over. If there is a "clunk" at TDC, you cannot run it without the gasket as the piston is hitting the glowhead. If it doesn't hit, run it and see if the revs go up. So this is how we zero-in on the best compression setting for your motor.

If your motor has a less than perfect piston fit, you will need to increase compression or go to higher nitro. Start by going to the Tee Dee high-compression head with three gaskets, then only two, then one. Record the revs and see which is the max. Going to the high compression head does impair the starting, so instead you might try increasing the nitro content in 5% increments. I have had Tee Dees with very little compression remaining, but they have run extremely fast if you can start them. Each engine has its own optimum compression and nitro settings. Once I have the best head setup I stick to it. In really cold weather I do run a little more nitro, but not much. The trick is to *not* overcompress your Tee Dees. When I first ran Tee Dees many years ago I copied other flyers by using 60% nitro and high-compression heads. This resulted in hard starting, hot engines, and eventually broken rods and even a piston center being blown out. Since I've gone to the low compression approach I have not broken a Tee Dee, even at 25,500 ground rpm.

If you have a low-compression Tee Dee that really runs fast, put a few drops of castor oil in the ports, flip it over, then a couple of drops of fuel as a prime. This should make it start easier. Try and avoid flooding the engines. This makes them very hard to start.

The Cox Tee Dee instruction manual that comes with the motor has lots of useful tips on disassembly techniques etc. It is worth reading.

The Cox gray plastic and black plastic props are very stiff and won't de-pitch at all. In the Cox manual they quote 21,000 rpm on these props, which is about right. The Thimble Drome black Nylon 5 x 3 paddle blade is very flexible and if de-pitched slightly runs very fast. These are the props you can get 25,000 out of.

If you dork badly in soft mud, the mud will go right through to the backplate. Try not to move the crank, and strip the engine for a good cleaning.

Tee Dees will not start with any foreign matter in the cylinder.

If your good-starting motor suddenly won't start and the glow head is good, take the head off and look for dirt in the cylinder. A small amount of dirt can usually be flushed out with WD-40.

Finally a word on another good engine. The AME engines are a fast AAC setup, but their starting is way down from the Tee Dees. I have two AME engines that have lost compression and are now in free-flight models for electric starter use only. The AME when new has a steep taper to the bore and the piston only seals at TDC. Hand starting is not that easy, and an extremely high-compression head is needed. As the aluminum piston wears a little, the seal rapidly deteriorates and hand starting becomes very difficult. The AMEs are faster and lighter than the Tee Dees, but sometimes they just won't start. And you can't win a combat match on the ground!

Good luck with your Tee Dees.

Send comments, questions and ideas to Mel Lyne c/o Flying Lines or e-mail Mel at mlyne@alpha.sea-to-sky.net



Another C.O.L.D. Day Coming in Oregon

Well, it's official. I have received the AMA sanction for the '01 C.O.L.D. Stunt Contest. Due to popular demand, the schedule will be changed a bit from last year. This year we will be having a two-day event. We'll be flying Old Time Stunt and Classic Stunt on Saturday, July 21, and the four PAMPA classes of Precision Aerobatics on Sunday, July 22.

We don't have all the details worked out yet, but we will definitely be providing lunch for contestants on Sunday once again. One of our club members has promised an Alaska salmon for the barbecue plus whatever dead-animal-du-jour we can come up with, as well as corn on the cob and whatever else we can scare up. Personally, I'm

hoping for more elk-kabobs, I'm working on it

We have all the manpower we need for the contest with the exception of qualified judges, particularly OTS judges, so if anyone wants to volunteer to help please contact me either via e-mail at hogrider@palmain.com, or by phone at (541) 546-9132. Judges eat for free whether they enter the contest or not! We do need help in this area, folks!

I will try to get flyers made up and sent out ASAP. Please mark your calendar for the C.O.L.D. contest this year. Last year was great fun and we expect this year to be even better!

The Central Oregon Lawn Darts are settled in for winter flying, building and general tinkering. Loren Anderson is working on a profile Oriental. He has a new Stuka Stunt .40 to power it. His flying has improved to the point that his trusty U-Keys are holding him back. We're all looking forward to seeing the Oriental out at the Field of Dreams circle.

Loren has also learned to make Delrin venturis and has several engines he has modified for stunt. He's been dropping liners, grinding ports & filling bypasses. All scary stuff to me but he is undaunted. His efforts are really looking promising; several of his modified engines are working very well running a strong 4-2-4 break.

Montana Marlatt has his Skyray 35 flying that he won last fall and it's well into the trimming stage. He started with a Fox .35 in the nose but it turned out to be a vibrator so we swapped in a Thunder Tiger .25 with a Loren venturi. It's working much better. Now we're working with props and lines. His flying has improved quite a lot as well and he's very much looking forward to the new season.

I'm still plugging away on my Shark 45. I hope to have it ready for the Spring Warm-Up contest in April. I'm really glad I got an early start on this airplane; it has been quite a challenge but I think it will be worth the effort. I have a new Tom Lay Super Tigre .60 to haul it around. If all goes according to plan this will be my all-purpose airplane next season, as I plan to fly it in both Classic and precision aerobatics.

We have a few new prospects here in Central Oregon that are showing interest in control-line flying; perhaps we'll have some new Lawn Darters by spring!

Till next time ...

Fly Stunt, fly often, fly safe!

The Problem with Racing

By Mark Hansen

Much has been written about the downward trend in attendance that racing suffered during the 2000 competition season, but so far not one article has attempted to address the underlying problem with racing — nonparticipation in control-line modeling in general.

Instead of verbosely expounding about how if there were a clean slate of racing events, or a standardization on the currently most popular events, run in umpteen heats and features, we should be addressing the problem of why control-line modeling has plummeted in popularity.

Before I go into the health of the control-line modeling population, I will first look at the extremely healthy population in a leisure time activity that has both individual and teams in either sporting or competitive events — tennis. For many years this was my primary hobby, in fact I progressed to the level of teaching professional, with a certificate from the USPTA to prove it. When I competed, I preferred to play doubles, because it best utilized the strengths of my game. (I know that this seems a bit off track, but please bear with me.) In the Northwest district of the USTA there were approximately 250,000 people that played tennis at least once a week, and 500,000 that played at least once a month. In the Portland metropolitan area (including Vancouver, Gresham etc.) where I was the most active, there were somewhere in the area of 25,000 tennis enthusiasts. Despite these seemingly boundless numbers, I had real difficulty finding a regular doubles partner. Of the 25k, more than 95% were *not* competition oriented players — they were casual recreational players, who had no interest in playing in tournaments. Of the remaining 5%, many factors intervened with there tournament programs, work, family, school, and other interested besides tennis. 97% of them were unable to make the necessary time commitment, to be a successful doubles team. I was always able to find a partner for tournaments, but I was seldom able to keep that same partner for more than two tournaments, let alone an entire summer. Because of conflicting schedules we were seldom able to practice regularly before tournaments, and because of this, our performance suf-

fered.

Demographically the tennis playing population is very similar to the control-line population, in the Pacific Northwest. As with control-line modelers, most tennis players are well-educated, self-motivated, hard working men and women from virtually all ethnic backgrounds.

Now lets look at the northwest control-line population. According to *Flying Lines* there are 88 people actively flying in contests. (*Actually, that number is how many people scored points in competition. There were more than 88 total competitors. — ed*) With even a smaller number taking part in racing events. Drawing from the above it is easy to see that the most popular control-line events are going to be those that are for individual competition. Those that require a team effort are going to be much more difficult for people to get prepared for and keep in practice for. With tennis every partner I had knew what the rules were and how to play the game. In control-line racing, there are many different events, each with their own rules and preparatory complexities.

But what is really missing from control-line modeling is a large population of sport flyers from which to draw contest attendance. With such a limited number of participants, almost all of who are competing, it is no surprise that the number of racing teams is waning. Even if there were a Czar of racing, he would preside over something like the population of New Princeton, Ore. If there were 1,000 people actively sport flying control-line models in the Portland area, there would be a healthy number of racing competitors, and some sort of events would evolve. Isn't this the situation that historically led to what most consider to be the zenith of control-line modeling, thousands of sport flyers spread all over the country; getting together to sport fly on weekends and perhaps travel to some sort of local contest, where winning was secondary since there was little in the way of formal rules. Just fly and have fun.

The current population of control-line modelers is attracting few new modelers (Montana Marlatt, Crystal King, Dondi Garrison), growth that is well beneath the level of attrition (death rate, loss of interest, discovery of girls, family intervenes, etc.) for control-line modelers.

Ask any paleontologist what happened to the Mammoth and they will invariably tell you that the birth rate was less than the rate of attrition. And what happened to the mammoth — EX-

TINCTION!

Instead of asking how to increase the racing population, the entire Northwest control-line community should suspend competition and concentrate its efforts on promoting recreational control-line modeling by the public at large. Once there is a healthy population of sport flyers, competitive modeling will evolve; it may not look the same as what we are doing now — but it will be competition. In order for this to succeed we will need a strong national organization, interested in promoting modeling of all types, and willing to help shoulder some of the financial burden; in tennis the USTA sponsors free lesson for children, held at city parks each year, instructors are equipped with rackets and balls and are paid a comfortable salary. The USTA claimed that these lessons reached 1.5 million children last year; that type of exposure is what takes an activity and makes it a mainstream household word. Control-line modeling is without any promotional support from our national level organizations (AMA, MACA, NCLRA, NASS, PAMPA, NCS), yet the national organizations still collect dues from all of their control-line flying members. And how about your local club, I bet they have a treasury of over a thousand bucks, which is usually spent on contest prizes or some such nonsense. Why not put that money to good use purchasing supplies for a teaching program, coordinated with your local parks and recreation department. Once you are teaching kids to fly in the park, with the government's blessing what is stopping your club from using it as a flying site — nothing.

When the parks are filled with people young and old alike, enjoying control-line modeling, there will be no problem attracting people to a racing contest.

In closing I have to ask the question, with all of the concern over the death of racing; have you done anything to promote control-line modeling? Stop competing to glorify only yourself, and start promoting control-line modeling for the betterment of your entire modeling community, and community in general.

Mark Hansen can be contacted via e-mail at FastCombat@aol.com

RPM →

Understanding engines

→ By Paul Gibeault

Fox .15 setup notes for Goodyear or Clown Racing

By Paul Gibeault

Consider the following:

Dismantle the engine entirely, clean thoroughly and deburr everything. Use an Arkansas or India stone, or a Dremel with a Craytex wheel. Do whatever it takes to get a "free" crankshaft fit in the crankcase. The shaft with all parts clean must be able to rock to the bottom every time with just a bit of forward and aft end play.

Try to find the tightest piston/liner fit and use that. Don't hesitate to mix and match pistons tight setup. If you are able, it is wonderful to relieve the top, starting the relief approximately .040" down from the top of the piston and ending up a total of .001" smaller at the very top. I have had the luxury of about eight piston-liner assemblies to mess around with (mostly used) to look for a great fit. Many seemed OK, but only a few were really strong.

For the very best performance, it most likely helps a lot to heat treat the piston to get it to grow, then refit it as required, but I really have not bothered to do this myself. I do have a procedure on file, should you wish to try it.

Fox made (makes?) at least five different types of head buttons. The good news is that the latest head shape is as good or better than anything else. However, often the button fit into the liner has .001" or more slop at the top and this is bad. Ideally, "band" the head for a snug fit (a procedure first described in print by George Aldrich, which involves making up an aluminum "band" that is shrink-fit onto the existing head. The whole assembly is then turned in the lathe for a perfect snug fit into the existing cylinder.) Or, like me, swap heads into liners until something comes close, and live with it. My best Fox uses a Gibeault/Nelson head, but perhaps that is for a later discussion.

A head clearance of .010-.012" seems good

with this latest head. Once fully broken in and racing, keep lowering it .002" at a time until you blow plugs, then back up a bit.

Break in at 20,000 rpm minimum, running rich of course, for 20 minutes, at least two minutes at a time and letting it cool. You must use a minimum 25% all-castor oil fuel with 10% nitro for the first little while, and don't ever let the engine fly continuously overlean. Use a bit lighter prop (APC 8x4 cut to 6-5/8" diameter) during this time. Stunt flying for an hour or so with a different tank is ideal for breaking in.

Reinspect the piston periodically for shiny spots and relieve as required.

That's about it. After a while you will begin to do something similar to this with all your race equipment. The really big key is not to do more harm with constant disassembly than you would by just leaving the darn thing alone! Several people who have left things alone have quite strong Foxes, such as Mike Conner and Mel Lyne.

So, work carefully with attention to detail, a gentle touch, and be careful re-torquing the screws, especially the head screws.

No guarantees at all, though, cause they're Fox! Of course, some of you know I went to ABC piston/liners in mine for Clown, but good-running iron/steel engines have done a best for me of 278 laps, which isn't bad. Mike Conner has done 268 laps and Mac Ryan did 265 once. This is the goal. As long as you don't expect 300 laps in Clown, then go for it!

I actually with Clown would go to stock, or possibly ABC Foxes, but of course that'll never fly, so carry on. Your goal is to make them work despite all the disadvantages — plus, if you're going to screw up, do it on a Fox and not on a Nelson!

Like Class I Mouse, I've made a lot of slow engines too, but the cost of failure in that class is still very acceptable, plus it taught me how to "feel" by hand to 50 millionths of an inch precision. You will learn this skill too, in time, so carry on and let's see what happens!

Paul Gibeault can be contacted by e-mail at salor@home.com

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THE COGNITIVE MODELER

Thinking about our hobby ... By Mark Hansen

Debunking Line Tension

By Mark Hansen

Before I can continue on the topic of designing a fuel tank for a control-line plane, I must first introduce the reader to the topic of line tension, and what in fact causes line tension — **Centripetal** acceleration.

Most publications rely on empirical superstition and qualitative myth to explain line tension, but a quality publication like *FL* would never water down such a fundamental topic.

In all facets of our hobby/sport, lines of differing lengths and diameters are used to restrain a wide variety of models at an even wider range of speeds. As you may have guessed, these are some of the factors effecting line tension. Here is a complete list of all of the factors affecting potential line tension.

- 1) Velocity of model
- 2) Length of lines used
- 3) Mass of model (not weight)

As I said above, these factors affect potential line tension, and it will be assumed that the model being discussed has been trimmed correctly and possesses the proper amount of leadout rake. I will also assume that the models being flown are being flown in a windless environment.

The Relationships governing line tension are as follows:

$$\text{Force} = \text{Mass} \times \text{Acceleration}$$

$$\text{Acceleration} = w^2(\text{angular velocity}) \times \text{Line length}$$

The velocity of the model is the most critical factor for good line tension, since the angular velocity is squared. The second most critical is the length of the lines, and least critical is the mass of the model.

Let's look at an example calculation for the average .35-size stunter that tips the scales at 33 oz. and is flown at 60 mph on 60-foot lines.

First we will need to convert the weight in ounces to pounds and then into slugs; slugs are the

unit of mass in the English system.

$$33\text{oz.} / 16\text{oz. per pound} = 2.06 \text{ pounds}$$

$$2.06\text{lbs} / 32.4 \text{ feet per second}^2 = .064 \text{ slugs}$$

Now before I lose all of the readers, I will digress to discuss why we are converting our weights into slimy shell-less gastropods. There are many ways to determine how much matter makes up a particular object. One way is to weigh the item. Weight is always a force whether it is a metric weight, an English weight or a troy weight. Weights are by definition all forces, and as such, these units are a mass x an acceleration. In the English system of measures, the pound is a unit of force that is made up of 1 slug x 32.4 feet per second² (all of these little superscript 2's are read as "squared"). The slug is the unit of mass in the English system and the 32.4 feet per second² is the acceleration due to gravity. Mass is the fundamental measure of how much of something is present, and does not change anywhere in the universe, here on Earth, or on the moon the mass is always the same; the weight, however, changes, with the difference in gravitational acceleration.

Now let's figure the angular velocity of the model in question. At a linear velocity of 60 mph on 60 foot lines it takes 4.28 seconds to complete one lap. Below is the calculation:

$$\text{Circumference} = 2 \times \text{lines} \times \pi$$

$$\text{Circum.} = 2 \times 60' \times 3.1415927... = 376.99'$$

$$60 \text{ mph} \times 5,280' \text{ per mile} / 3,600 \text{ seconds per hour} = 88 \text{ feet per second}$$

$$376.99' \text{ per lap} / 88' \text{ per second} = 4.28 \text{ sec/lap}$$

What's that, we have seconds per lap, and we need laps per second. Well, all we have to do is reciprocate the numbers, and we'll have the units all straighten out.

$$1 \text{ lap} / 4.28 \text{ seconds} = .23 \text{ laps/second}$$

I started the calculation with seconds per lap to allow the reader to more easily calculate the line tension of an actual model since the reader will be timing their model in seconds per lap.

Here comes the tricky part of the whole thing, and I will again digress from the subject at hand, to discuss different ways of measuring angles. There are three common ways of measuring angles:

- 1) Degrees, $360^\circ = 1$ complete revolution
- 2) Gradient, slope % = rise / run x 100
- 3) Radians, 1 revolution = 2π radians

For our purposes, we will need a measurement that has no other units applied to it. Degrees

have the annoying little "o", so that rules them out. Gradient can only measure angles in the first quadrant (and no greater than 45°) where all angles are positive, and of course, the annoying percent sign rules it out. The last, and probably most unfamiliar to the reader, the "radian," is the only one that will work for our purposes.

The confusing thing about radians is how they relate to a full circle, and this is where most problems with using them arise. When we figured out the circumference of the circle we were flying in, we multiplied the line length by 2π to find that distance. Well, radian measure is the same thing, except that the line length is a unit circle. A circle whose diameter is one unit of measure. Remember, circumference = 2πr, well in the case of radians the "r" is equal to one and can be ignored.

Henceforth, there are 2π radians in a complete circle. The reader will also notice that there are no units to the numbers, just two and Pi.

Converting our angular velocity from laps/second (to radians per second) is a fairly straight forward process. Simply take the lap/second and multiply it by the 2π radians/lap and we are left with radians/second.

.23 laps/second x 2π radians/lap = 1.45 rad. / sec. = w

Now for the moment we have all been waiting for, the calculation of actual potential line tension. Take the angular velocity and square it and multiply it by the line length and we will have the acceleration due to being captive in a circle — or as we physics types call it, *centripetal acceleration* (there is no such thing as centrifugal force).

$$w^2 \times \text{Line length} = \text{centripetal acceleration}$$
$$(1.45 \text{ rad./second})^2 \times 60' = 126.15' / \text{second}^2$$

Now if you remember way back up at the beginning of this little discussion we said that force is equal to mass x acceleration, or if you prefer $F = m \times a$.

With our plane tipping the scales at a mere .062 slugs we have the potential to have 7.82 pounds of line tension (or 7.82 lbs of centripetal force).

.062 slugs x 126.15' / second² = 7.82 slugs/sec.² (remember these are the units that make up a pound)

In closing I think it bears mention that the very best way to increase line tension is to increase your angular velocity, by increasing your linear

velocity. The second best way is to increase your lines in length and maintain the same angular velocity. The worst way to increase line tension is to increase the mass of your model.

In my next article I will bring all of the concepts of centripetal acceleration into designing a task-specific unflow tank.

As always please feel free to ask me any questions you may have about any of the above, by e-mailing me at FastCombat@aol.com. Keep those line tight.

Just for the **FUN** of it!

By Bill Darkow

There's No Business Like Show Business

By Bill Darkow

When you fly as part of a control-line show team, you have just entered the world of entertainment. It's quite different from fun-flying for your own enjoyment or to impress your colleagues. You're now trying to put on a show that will impress the spectators — most of whom have never seen a CL model perform — with what a great sport CL modeling is and how much fun and thrilling it can be. The circle is your stage. The models are your props. You're in show biz!

I like to think of show team flying as guided by four Elements — (1) Entertainment, (2) Education, (3) Enlistment and (4) Enjoyment.

Entertainment is basic. Without that element, there is no show. It's just some people flying model airplanes and some other people watching them. Your "routine" — the models you fly and the way you fly them — should be determined by their entertainment value to the spectators. We all enjoy watching someone perform a good aerobic pattern, but what's in it for the uninformed spectators? A good public address announcer is a big help, but how much of a pattern will spectators watch before walking away? Types of models can make a difference — a sleek precision aerobatics plane, a biplane, a flying wing, etc., can boost entertainment values.

I'm sure you can come up with all kinds of acts

that have high entertainment values but remember, someone has to perform them. That's why it's called a show *team*. Team Manager Jim Cameron and I welcome your suggestions and will consider them to see if they can be worked into the team's routine. We now have enough team members and shows scheduled to put on a different routine at each show if we want to.

Education is the information given to spectators and how it is delivered during and after each flight. Let's hope we're lucky enough to come up with a good announcer at each show. When your flight is over, it's a good idea to bring your plane over to the display table and hang around for a while to answer questions. There are usually plenty of them ranging from the frivolous to the serious. Try to treat them all with respect. Remember, most of the spectators have never met a CL flier up close and personal before.

Enlistment can be tricky. The most obvious method — put a handle in someone's hand and let them try it for themselves — usually works only with the kids and we are not permitted to do that at some shows. A copy of our Fireball brochure and an invitation to attend one of our Sunday afternoon flying sessions at East Delta Park might be a good tactic. An interested spectator could be informed of our Web site and, if they're willing to part with their name and address, a complimentary copy of our newsletter might be a good follow-up. Each of us should use his own favorite method of trying to recruit someone for the sport.

Enjoyment. Yours. Good show team performing is a lot of hard work, so make sure there's enough fun in it for you to make it worth your effort. We already enjoy some goodies like free admission to air shows and aviation museums, the occasional treat to a hot dog and ice cream sundae, etc. Caroline and I plan to host the now traditional season-ending barbecue at our place on September 9th. Talk with Jim or me if you have any ideas on how we can improve our "fun factor."

As they say in show biz — break a leg!

SPREAD THE WORD!!

Flying Lines is most effective at spreading the CL word when everybody's on board. You can help spread the word.

You can get cool *FL* stickers for your tool box or planes by requesting them from the editor. A \$1 donation per sheet of stickers helps defray the cost. They'll make you part of the *FL* crew!

Learn about racing!

Control-line racing is one of the most varied and interesting forms of model aviation competition. It offers events for all modeling skill levels, a natural progression up the skill ranks, and lots of fun at every level. It's one of the easiest of competitive events to get started in, and yet offers challenges for the experienced modeler. Best of all, there are no secrets! Racing competitors are happy to share their knowledge with anyone interested in learning about the activity.

And here's your chance to get the expert racers' full attention!

Northwest racing experts are planning a **racing seminar and novice race day** as a preliminary to the April 8 racing meet in Salem, Ore. If enough pre-interest is shown, top racing teams will be in attendance on Saturday, April 7, to show off their equipment, demonstrate techniques, and assist novices with their equipment, piloting and pitting skills. Races will be held for the novices, with the experts assisting and advising.

Important: Because this event will be bringing out volunteer racing experts a day earlier than their contest, it depends on **pre-registration**. The seminar portion of the weekend will only be held if sufficient interest is shown in advance.

If you are interested in attending and learning at this event, contact the FL editor by e-mail or by mail, and let us know of your interest! Status of the activity will be announced before the weekend.

This is your chance to get started in a great CL activity. Don't miss out!

Flyaways

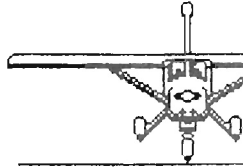
Random tips and ribs from
the *FL* workshop floor

We're not alone in our difficulties in keeping our planes separate from the hard, cold earth. A recent news article reports that a helicopter crash that killed a Northwest newspaper publisher was the result of pilot error. According to the National Transportation Safety Board, the pilot's error was "the pilot's failure to maintain clearance from terrain." Tell us about it.

Tell Bruce: Our AMA District Vice President, Bruce Nelson, wants to hear about CL activity. Send him your news for *Model Aviation*.

The 30th annual...

Paul Agerter Northwest
Control-Line Regionals



May 25-26-27, 2001

The West's *biggest*
control-line model aviation event

CL COMPETITION AT ITS FINEST!

With **43 events** and **132 trophies**, the Northwest Regionals provides the largest selection of CL competition events and awards available in a single contest in North America.

You can compete
in these great championship events:

- AEROBATICS — 4 PAMPA classes, Old-Time Stunt and Classic stunt!
- COMBAT — AMA, Slow, 1/2-A, 80-mph official, Vintage Diesel fun fly!
- NAVY CARRIER — Profile, Class I, Class II and .15 carrier!
- RACING — Mouse I&II, Rat, Slow Rat, Goodyear, NW Goodyear, NW Sport, NW Super Sport, Clown, B-Team and Quickie Rat!
- SCALE — AMA Precision, AMA Sport Scale and Profile Scale!
- SPEED — 1/2-A, 1/2-A Proto, A, B, D, FAI, Jet, Formula 40, .21 sport, .21 Proto, NW Sport Jet!
- JUNIOR EVENTS — Northwest Sport Race, Class I Mouse Race! **SPECIAL JUNIOR PRIZES!**
- FLOAT-PLANE — Schneider Cup and Open Seaplane, plus scale flights on the pond!

Enjoy The Regionals at Roseburg Regional Airport!

Smooth paved surface ... Ample parking ... Camping and RV space ... Rest rooms
On-site hobby shops ... Food concessions ... Motels and restaurants nearby!
TROPHIES ... MERCHANDISE PRIZES ... GRAND CHAMPIONSHIP TROPHIES
Camping and practice circles at Douglas County Fairgrounds, off Interstate 5 at Exit 123

Be sure to attend the 30th Anniversary commemorative banquet!

Details to be announced at registration.

Be sure to check the back of the flyer for schedule and rules details. The flying site at Roseburg Regional Airport is just off Interstate 5 Exit 125 in north Roseburg.

Contest Director Craig Bartlett, 205 N.E. Cedar Lane, Corvallis, OR 97330
(541) 745-2025, e-mail sraigbart@yahoo.com

The Northwest Regionals are brought to you in part by
Eugene Toy & Hobby, (541) 342-4414, www.eugenetoyandhobby.com

The Paul Agerter Northwest Control-Line Regionals

Roseburg Regional Airport, Roseburg, Oregon

SCHEDULE OF EVENTS

<u>FRIDAY</u>	<u>SATURDAY</u>	<u>SUNDAY</u>
Speed (all classes) 10-6	Mouse Race I (Jr.) 8:30 a.m.	Prec. Aerobatics 8:30 a.m.
Scale and Schneider	1/2-A Combat 8:30 a.m.	Scale flights * 8:30-4
Floatplane flights * Noon-4	Carrier (all classes) 8:30-5	Floatplanes * + 8:30-4
	Speed (all classes) 8:30-5	AMA Combat 8:30 a.m.
	Floatplanes * + 8:30-5	Goodyear 8:30 a.m.
Slow Combat Noon	Old-Time Stunt 9 a.m.	Slow Rat Race 9:30 a.m.
	Scale static judge 9 a.m.	NW Sport Race (Jr.) 10:30 a.m.
Northwest Goodyear 12:30	Mouse Race I (SO) 9 a.m.	NW Sport Race (S-0) 11 a.m.
Carrier (all classes) Noon-5	Mouse Race II 11:30 a.m.	NW Super Sport 2 p.m.
Flying Clown Race 2 p.m.	Classic Stunt 12:30 p.m.	
B-Team Race After Clown	80mph Combat After 1/2-A	
	Rat Race 2 p.m.	
	Quickie Rat After Rat	

SCHEDULE NOTES

Registration Friday 8 a.m.-5 p.m., Saturday and Sunday 8 a.m.-noon. Enter early, but not before opening time!

Diesel combat is an unofficial fun-fly activity, permitted all weekend as time allows.

* *Scale flights*: Floatplanes scale flights: Friday on the pond. Non-floatplane flights: Sunday.

+ *Open and Schneider flights* Saturday and Sunday 8:30-5 on the pond. Scale floatplane flight judging Friday only.

No flying before 8 a.m. any day.

Float plane fun-fly Wednesday-Friday and Monday on the pond.

RULES INFORMATION

- AMA events are per new **1999-2001 rule book**, except as noted below. **Know the rules!**
- Official Northwest Rules will be used for the following events: *NW Sport Race, NW Super Sport Race, NW Goodyear, Flying Clown Race, B-Team Race, 15 Carrier, 80-mph combat, Northwest Sport Jet Speed and Floatplane events. Quickie Rat will use NCLRA rules.* For complete rules, write John Thompson, 2456 Quince St., Eugene, OR 97405, JohnT4051@aol.com. **Not knowing the rules is no excuse — get a copy now!**
- **COMBAT** — All official events flown double-elimination. **FLYAWAY SHUTOFFS: Failure of a shutoff results in disqualification from the event.** Be sure that yours works!
- Precision Aerobatics Model Pilots Association rules will be used for *Old-Time Stunt* and *Classic Stunt*.
- **Safety things required in all events.**
- Contestants may at some times be required to assist in timing or judging.

OTHER INFORMATION

- AMA or MAAC membership required for all participants. AMA membership available at registration.
- Only participants and officials allowed in flying areas. All others must stay outside roped-off or restricted areas.
- Absolutely no alcoholic beverages on flying field during meet hours.
- Awards — Trophies and merchandise through third place in each event and age grouping, and first- through third-place grand championship trophies. **Approximate value of awards: \$3,000.**
- ODOT parking lot across the street from the airport opens at 4:30 p.m. Friday — not before!
- **Product vendors contact Contest Director for permission and site info.**

FOR MORE INFORMATION, CONTACT:

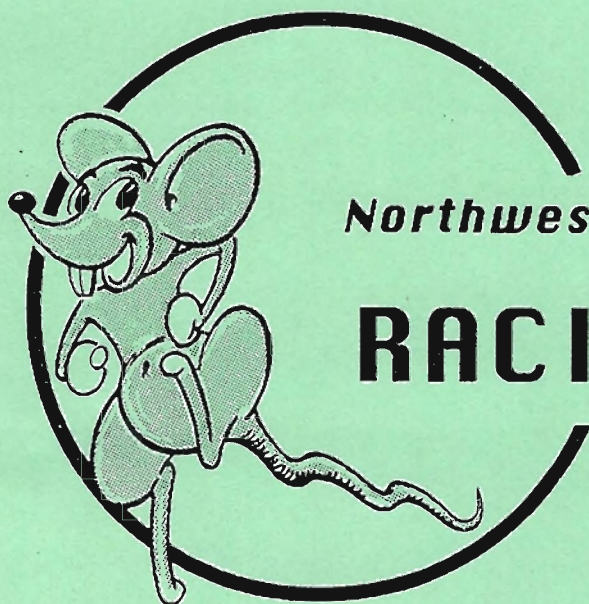
Contest Director Craig Bartlett, 205 N.E. Cedar Lane, Corvallis, OR 97330 — (541) 745-2025

SPECIAL ROOM RATES AT OFFICIAL HOTEL — THE WINDMILL INN

Near the contest site — (800) 547-4747

Mention "Northwest Regionals"

the **WESTERN OREGON CONTROL LINE FLYERS** present the



Northwest Control Line

RACING TUNE-UP

April 8, 2001
Salem, Oregon

The Events:

AMA MOUSE RACE CLASS I
AMA MOUSE RACE CLASS II
NW FLYING CLOWN RACE
NW SPORT RACE
NW SUPER SPORT RACE

The Details:

Contest is A.M.A. class 'A' sanction #01-0630
A.M.A. membership required of all participants, available at registration
Contest site is Bill Riegel Model Airpark, located at the Salem Airport
All events will be flown under current A.M.A. and Northwest region rules
Note: New line requirements for Mouse II are 47' 6" length
Registration opens at 9 AM with events in above order starting at 10 AM
Special Note: There will be a practice session / racing seminar on
Saturday the 7th. All novices and experts encouraged to participate!

For More Information:

John Thompson 541-689-5553 JohnT4051@aol.com
or
Mike Hazel 503-364-8593 ZZCLspeed@aol.com

**WESTERN
OREGON
CONTROL
LINE
FLYERS**

WOLF
1073 WINDEMERE DRIVE NW
SALEM, OREGON 97304

ACADEMY OF MODEL AERONAUTICS
CHARTER CLUB #3464





Jim Walker Memorial Control Line Contest

April 21 - 22, 2001

E. Delta Park - Portland, OR

Exit 306-B off I-5

SIX Stunt Flying Events!

Old Time & Classic - Sat. 10am-4pm

"FIRECAT" design is legal for Old Time Stunt

(Kits available from Frank Macy (503) 657-9902 and TCI Hobbies (800) 606-0097)

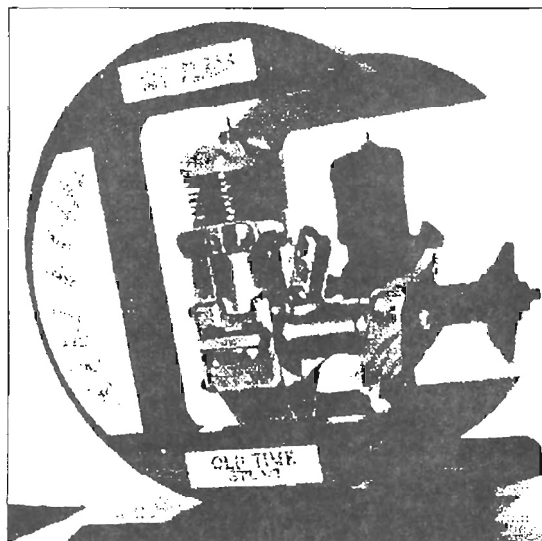
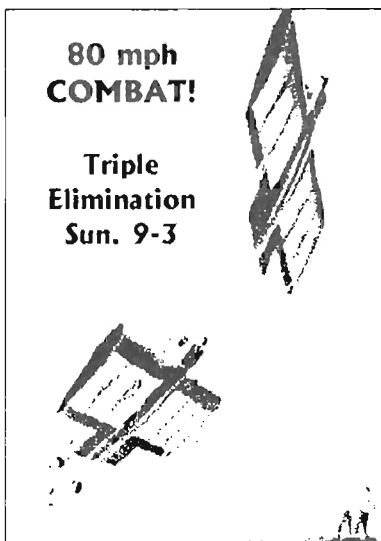
Precision Aerobatics - Sun. 9am-3pm

Beginner, Intermediate, Advanced, Expert

Approved by Academy of Model Aeronautics

Contestant must have current AMA license.

Contest Director: Gary Harris (503) 324-3450



Custom-crafted by Dave Baxter

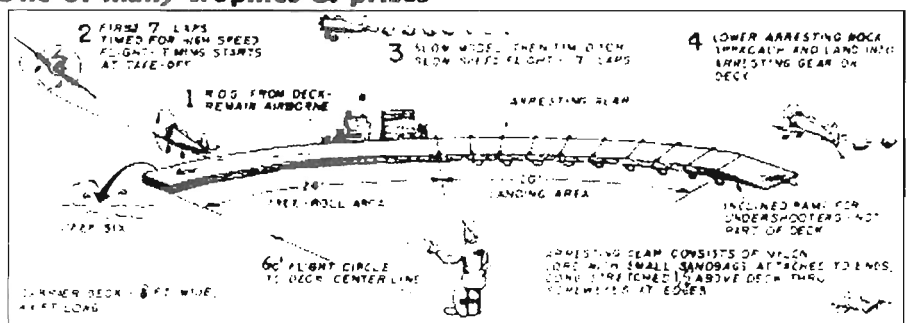


One of many trophies & prizes

**THREE
Carrier Events!
Class 1&2 Comb.
Profile**

Northwest .15

Saturday Only - Autogyros permitted



Entry fee = \$10 for 1st event, \$5 for 2nd event, \$20 for 3+ Jr., Sr., Open Combined. Prizes for highest placing Jr. & Sr.

FLYING LINES

2456 Quince St.
Eugene, OR 97404

FLYING LINES is produced by a staff of dedicated volunteers interested in keeping lines of communication open between Northwest region control-line model aviators. *FLYING LINES* is independent of any organization, and is made possible by the financial support of its subscribers.

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Contributions for publication are welcomed. Any material submitted to the editor which is not for publication should be indicated as such. Duplication of contents is permissible, provided source is acknowledged.

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Rush to:

First Class Mail